Eliciting project managers’ perceptions regarding economic sustainability incorporation on construction projects: a Bloemfontein case study

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Abstract. The operationalization of sustainable construction [SC] practice poses a challenge in South Africa. Seemingly, there is an overt concentration on some SD dimensions during decision-making by project managers. Yet, successful operationalization requires the incorporation of all SD dimensions in an integrated manner with trade-offs made to accommodate project peculiarities. To date, a paucity of literature eliciting perspectives of project management professionals within Bloemfontein on the consideration of economic sustainability in SC practice has been observed. This study seeks to explore the perspectives and understanding of project managers on economic sustainability and to identify the factors influencing the prioritization of economic sustainability aspects to secure satisfactory trade-offs.

A qualitative case study research design using semi-structured interviews was used to elicit data from a purposively selected sample of project managers working within Bloemfontein. Qualitative content analysis (QCA) was utilized for data analysis. Findings confirmed that although project managers have an appreciable level of understanding concerning economic sustainability in SC, they lacked an understanding of how to motivate for its prioritization when compared to environmental and social dimensions. It is expected that these studies’ findings will contribute to the growing literature on the incorporation of sustainability dimensions within the construction projects.

Keywords: Bloemfontein, Construction industry, Economic Sustainability, Sustainable construction, Project Managers

1. Introduction
The construction industry plays an integral part in sustainable development. It involves different stakeholders who produce, develop, plan, design, change and manage the built environment [1]. The construction industry affects the environment, economy, and society. A sustainable construction industry must ensure a healthy, safe, and productive built environment. Project managers are considered integral in the quest for sustainable construction [2]. Du Plessis [3] defines sustainable construction as a process that seeks to restore and maintain harmony between the natural and built environments. It creates settlements that affirm human dignity and enhance economic equity. Kibert [4] alludes that sustainable construction involves the consideration of sustainability tenets across the building life-cycle phases of planning, construction, maintenance, renovation, and demolition. It plays a significant role in the creation and operation of a healthy built environment with the focus on resource efficiency and ecological design. Yin [5] highlighted major areas for sustainable construction practice to include, compliance with legislation pertaining to sustainability, design and procurement, technology and innovation, organizational structure and process, and education and training. The sustainability dimensions must be incorporated into construction management for the operationalization of sustainable construction practices. For instance, relating to the social dimension, improvement of the quality of life for humans is crucial. This includes to take catering for the basic needs of people, beyond comfort, identity, and choice.

Social sustainability is referred to as the precondition of economic sustainability [6]. Economic sustainability is viewed as an important aspect of sustainable development as it requires the creation of
new markets and opportunities. Economic sustainability includes the maintenance of high levels of economic growth which is achieved through improved project delivery, increased profitability, and productivity [7]. Environmental sustainability helps in reducing the use of energy, water, materials, and land in the construction industry. It promotes the usage of renewable and non-renewable resources. At global and local levels, it minimizes pollution and damage to sensitive landscapes. Environmental sustainability creates a healthy and non-toxic environment. A comprehensive plan of action is required in the project life cycle to achieve environmental sustainability in construction projects [8]. Based on the foregoing, it can be discerned that sustainable construction involves the quest to find a balance between social, economic, and environmental dimensions in the construction industry. However, it is evident that different dimensions have been prioritized to the detriment of other dimensions by project managers during the delivery of construction projects. This negates the principles of sustainable construction. This prioritization of certain dimensions over another has been attributed to the level of knowledge or perception of the project management team (PMT). This necessitates an investigation into the various perceptions of the PMT. But a paucity of literature eliciting perspectives of project management professionals within Bloemfontein on the consideration of economic sustainability in SC practice has been observed thereby making this study, imperative.

To achieve its objective, the rest of the paper is structured accordingly: theoretical perspectives: a literature review of the following aspects: sustainable development and sustainable construction; incorporation of the sustainability dimensions into construction projects; justification of the research methodology deployed; presentation and discussion of results; and conclusion.

2. Sustainable development and sustainable construction
The terms, “sustainable development” and “sustainable construction” are two sides of the same coin. To understand the meaning of sustainable construction, an explanation of sustainable development must be given. The term “sustainable development” refers to the development that meets the needs of the present without compromising the ability of future generations to meet their own needs [9]. This definition implies that the development must ensure that everyone has a better life at present and the future generation must be considered. Different scholars define sustainable construction differently as it is a cross-cutting concept. Ametepey, Aigbavboa and Ansah [10] define sustainable construction as “subdivision of sustainable development and its application to the construction industry” (1683). Since construction industry involves different stakeholders in planning, developing, producing, designing, maintaining the built environment, Langston et al. [11] described sustainable construction as a component of sustainable development that includes tendering, site planning and organisation, selection of construction materials, recycling and minimization of waste. According to Kibert [12], sustainable construction is a process that creates a healthy built environment using efficient resources and ecologically based principles.

Yılmaz and Bakiş [6] refers to sustainable construction as an “application of sustainable development principles to a building life cycle from planning the construction, constructing, mining raw material to production and becoming construction material, usage, destruction of construction, and management of wastes. It is a holistic process which aims to sustain harmony between nature and constructed environment by creating settlements which suit human and support economic equality” (2258). Aigbavboa, Ohiomah and Zwane [13] views sustainable construction as an achievement of sustainable development within the construction industry. It is also viewed as one component that creates a holistically, sustainable environment. Also, Aigbavboa et al. [13] mentioned that the desire to commit to sustainability practices is driven by the adoption of sustainable construction which includes financial incentives, legislation, and the demand of clients. In this case, the perception of project managers regarding the aspect of economic sustainability is to ensure that value is added to the quality of life for the individual and the community.

Reffat [14] explains that sustainable construction implies not only new environmentally oriented construction design, but also new environmentally friendly operation and maintenance procedures. Not
only must construction materials and components be produced sustainably, but their use must also be employed to new requirements derived from the holistic environmental prerequisites. To improve the quality of the construction processes and products, sustainable construction considers: (i) reducing building material wastage and thereby reducing global material consumption, the amount of construction demolition and process waste; (ii) increasing the use of recycled waste as building materials because this is a convenient way to reduce the environmental impact of the construction industry; (iii) improving building energy efficiency by cutting down both consumption and embodied energy; water conservation utilised as a combination of user education, design and technical changes with improved water metering systems, rainwater harvesting systems, re-using water, waterless technologies and low flow, aerated and self-closing faucets are suggested; and (v) durability and maintenance which aims at increasing knowledge on the service life of the built environment as well as generating and managing life data since it is a major challenge for achieving a more sustainable construction industry [14,15, 16].

Shrivastava and Berger [15] highlighted the principles of sustainable construction. Further, they explained that they are mostly concerned with encouraging construction industries to move to be sustainable, use natural and human resources, operations, products, and waste management. Zuofa and Ochieng [17] identified different principles applied in sustainable construction. Highlighted principles of sustainable construction include the minimization of resource consumption, maximization of the re-use for resources, usage of renewable and recyclable resources, creation of non-toxic and healthy environments and good quality of built environments [18]. Scholars further emphasised that sustainable construction principles will be best achieved if the project managers reach consensus and compromise in their projects. From the foregoing, Brooks and Rich [19] indicate that awareness of the sustainability concept in the construction industry has increased. Despite the benefits and principles identified, the construction industry is faced with challenges in achieving sustainable construction. Lack of capacity to implement sustainable practices within the construction industry is seen as a salient barrier [14]. According to Zuofa, Ochieng and Burns [20], awareness of sustainability issues by some project managers in the construction industry is still lacking and economic success is affected. In addition, lack of limited public awareness, commitment by top management, and sustainable practices contribute to challenges negating the implementation of sustainable construction [20, 21]. Scholars such as Ametepey et al [11] indicate that other barriers in sustainable construction implementation include financial, political, managerial, technical, socio-cultural aspects and knowledge.

Sustainable construction integrates fundamental pillars of sustainable development; economic, environmental, and social. These pillars of sustainability can be incorporated in construction projects because they have benefits such as environmental responsibility, social awareness, and economic profitability for the society [11]. Therefore, for sustainable construction to be successfully operationalized, the project managers must be able to ensure that the incorporation of sustainability tenets into various phases of the project lifecycle occurs in an integrated manner. However, this has not been the case, as project managers have sought to prioritize certain dimensions over the other thereby negating the quest for sustainable construction. Given that this has been attributed to the extent idiosyncrasies of project managers as it concerns sustainable construction practice, this study seeks to explore the perception of project managers concerning the incorporation of economic sustainability tenets within their projects, albeit using a Bloemfontein exemplar.

3. Research Methodology
The study adopted a qualitative case study research design. According to Creswell and Poth [22], a case study research design allows the researcher to explore a bounded system and to collect data about the phenomenon being studied. In this instance, semi-structured interviews were employed for data elicitation at different intervals. Bernard and Ryan [23] describe semi-structured interviews as a data collection technique that emphasizes similar and not identical questions being asked to the same sample size. In this case, individual semi-structured interviews were conducted with purposively recruited project managers within the Bloemfontein area. An interview protocol was developed with different themes for the interviewees and the questions were centred on the objectives of the study.
Upon the identification of ten institutions dealing with construction projects within Bloemfontein, only six project managers gave permission for the interviews. These included one project manager from the public sector and five project managers from the private sector. The choice of conducting interviews within Bloemfontein area was convenience and funding. The interviews were conducted between July and September 2019. All the interviewees were informed of the confidential nature of the interview process. The interviewee demographics are displayed in Table 1.

| Position          | Gender | Sector |
|-------------------|--------|--------|
| Project Manager   | Male   | Private|
| Project Manager   | Male   | Private|
| Project Manager   | Male   | Private|
| Project Manager   | Male   | Public |
| Project Manager   | Female | Private|
| Project Manager   | Male   | Private|

Table 1. Interviewee demographics

Source: Authors’ fieldwork (2019)

The interviews were recorded using the voice recorder, with the consent of the interviewees and they were subsequently transcribed. Transcripts were read by the corresponding authors to make sense of the responses from the interviewees. The accruing data were analysed thematically, relying on a set of pre-set themes that evolved from the literature.

4. Findings
The study’s findings are discussed according to pre-determined themes resulting from the study’s guiding research question: What are the perceptions of project managers concerning the aspect of economic sustainability in the construction industry? The thematic areas consist of the perceptions of the project managers in the construction industry. Four themes were selected for discussion, namely: understanding of economic sustainability by project managers in the construction industry, perception of the contribution of economic sustainability to effective project management of construction projects, perception of the contribution of economic sustainability incorporation to effective project management of construction projects and, the role of project managers concerning the incorporation of economic sustainability in construction industry.

4.1. The level of knowledge of sustainability among construction project managers
Schultmann and Sunke [24] state that the construction industry plays an integral part in ensuring that sustainability is put into practice. This includes the application of the principles of sustainable development to the construction life cycle [7]. In every construction project, the project manager ensures that the project is according to the predetermined plan and objectives through the disciplines of planning, organizing, directing, and controlling and with the application of knowledge, skills, tools, and techniques. One participant indicated that project managers influence sustainable development although such is usually achieved through a rich experienced from projects other than the state projects. Another participant stated that construction project managers are mostly focused on development and they tend to forget to deal with sustainable development. In this instance, the example cited involved developers who develop shopping malls in the townships, and this affects township’s economy. Furthermore, the participant stated that development must be balanced and be considerate of all aspect of development.
Project managers work process in ensuring sustainability can be achieved through assessing the current project sustainability whereby an analysis is to be made to get greatest opportunities, for improvement, to measure progress as sustainability initiatives take shape; developing a sustainability strategy, this is where project draft a strategy that defines the organization’s goals in improving sustainability; adopting a sustainable standard by setting standards that help project managers in determining whether they are meeting their sustainability goals; looking for sustainability in partners and vendors, by asking vendors to increase their own sustainability which leads to broader improvements; and spreading the word, by engaging project team in reaching sustainability goals.

In supporting the above, two (2) interviewees indicated that they are currently working on projects that involve sustainability in the country, although this will take a while to achieve but the mindset shift is important in order to make a positive impact. Other participant indicated that job creation, managing to produce quality buildings to last for a life time in the methods used as well as materials, and green building principles applications are processes that he is working towards achieving although some of them are on-going.

4.2. Understanding of economic sustainability by the project managers in the construction industry

Assessing the understanding of project managers in the construction industry is important so that the objectives behind the study can be understood. The interviewers commenced by exploring the understanding of the interviewees about their knowledge of sustainability in the construction industry. Their level of knowledge regarding sustainability in construction projects was explored. Knowledge level assists the project managers to make informed decisions and perform tasks and routines to ensure sustainability. Hussain et al. [25] state that the construction industry is an integral part of the economic growth of the country. It plays a role in improving the quality of life of its citizens as it makes provision for socio-economic infrastructure. Sustainability is a multi-dimensional system that is directed to reduce the impacts on the environment. This refers to economic, environmental, and social parameters.

The aspect of economic sustainability in construction is achieved by taking the life cycle costs of a building into consideration, considering other resources of the financial mechanism, promoting sustainable consumption by developing appropriate economic instruments, and considering the impact the economy has on local structures. Some interviewees highlighted that economic sustainability, as part of the construction, renders job opportunities during the construction period. Connecting the different pillars of sustainability, the emphasis was extended to environmental sustainability in terms of the use of materials and resources used in construction. One of the interviewees indicated that economic sustainability is intertwined with social sustainability. The interviewees emphasized that their projects are based on the sustainability of economy in the country. Continuing, some project managers indicated that their leadership skills contribute to economic sustainability. This is buttressed by ensuring teamwork in the construction projects.

As indicated by Zuofa et al [20], the construction industry faces several challenges in achieving sustainable construction. Challenges were also shared by some interviewees, which include lack of awareness and enough exposure to sustainable construction practices. The literacy level also plays a key role in economic sustainability in that one project manager specified that highly qualifies project managers are most likely to deliver successful, economically sustainable projects. Major challenges indicated by the project managers is the inability to provide projects that can be economically maintained beyond completion in terms of affordability by the end-user. Ojo et al [21] highlighted the poor commitment of top management in the construction industry as a major challenge. Project managers’ role is to ensure project sustainability, its improvement and sustainability strategy. Some interviewees highlighted their full involvement in projects to ensure economic sustainability. Economic sustainability increases profitability, and this is achieved by using resources efficiently, including labour, materials, water, and energy. Hussin et al. [25] indicate that waste is a serious challenge in construction projects because it has a direct impact on productivity, material loss and completion time of the project. All these can lead to the loss of vast amounts of money. Interviewees indicated that the materials are used
efficiently, and waste is always reduced. Despite the challenges they encounter, they are striving to achieve economic sustainability within the construction management.

4.3. Perception of the contribution of economic sustainability incorporation to effective project management of construction projects

Having explored the understanding of the economic sustainability of the project managers in the construction industry, the researcher went further to explore the perception of the contribution of economic sustainability to the effective management of construction projects. In this section, three questions were asked to participating project managers, which required them to state the challenges they have faced as project managers with regards to sustainability on projects they have worked on. Also, project managers were requested to state the impact they have on economic sustainability. Lastly, as unemployment is one of the major challenges in the country, how do they advise respective contractors to promote job creation. Haughey [26] highlighted that the role of the project manager before the commencement of any construction project is to ensure that the project goals, objectives, scope, risks, issues, budget, timescale and approach have been defined to achieve the successful project within the estimated timeframe or completion time without any complexity of the work. Furthermore, to ensure that the above-mentioned project managers’ responsibilities are accomplished without any difficulties, full and accurate information must be communicated to every consultant and labourers involved in the project to ensure that everyone agrees. If there are any misunderstanding or differences in opinions, the project manager must ensure that they are resolved before the project commences [26]. One of the interviewees stated that all his roles as the project manager had been performed accordingly. On the other hand, from one construction firm, the interviewee indicated budget constrains as the barrier to achieving economic sustainability as they operate on the firm budget. Construction researchers are increasing their focus towards identifying the tools, techniques, processes, methods, knowledge, skills and experience required to improve the management techniques that project managers may use in ensuring that complex construction projects are completed within the desired constraints of cost, time and quality.

Reffat [14] states that lack of capacity, both from human to skills, poses a threat to sustainable construction. There is a shortage of professionals, tradesmen and laborers who have been trained to support sustainable construction. In achieving a sustainable construction, the professionals, clients and the laborers need to acquire adequate skills and knowledge to avoid the delays of the project, low quality of the work, damages to materials, overspending on the project and wastage of materials. If there is a skilled, well trained, and qualified project manager that overlooks the construction projects, there will be no waste in any of the resources used in those projects [14]. To achieve this, the participant responded based on their role and experience they have in the construction industry. One participant made an example of the current project she is working on, where she indicated that they were able to install Light Emitting Diode (LED) light with time switches and this allows more sustainable use of electricity. Also, another interviewee indicated that the project he is working on has less impact with regards to economic sustainability.

4.4. The role of project managers concerning the incorporation of economic sustainability in construction industry

Construction projects are a mechanism of change both within an organization, and the economy at large. Thus, project managers are change agents who play important role on the sustainability of an organization. Therefore, it is significant for project managers to ensure that sustainability practices are being implemented within the construction industry they are working on. Participants were required to briefly explain their role within the construction industry that ensures sustainability. Of the 6 participants who took part in the interview, 2 of them stated that their role in any project their working on is to ensure that the goals, objectives and the scope of the projects are successful and within the budget and time allocated without any complexity of the work. One other participant emphasized the fact that the use of collaborative software used in project management helps in achieving sustainable construction. Other 3 participants stated that keeping a project in time and within the budget is important. They also
emphasized the fact that managing material use, ensuring that the contractor orders the correct materials as per the scope of work and using materials optimally is also significant to ensure sustainability.

5. Conclusions
The South African construction industry has experienced several barriers to improving aspects of sustainable development. Sustainable construction has been used as a subset of sustainable development. It involves social, economic, and environmental sustainability dimensions. Sustainable development and sustainable construction play a key role in construction projects. This study set out to explore the understanding of economic sustainability by the project managers within the construction industry. Again, the focus is on the perception of the contribution of economic sustainability to effective project management of construction projects. The study focused on the public and private sectors of construction industries within the Bloemfontein area. For data elicitation, semi-structured interviews were conducted with project managers. The accruing data were analysed thematically. The findings of the study confirmed that project managers understand economic sustainability within construction projects. Also, their perception of the economic sustainability dimension will contribute to the effectiveness of project management in construction projects.

Acknowledgements
The author greatly acknowledges the Central University of Technology, Bloemfontein, BTech students, Monyane, M. S and Khuduga, B.M for conducting the interviews with the project managers within the Bloemfontein area.

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