Identifying the awareness level of the use of sustainable project management in the South African construction industry

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Abstract. The relationship between project management and sustainable development is rapidly gaining interest from both practitioners and academics. This is so because projects have long term impacts on social, economic and environmental sustainability to South Africa, because of this construction companies are increasingly under pressure to incorporate the objectives of sustainable development into company policies and decision-making processes. The aim of this study is to identify the level of awareness of sustainable project management by professionals in the South African construction industry. A quantitative methodology approach was adopted for this study, a questionnaire was employed to gather data for this study. A total of fifty-two (52) respondents returned their questionnaires. Descriptive statistical tools were used to analyse the findings, tools such as mean item score (MIS) was used to rank the level of awareness of sustainable project management and the reliability of the was also checked. Findings from this study revealed that the implementation of sustainable project management can lead to saving energy, reduction of greenhouse emission amongst many. This study concluded by stating that it will be imperative for policies to be put in place by the government to help encourage organisations to implement sustainable project management.

1. Introduction

The high level of degradation to the environment has led to a major concern in the construction industry. The construction industry is one of the contributors to global emission after Manufacturing as a result of huge amount of energy expended [1]. The emission of carbon has resulted to global warming which has affected welfare and health of the public [2]. Sustainable development is tasked with the reduction of carbon emission; this is a responsibility most countries have embraced to save the environment from the challenges of global warming [3]. It is of importance that project management practices need to reconsider their practices as the need to adopt sustainability is of importance. Companies are reviewing their various activities in the project management processes so as to incorporate sustainability into project management processes and shift from focusing on the traditional performance metrics such as quality, time and cost [4,5].

Sustainable project management as defined by Silvius and Schipper [6] defined sustainable project management as practices that ensured a profitable, fair, transparent, ethical, safe and environmentally acceptable project delivery aimed at delivering of project which is socially and environmentally acceptable in the entire project lifecycle.

Sustainable project management seeks to use practices that confirm social, ecological and profitable delivery of the project so that the delivery of the project is socially, environmentally acceptable through the project lifecycle [6]. In addition, sustainable project management involves stakeholder cooperation...
[7], as well life cycle thinking [8]. Project management balances on the three dimension of sustainability [6, 9]. Several reasons have been cited to be the reason for the lack of implementation of sustainable project management such as conflict of interest, low levels of commitment from key stakeholders, the benefits economically are low as compared to the initial investment. Hence it is of importance to determine the barriers and drivers, but importantly the need for the level of awareness is necessary as this is the primary objective of this study.

2. Literature Review
A project is an event which includes a pre-project phase to make efficient planning and a post project phase to confirm a positive integration into core business [11]. Each project is with their features that must be studied, depending on the context, context such as stakeholders, environment, and risks [12]. projects size, uniqueness and complexity are different [13]. Consequently, the standards for gauging success varies from project to project [17]. Such variances make it difficult to comprehensively establish a set of agreed project success factors [14]. Projects are carried out to achieve certain goal and selected objectives [15]. The value strategically can be defined in terms of the sustainable dimension [16]. To the project manager, contractor and customer benefit, value and value creation are different for all the professional. Winter and Szczepanek [17] also discussed the different view of the stakeholders in terms of the different phases of the project and product lifecycle [18],[19]. Sustainable project management suggests the use of sustainable dimensions for the delivery of the project so that the project is within the sustainable goals whereby all processes must be sustainable [6]. [20] proposed several reasons for the lack of sustainability in project management; the lack of implementation of sustainable project management such as conflict of interest, low levels of commitment from key stakeholders, the benefits economically are low as compared to the initial investment. Zhang et al. [21] and Barandica et al. [22] considered life cycle perspective in the construction of projects whereby it reduces the emission of green house. SPM should be integrated to make sure that project management is updated and ready to face global sustainability related problems. Thus the aim of this study is to identify the level of awareness of the concept of sustainable project management in the South Construction Industry.

3. Methodology
Research involves a careful exploration of existing research methodologies for the determination of an appropriate research approach and design for that research. This research adopted a quantitative research methodology approach, which is defined by Babbie [23] as a method that accentuates impartial measurements as well as the measurable, scientific, and mathematical examination of information that is gathered through questionnaires and surveys and at times through the manipulation of prior collected arithmetical data. Quantitative research methodology approach needs the researcher to sustain a level of objectivity for the subject under study. Additionally, data collected for the quantitative method is numerical instead of text oriented. Quantitative information was gathered through questionnaires. The major target population for this research were the built environment and engineering industry professionals in South Africa namely; architects, builders, structural engineers, electrical engineers, mechanical engineers, quantity surveyors, construction project managers, suppliers. A total of sixty-five questionnaires were circulated with only fifty-two completed and of the fifty-two completed all were viable. This implies that 80% of the aggregate number of questionnaires circulated were viable for the study. A Likert scale was used to determine the level of agreement in the following; Strongly Disagree (SD), Disagree (D), Neutral (N), Agree (A), Strongly Agree (SA). The respondent’s factors were changed from the Likert scale to a Mean Item Score (MIS). This is the same method used to examine the response obtained from the questionnaires. The Mean Item Score was calculated using the formula:

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\text{Mean Item Score} = \frac{1n1+2n2+3n3+4n4+5n5}{\Sigma N} \quad \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots\n

4. Findings
Table 1 shows the ranking of the respondent’s level of awareness of the about sustainable project management and the contribution of sustainable project management to it the environment and the society. The table reveals that the respondents are most aware that sustainable construction can save energy and non-renewable natural resources ranked at number 1 with an MIS of 4.23, an SD of 0.807. Ranked second is that sustainable construction help reduces greenhouse gases with an MIS of 4.21 and an SD of 0.871; awareness that sustainable project management can guarantee a good and healthy environment ranked 3 with a mean of 4.19 and an SD of 0.817. The respondents were moderately aware of that sustain-able project management can improve overall project performance (R=9, $\bar{x}=3.96$, $\sigma=1.009$). Ranked tenth is the level of awareness of the importance of sustainable project management to the environment. The table also reveals that the respondents are least aware of any government support with a ranking of 20 and a mean of 3.21 and a SD of 1.258.

**Table 1. Level of awareness of sustainable project management**

| Are you aware                                                                 | Mean $\bar{x}$ | Std Deviation | Ranking R |
|-------------------------------------------------------------------------------|----------------|---------------|-----------|
| 1 That sustainable construction can save energy and non-renewable natural resources | 4.23           | 0.807         | 1         |
| 2 That sustainable construction help reduce greenhouse emission               | 4.21           | 0.871         | 2         |
| 3 That sustainable project management can guarantee a good and healthy environment | 4.19           | 0.817         | 3         |
| 4 That sustainable project management can lessen running(utility) costs       | 4.04           | 0.885         | 4         |
| 5 Of the materials that are used in constructing green buildings              | 4.04           | 0.928         | 5         |
| 6 That sustainable project management can better the quality of the building  | 4.02           | 0.939         | 6         |
| 7 Of training to better the knowledge of sustainable project management       | 4.00           | 1.010         | 7         |
| 8 That sustainable project management can promote                            | 3.98           | 1.019         | 8         |
|   | renewable energy use |   |   |
|---|---------------------|---|---|
|9  | That sustainable project management can improve overall project performance | 3.96 | 1.009 |
|10 | Of the importance of sustainable project management to the environment | 3.94 | 0.850 |
|11 | That sustainable project management can reduce the negative impact of human activity | 3.92 | 1.100 |
|12 | That sustainable project management advance economic growth | 3.90 | 0.975 |
|13 | Of the return on investment and economic performance | 3.90 | 1.125 |
|14 | That sustainable project management can reduce the building cost | 3.85 | 1.127 |
|15 | Of the role of sustainable project management in resolving socio-economic issues | 3.83 | 1.024 |
|16 | Of the role of sustainable project management in creating sustainable or self-sufficient communities | 3.75 | 0.926 |
|17 | Of better labor practices | 3.69 | 1.276 |
|18 | Of the necessary green building code and regulations | 3.60 | 1.034 |
|19 | Of suppliers who deal with | 3.48 | 1.196 |
5. Findings and Discussion

5.1 Findings
From the findings, it revealed that the respondents are most aware that sustainable construction can save energy and non-renewable natural resources (MIS=4.23, SD=0.807); that sustainable project management help reduces green-house (MIS=4.21, SD=0.871); awareness that sustainable project management can guarantee a good and healthy environment (MIS=4.19, SD=0.817). Davies (2012) says that buildings count for about forty percent of the global energy utilisation and therefore the built environment should play a key part in developing an operative energy conservation plan. Furthermore, Green buildings safe-keep the natural environment and natural resources and enhance our quality of life and personal satisfaction. Most greenhouse emissions come from building structures, comprising of both operational and incorporated emissions accounting approximately 33% and approximately 8% separately of aggregate annual global greenhouse gas emissions.

5.2 Discussion
Sustainable project management is based on building green and in a way that conserves the natural environment. Green project managers have the responsibility to ensure that the design specifications of architects and engineers should be effectively carried in the construction process to ensure optimum and conservative use of resources, and therefore ensuring that the set green requirements are achieved, and the buildings are constructed up to the green rating standards. The findings suggest that the construction industry professionals identify sustainable project management with natural resource conservation and sustainability.

5.3 Implications of Findings
The results infer that the level of awareness of sustainable project management of construction industry professionals is on the conservation of the natural environment. This then speaks to the possibility of successful reception and implementation of sustainable project management in the construction industry to combat the harmful effect the industry has on the environment.

6. Conclusion
This study concluded that, the level awareness of sustainable project management is high among South African construction professionals, yet the application of this is a big issue. This leads to the school of thought that perhaps the level of awareness is very well known among South African construction professionals. The professionals did indicate from the findings that once SPM is applied, then it will lead to saving of energy and non-renewable natural resource, also help reduce greenhouse emission. This study further recommended that, need the government need to incentivise to promote all forms of sustainability in the construction industry. The researcher also recommends that professionals’ body must come together to educate construction professionals on the benefits of the implementation of sustainable project management.

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