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Exploring Patterns of Sustainability Stimuli of Project Managers

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Received: 7 August 2019; Accepted: 12 September 2019; Published: 13 September 2019

Abstract: Sustainable project management is becoming important and the sustainability concepts of people, the planet and profit needs to be incorporated into any type of project. This article focuses on the behavior of the project manager per se and the stimuli patterns that motivate them to adhere to sustainable project management. Three stimuli patterns are used i.e., intrinsically motivated, pragmatic and task driven. To determine which of these patterns influence a project manager, a quantitative pair-wise comparison was used. Twelve statements were used in a pair-wise comparison resulting in a combination of 66 questions. A sample of 101 project managers was analyzed to determine the stimuli patterns. The results indicate that the most prevalent stimulus pattern is the intrinsically motivated pattern with the other two patterns equally important. The results are consistent across gender, age and types of projects as well as industries. It can be concluded that for this study, project managers incorporate sustainability because they feel that it is something they should do. The motivation to consider sustainability is dominated by their behavioral beliefs and the characteristics of the project, or the opinion of others, do not play a large role. This research contributes to the larger body of knowledge with regards to sustainable project management and specifically to the human behavior of project managers. This research addresses the gap that currently exists in current literature where the focus is on the product's sustainability and sustainable processes.

Keywords: sustainability; stimulus patterns; project manager; behavior

1. Introduction

'Green' or 'sustainable' project management is one of the most important global project management trends today [1,2]. As organizations are making the transition to more sustainable products, services, resources, practices and business processes [3], also the process of project management is affected [4]. 'Sustainable Project Management' is developing as a new paradigm in project management [4,5] and the insight is growing that project managers, as the 'change agents' of the organization, play a key role in the transition to more sustainable business practices [6]. This pivotal role of the project manager [7] is also recognized in the most recent industry standards of project management, that "are explicitly referring to sustainability as a perspective that should be taken into account in the management and governance of projects" [5]. However, project management and sustainability are not natural friends [8] and it may therefore not be surprising that Økland [9] still observes a gap between the literature on sustainability in project management and what is carried out in practice.

Hwang and Ng [10] conclude that "Today's project manager fulfills not only traditional roles of project management but also must manage the project in the most efficient and effective manner with respect to sustainability." and Taylor [11] recognizes that "Project and Programme Managers are significantly placed to make contributions to Sustainable Management practices". However, where various authors refer to the opportunity or responsibility that project managers have to consider the sustainability of their projects, Silvius et al. [12] conclude that "having the opportunity to act may not be enough", as several other factors may influence the actual behavior of the project manager. For example the fear that initiating a discussion on sustainability might harm their relationship with the project board [13].

In an explorative study into the factors that stimulate project managers to address sustainability in their projects, Silvius et al. [12] found that different (groups of) project managers are stimulated by different factors. With the theory of planned behavior [14] as a conceptual foundation, their study used Q-methodology to reveal different stimuli patterns of project managers, and identified three distinct patterns in the stimulation of sustainable project management behavior: "Intrinsically motivated", "Task driven" and "Pragmatic" [12]. The study of Silvius et al. [12] identified these three patterns, but no further study has been done on the characteristics of the project managers that represent these three behavior patterns. The study reported in this article addresses this gap and aims to deepen our understanding of the three stimulus patterns identified by Silvius et al. [12]. The study builds upon these stimulation patterns by performing a quantitative study of project manager's 'fit' with the three patterns and the analysis of the characteristics of the three 'patterns' of project managers. The research questions for the study were formulated as: (i) What is the dominating pattern that project managers exhibit and (ii) is there a correlation between the three patterns.

The contribution the study makes is that it provides a validation of the patterns of stimulus of project managers, "Intrinsically motivated", "Task driven" and "Pragmatic" as found by on Silvius et al. [12], while deepening our understanding of these patterns in terms of occurrence, correlation with personal characteristics and correlation with characteristics of the project and industries that the project managers are active in. By doing this, the study contributes to the need to bring sustainability considerations in project management into practice [15].

The remainder of the paper will follow the well-known five-paragraph structure. The following paragraph discusses the literature on sustainability in project management and the theory of planned behavior as a theoretical framework for influencing sustainable behavior. The next paragraph, paragraph 3, reports the research strategy of this study and explains the instrument we developed. Paragraph 4 reports on the findings of the study and discusses these findings, followed by conclusions in paragraph 5.

2. Literature Review

2.1. Sustainability in Project Management

The rationale for suggesting a relationship between sustainability and project management is the growing consideration of sustainability in business practices. Misopoulos et al. [16] recognize that there is a plethora of drivers for companies to implement sustainable practices, and senior business professionals acknowledge that "business will need to play the leading role in advancing sustainability in the future" [17]. Projects play an instrumental role in the development and implementation of more sustainable business practices and thereby the sustainable development of society [6]. The emerging literature on sustainability and project management, describes the relationship between sustainability and project management in two ways [18,19]: The sustainability of the project's product (the deliverable that the project realizes) and the sustainability of the project's processes of delivering and managing the project. These two focus areas opens a gap in the research with regards to the skills, knowledge and behaviors that are needed by project managers to manage sustainable projects.

Integrating sustainability considerations into the project's product or deliverable logically influences the specifications and design of the project's deliverable [20,21], materials used [22], benefits to be achieved [8,23] and quality and success criteria [24]. These product-related aspects of the project are also considered the content of a project. Studies on the integration of sustainability into the content of the project often focus on operationalizing the triple bottom line (TBL) concept [25] by developing sets of indicators on the different TBL perspectives: Social, environment and economic (For example [24,26–29]). Considering sustainability in these aspects will most of all result in a more sustainable project in terms of a more sustainable deliverable, however, this approach bears the risk of lacking the holistic approach of the integration of the economic, environmental and social perspectives.

Sustainable project management, however, is not about the management of sustainable projects; it is about managing projects sustainably [30]. Sustainable project management is about integrating the dimensions of sustainability into the processes of project management and delivery [4], such as the identification and engagement of stakeholders [31,32], the process of procurement in the project [33], the development of the business case [23], the monitoring of the project [32], the identification and management of project risks [34], the communication in and by the project [35] and the selection and organization of the project team [30].

Several authors conclude that the sustainability perspective on both the content and the process of a project implies a scope shift in project management: From managing time, budget and quality, to managing social, environmental and economic impact [4,8,36]. However, adding new perspectives to the way projects are managed also adds complexity [8,31]. Project management therefore needs to adopt a more holistic and less mechanical approach [37] and evolve from an approach that can be characterized by predictability and controllability, to an approach that is characterized by flexibility, complexity and opportunity [13].

Integrating sustainability into project management raises the question of responsibility [38]. Hwang and Ng [10] conclude that the project manager must manage the project in the most efficient and effective manner with respect to sustainability. However, no clarity is given whether the project owner or sponsor should actually carry the bulk of the responsibility for this. No clarity is also provided whether the project manager, or the project team, is responsible for the sustainability of the project.

The question of responsibility is further addressed by a number of authors [8,39]. The conclusion of these studies suggests that all roles in the project can influence the sustainability of the project [39]), with most influence expected from both the project owner and the project manager [8]. The project manager is, also without formal responsibility for most content aspects of the project, well positioned to have a strong influence on the sustainability of the project and its project management. Given the growing attention for sustainability in professional standards and codes of conduct (for example [40,41]), it can be questioned whether the project manager can ignore a certain responsibility for applying this influence in order to make his/her project more sustainable [8]. Silvius and Schipper [30] conclude that integrating sustainability into project management requires a mind shift from the project manager. In their view, a sustainable project manager realizes that the project he or she manages, impacts society and takes responsibility for minimizing negative impacts while boosting positive contributions, with ethics and transparency as a basic touchstone [30].

2.2. Sustainability in Behavior

Implementation and reinforcement of corporate sustainability efforts largely depend on the degree to which employees embrace sustainable behavior [42]. Sustainable project management therefore is, in essence, about the behavior of the project manager [43]. The consideration of sustainability in the behavior of individuals has mostly been studied in the context of consumer behavior [44–48]. One of the most influential frameworks that are used to explain sustainable behavior is the theory of planned behavior (TPB) [14]. TPB aims to better understand, describe and predict behavior, by linking intended behavior to underlying beliefs. According to the TPB, (intended) human behavior is guided by three kinds of beliefs:

- Behavioral beliefs: Beliefs about the likely outcomes of the behavior and the evaluations of these outcomes. These beliefs produce a favorable or unfavorable attitude toward the behavior.
- Normative beliefs: Beliefs about the normative expectations of others and motivation to comply with these expectations. These beliefs result in perceived social pressure or a subjective norm.
- Control beliefs: Beliefs about the presence of factors that may facilitate or impede performance of the behavior and the perceived power of these factors. These beliefs give rise to perceived behavioral control.

In combination, these beliefs lead to the formation of a behavioral intention [14]. As a general rule, the stronger the different beliefs about a certain behavior are felt, the stronger a person's intention to perform the behavior in question is.

TPB is a popular way to examine underlying constructs of behavior. Some studies have examined the efficacy of the TPB in the form of a meta-analysis. The most inclusive meta-analysis has been conducted by Armitage and Conner [49]. Based upon an analysis of 185 independent studies, the predictive value of the TPB showed to be significant.

2.3. Sustainability Stimuli of Project Managers

Although the relationship between beliefs about sustainability and human behavior has mainly been studied in the context of consumer behavior, some studies also applied TPB in studies of sustainable behavior in the professional context of the individual (for example [13] and [50]. The study of Silvius et al. [12], into factors that stimulate project managers to consider sustainability, also builds upon the TPB model as underlying theory for the identification and categorization of sustainability stimuli. In order to be able to identify different subjective perspectives on sustainability, the study deployed Q-methodology as the research strategy. Q-methodology differs from R-methodology (surveys and questionnaires) in that it intends to show different answering patterns among the population.

The study of Silvius et al. [12] identified three distinct 'patterns' of project managers with regards to their reactions to sustainability stimuli, that they labeled as "Intrinsically motivated", "Task driven" and "Pragmatic":

- The intrinsically motivated project managers were stimulated to address sustainability because they care about nature, the planet and the future and because they feel that caring for sustainability is something they should do. In this pattern, the motivation to consider sustainability is dominated by behavioral beliefs. The characteristics of the project, or the opinion of others, do not play a large role. This group is intrinsically motivated for sustainability and will do what they consider the 'right thing'.
- The task driven project managers were stimulated to address sustainability by the project's requirements or objectives. These project managers will consider sustainability when it is part of the project's assignment, when the client asks for it or when they are rewarded for it. The task driven pattern is therefore pretty much the opposite of the intrinsically motivated pattern. For task driven project managers, the motivation to consider sustainability is mostly driven by the normative and control beliefs. This group therefore can be stimulated to consider sustainability by external pressure or rewards.
- The last pattern of project managers took a pragmatic approach to the consideration of sustainability in project management. These project managers were not strongly self-motivated for sustainability but would consider it when they see a good application for sustainability. The motivation to consider sustainability is mostly driven by the control beliefs. These project managers are stimulated by practical knowledge, tools and results.

Table 1 provides an overview of the statements that were highly ranked by the respondents. Table 1 also shows the category of each statement, which refers to the underlying belief (Behavioral, Normative or Control) in the TPB model [14] on which the statement was based.

Table 1. Distinguishing high-ranking statements of the three stimulus patterns (derived from [12]).

Pattern: Intrinsically Motivated			Pattern: Task Driven			Pattern: Pragmatic		
Statement	**Rank**	**Category**	**Statement**	**Rank**	**Category**	**Statement**	**Rank**	**Category**
I find it important that future generations can live a normal life	1	Behavioral	Key people find it important (project board/executive board/ management)	1	Normative	I can see the results of my work	1	Control
I find it important that we treat the earth well	2	Behavioral	It is part of the goals and/or contract	2	Control	My project team is interested in it and/or likes it	2	Normative
It has a stimulating effect on others, causing them to start addressing them too	4	Behavioral	Customers ask about it and/or find it interesting	3	Normative	I can give it shape and/or have my own ideas about it	3	Control
I think it is something that you should do	8	Behavioral	There is an impulse from the company to address it	4	Normative	My team has the knowledge, skills or abilities to do something with it	8	Control
I can see the results of my work	9	Control	It suits the culture of the company	8	Normative	Customers ask about it and/or find it interesting	9	Normative

From this table, it shows that the intrinsically motivated project managers were stimulated to consider sustainability predominantly by their personal attitude towards sustainability. The contrasting pattern, task driven, was predominantly stimulated by the normative expectations of others, for example the company the project manager work for or the customer of the project. Pragmatic project managers were predominantly stimulated by factors that facilitate or impede the consideration of sustainability.

As the study of Silvius et al. [12] was explorative in nature, aimed at identifying patterns of project managers, a follow up study is needed to deepen our understanding of the three groups of project managers and their characteristics. That is the study that is reported in this article. The following section describes the research approach and data collection strategy that the study applied.

3. Materials and Methods

3.1. Instrument Development

As the primary aim of the study reported in this article was to further explore the earlier identified patterns of stimuli of project managers, this study used a quantitative approach, with a survey-based strategy. In order to be able to map the respondents onto the three patterns found in the study by Silvius et al. [12], a measurement instrument needed to be developed. This was done by reusing the highest-scoring statements about what stimulates the consideration of sustainability for each of the three profiles, as a basis for the mapping. For each pattern, the highest-scoring 10 statements were selected. As some statement were amongst the highest-scoring statements in more than one pattern, this resulted in a list of 19 statements, out of the 46 statements that the explorative study [12] used. From this set of 19 statements, the statements that were not reported as distinguishing statements in any of the patterns and statements that had a high consensus score were removed, as they were less suitable to classify or map a respondent in one of the patterns. This resulted in a list of 12 defining statements that would form the foundation of the development of the mapping instrument. These statements are listed in Table 2.

Table 2. Selected statements for the development of the data collection instrument.

Number	Statement
1	I find it important that we treat the earth well
2	My team has the knowledge, skills or abilities to do something with it
3	Customers ask about it and/or find it interesting
4	I can see the results of my work
5	It is part of the goals and/or contract
6	I find it important that future generations can live a normal life
7	It suits the culture of the company
8	I can give it shape and/or have my own ideas about it
9	I think it is something that you should do
10	My project team is interested in it and/or likes it
11	There is an impulse from the company to address it
12	Key people find it important (project board/executive board/management)

With these 12 defining statements, a pairwise comparison test [51] was designed that paired each statement with all of the other 11 statements. With 12 statements, the test had in total 66 pairwise comparison questions.

Pairwise comparison tests are suitable instruments for decision making processes where many factors must be considered simultaneously [52]. Pairwise comparison tests are a way to structure an analytical hierarchy process [53], by rank ordering the stimulus statements in descending level of hierarchy. The analytic hierarchy process is a popular method for solving multi-criteria analysis problems involving qualitative data [54].

As this study aimed to deepen our understanding of the earlier found patterns of project managers' stimulus, intrinsically motivated, task driven and pragmatic, we compared the rankings of the statements 'perfect' rankings of each of the three patterns and derived a 'fit' score of an individual respondent with each of the three patterns. The fit scores were calculated as the percentage of congruence of the respondent's ranking of the 12 statements, compared with the 'perfect' ranking of a pattern. The three fit scores, one for each pattern, were than graphically reported in a spider web diagram. For example, Figure 1 shows the spider web diagram of a respondent that scored a 28% fit with the pragmatic pattern, an 82% fit with the intrinsically motivated pattern and a 24% fit with the task driven pattern.

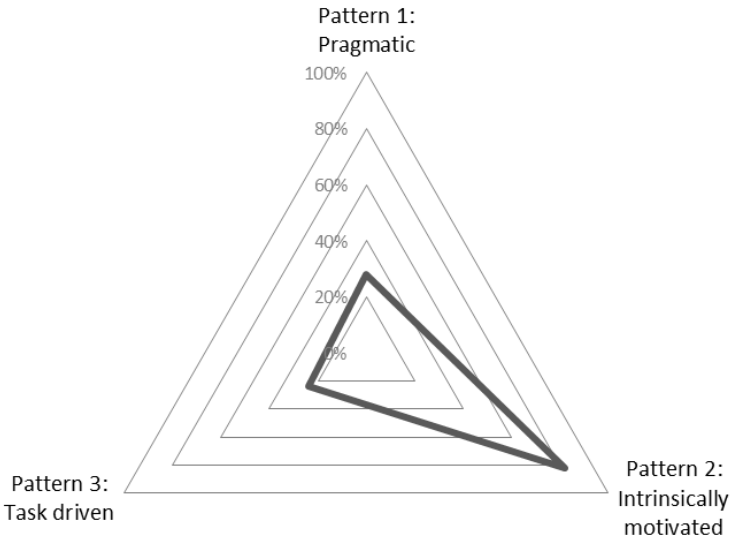

Figure 1. Example of an individual's pattern ranking.

Figure 1 shows that this respondent's preference fits most with the intrinsically motivated pattern. For that reason, we classified this particular respondent as intrinsically motivated. As a decision rule for the classification, we applied the highest fit score.

It might be worth noting that the example respondent depicted in Figure 1, also had a certain level of fit with the two other patterns. That was not unexpected as there was a certain level of correlation between the patterns. Even a perfect 100% fit score with one of the patterns would come together with a 15–25% fit score on the other two patterns.

3.2. Data Collection

Data collection was done using an online self-administered questionnaire, between October 2017 to February 2018. The survey consisted of two sections. The first section gathered biographical information whereas the second section focused on the pairwise comparison test of sustainability stimuli. The 66 pairwise comparison questions were randomly shuffled in order to minimize boredom on the respondents' side.

Since no list exists of suitable project managers, the researchers opted for non-probability sampling. The aim of the non-probability sampling approach was to get a representative sample. Accordingly, the following main approaches were used: Convenience sampling was used by having the survey circulated by the researchers. Snowball sampling was also used by inviting respondents to forward the survey link to other eligible project managers. A total of 172 responses were received with 101 complete responses. That is a 58% completion rate.

A Cronbach's alpha coefficient was used to test the internal consistency of the questionnaire. According to Field [55], a Cronbach's alpha coefficient of 0.7 and above is accepted as representing good reliability. A Cronbach alpha test was run on the 66 items with a result of 0.737, indicating a good level of internal consistency and reliability. However, as the study aimed to explore differences between different response patterns, this internal consistency was primarily used as a benchmark for testing the internal consistency of the responses of the different pattern groups later in our analysis.

Figure 2 provides a cross-tabulation between the respondents' age and gender. The results indicate that the majority of the respondents were between the age of 25 and 44 and that most of the respondents were male. This is not surprisingly as the project management discipline is still dominated by males [56,57]. The results also indicate that sample was representative across all genders and all ages.

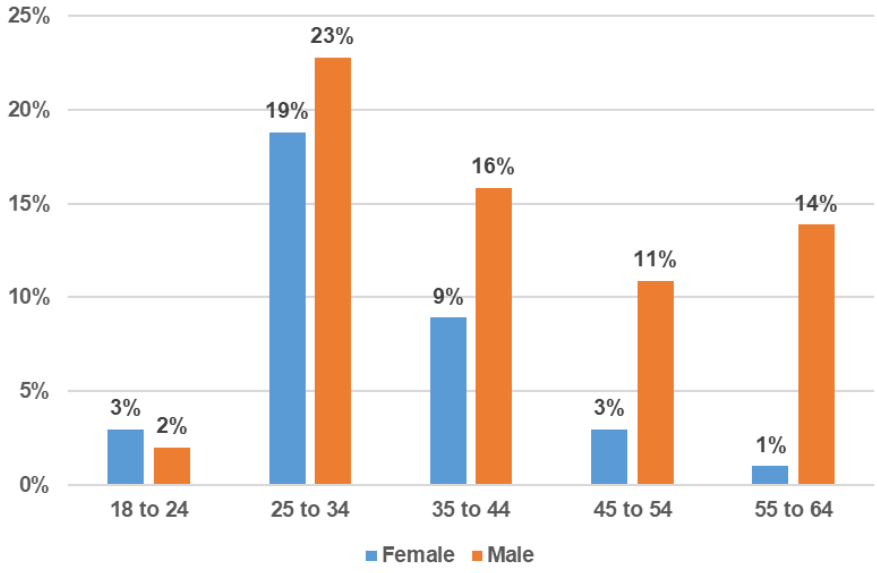

Figure 2. Gender and age distribution of the sample.

The majority of the responses came from Europe (48%) and Africa (33%). This can be contributed to the fact that the authors were based in Europe and South Africa. The remainder of the respondents (19%) were spread across the globe i.e., North America (4%), Asia (10%), Australia (2%) and South America (3%). The results indicate that a representative sample was completed in the questionnaire. The sample size however limited the generalization of the results.

Figure 3 illustrates that most of the responses represented consulting, legal, human resources, logistics and facilities services. The remainder of the respondents represented government (12.9%), education and training (11.9%), IT (11.9%) and financial services (11.9%). As with the geographical representation, the results in Figure 3 represent most of the industries where project management was practiced.

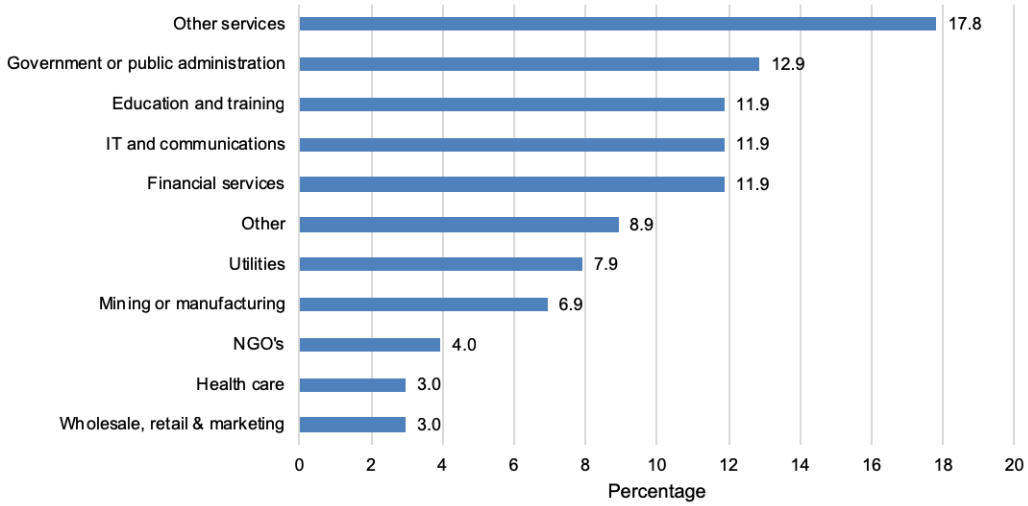

Figure 3. Industry representation.

The types of projects that the respondents engaged with are presented in Figure 4. Information technology/information systems projects were the most popular (26.7%), followed by organizational change projects (21.8%). One would have thought that civil engineering projects (infrastructure, building and construction) would be better represented as these projects are involved with sustainability concerns and issues [58,59]. It therefore has to be noted that the sample was biased towards information technology/information systems and organizational change types of projects.

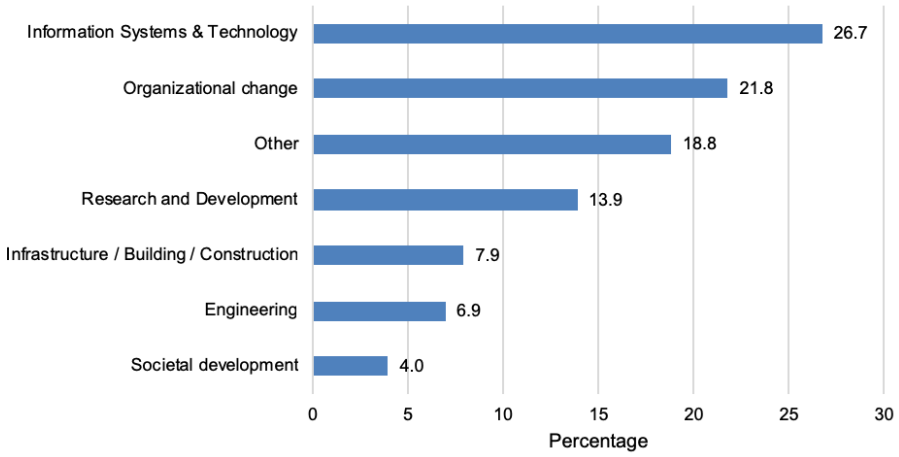

Figure 4. Types of projects.

The following section reports the findings of our study.

4. Results

The first part of the findings focuses on the preferred stimulus factor of the respondents and the second part provides a more general overview of the stimulus factors.

4.1. Overall Stimuli

Figure 5 presents the overall scores of the total sample of respondents on the three stimulus patterns. In general, the respondents in this particular study were leaning towards being intrinsically motivated (45.90%) when it came to incorporating sustainability into their projects. Pragmatic and task driven were equal at 26.05% and 26.18% respectively. The implication of the results as depicted in Figure 6 is that project managers incorporated sustainability because they believed it was the right thing to do and not because they saw a good application for sustainability, because the client asked for it or they were rewarded for it.

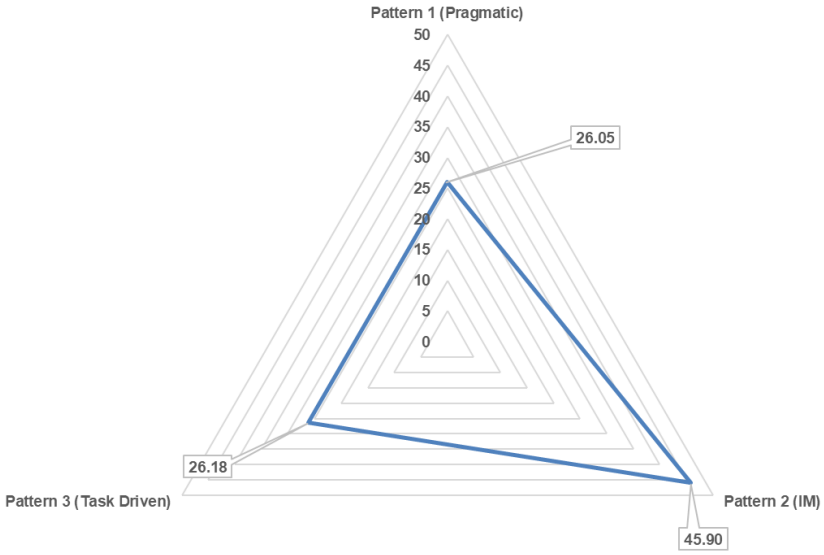

Figure 5. Overview of fit scores (total sample).

The results in Figure 5 corresponded with the overall ranking of the statements that appeared from the study (Table 3). The totals were calculated based on the number of times a statement was chosen as the preferred statement. The top three factors clearly indicate that the respondents were intrinsically motivated. Only four statements (F1, F6, F9 and F7) were scoring higher than the average score. Three of these factors spoke directly to the intrinsic motivation of the project manager.

Table 3. Average ranking of statements (total sample).

Number	Statements	Total
1	I find it important that we treat the earth well	764
6	I find it important that future generations can live a normal life	755
9	I think it is something that you should do	678
7	It suits the culture of the company	588
8	I can give it shape and/or have my own ideas about it	529
2	My team has the knowledge, skills or abilities to do something with it	507
3	Customers ask about it and/or find it interesting	504
12	Key people find it important (project board/executive board/management)	499
11	There is an impulse from the company to address it	488
4	I can see the results of my work	469
10	My project team is interested in it and/or likes it	450
5	It is part of the goals and/or contract	435

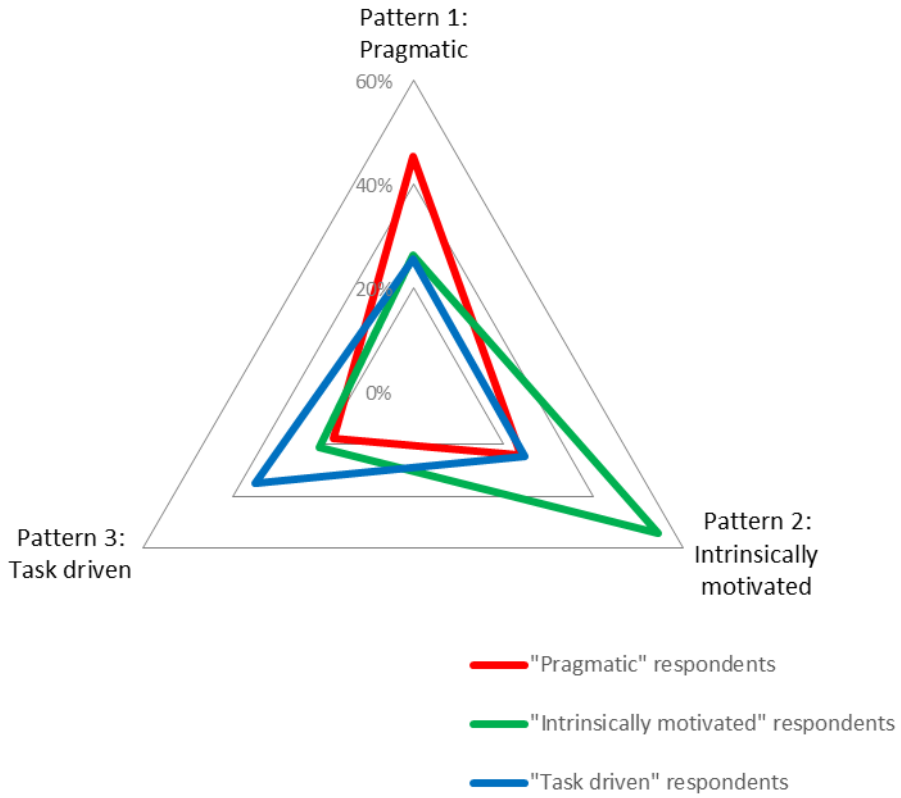

Figure 6. Average scores of the three groups of respondents.

4.2. Preferred Stimulus Pattern

A project manager's preferred stimulus pattern was determined through the application of the 'highest fit score' decision rule explained earlier. With this decision rule, we were able to classify 96% of the respondents in one of the three patterns. In line with the results presented in the previous paragraph, the classification shows that project managers were overwhelmingly classified as intrinsically motivated (72.3%) when it comes to the inclusion of sustainability in their projects. Pragmatic (12.9%) and task driven (10.9%) patterns were closely tied for second and third place. There were a few project managers (4%) who were stimulated by more than one stimulus pattern. It was decided to remove these respondents for the rest of the data analysis.

Figure 6 shows the average scores of the three identified groups on the three stimulus patterns.

From Figure 6, it shows that the identified groups of respondents provided a reasonable to good fit to the three stimuli patterns found in the study by Silvius et al. [12]. This result might be seen as a confirmation of the results of this earlier study. A Cronbach's alpha coefficient was used to test the consistency of answers of the three groups of respondents. Table 4 shows the results of this test.

Table 4. Cronbach alpha coefficients per pattern group.

	Cronbach's Alpha
Pragmatic	0.798
Intrinsically motivated	0.746
Task driven	0.454
Total sample	0.737

Table 4 shows that two of the three patterns had a good internal consistency in the answering of the pairwise comparison questions. When considered per pattern group, the internal consistency improved, compared to the consistency of the whole sample, as was also expected. Although consistency of a

pairwise comparison test is not necessarily a point of discussion [60], also this result strengthened our confidence in the three stimulus patterns found by [12].

A further analysis into the preferred sustainability stimuli of project managers, revealed some interesting observations. Project managers that were either pragmatic or task driven, second sustainability stimulus was intrinsically motivated. The rankings are displayed in Table 5.

Table 5. Preferred sustainability stimulus order.

Original Stimulus	Second Stimulus	Third Stimulus
Intrinsically motivated	Task driven (24.83)	Pragmatic (23.92)
Pragmatic	Intrinsically motivated (45.41)	Task driven (25.54)
Task driven	Intrinsically motivated (20.96)	Pragmatic (17.68)

Overall, the results indicate that intrinsically motivated was the more dominant stimulus. This is a positive result as the chances were better for the incorporation of sustainability into a project when the project manager was intrinsically motivated. To ensure that sustainability is incorporated into projects and project management, project managers should be intrinsically motivated. The question that needs to be answered is how do we intrinsically motivate project managers to sustainable project managers? This might be an area for further research.

Table 6 presents a correlation between the three groups of respondents. The three groups were negatively correlated with each other with only two of the correlations significant at either the 95% or 99% interval levels. Task driven was negatively correlated to both the pragmatic (r = −0.260, p = 0.001) and intrinsically motivated (r = −0.206, p = 0.05) factors. This implies that the three patterns work against each other. For example, when a project manager is intrinsically motivated, it implies that the other two patterns are suppressed. This is the case with the other two patterns as well. The patterns were exclusive from each other and did not support or contribute to each other.

Table 6. Correlations between respondent groups.

		Pragmatic	Intrinsically Motivated	Task Driven
Pragmatic	Pearson Correlation		−0.152	−0.260 **
	Sig. (2-tailed)		0.137	0.010
	N		97	97
Intrinsically Motivated	Pearson Correlation	−0.152		−0.206 *
	Sig. (2-tailed)	0.137		0.043
	N	97		97
Task driven	Pearson Correlation	−0.260 **	−0.206 *	
	Sig. (2-tailed)	0.010	0.043	
	N	97	97	

**: Correlation is significant at the 0.01 level (2-tailed); *: Correlation is significant at the 0.05 level (2-tailed).

These results correspond with the results of Table 5. When the preferred sustainability stimulus order was compared with the correlations, then the same pattern appeared. The intrinsically motivated stimulus was the dominant stimulus and had a negative impact on the other stimuli. The results in both the tables indicate that pragmatic and task driven stimuli played a small role when a project manager was intrinsically motivated. The intrinsically motivated stimulus overrode all the other stimuli factors.

4.3. Analysing the Patterns

As this study aimed to deepen our understanding of the three stimulus patterns that stimulate project managers to explicitly consider sustainability in their projects, "Intrinsically motivated", "Task driven" and "Pragmatic" as found by Silvius et al. [12], we analyzed the earlier reported

descriptive data of the respondents through the lens of the three groups (pragmatic, intrinsically motivated and task driven).

Regarding the industry representation, Figure 7 shows that certain stimulus patterns were overrepresented in certain industries. For example, government or public administration and financial services both show a peak of the task driven pattern. A potential explanation for this might be the strong governance that these sectors typically implement in their organizations. However, this interpretation goes beyond the scope of our study. The pragmatic pattern peaks in the IT and communication sector, whereas the intrinsically motivated pattern followed mostly the industry representation that the entire sample showed. This last finding is not surprising, given the dominance of the intrinsically motivated pattern in the total sample.

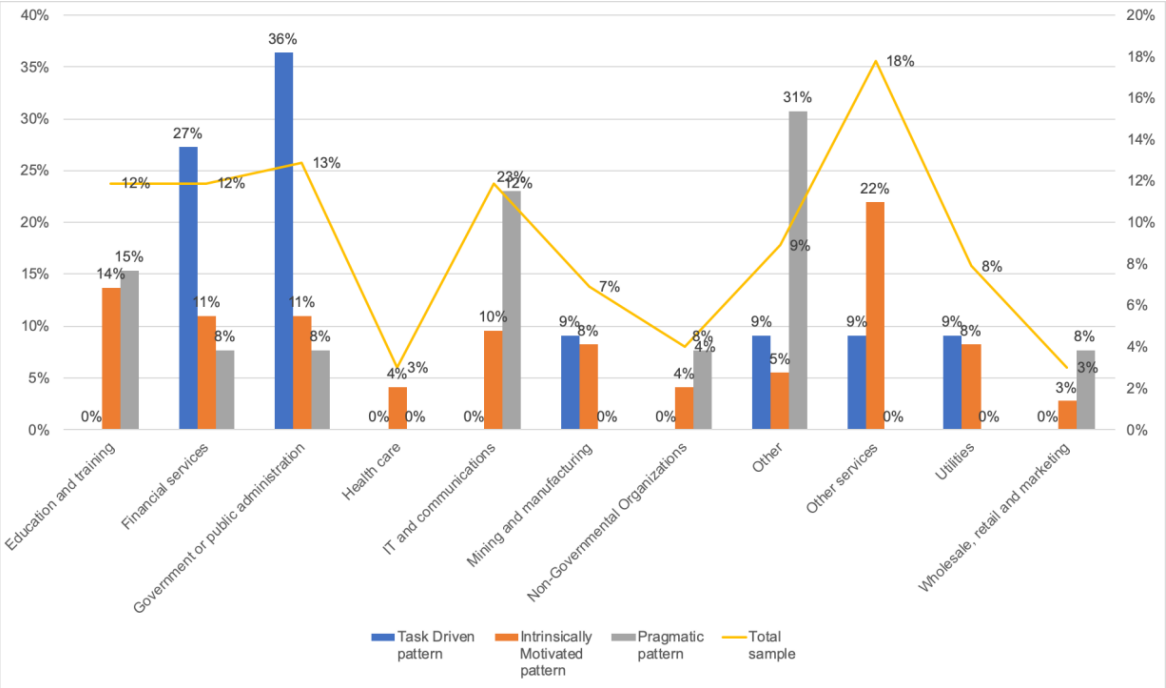

Figure 7. Industry representation presented per stimulus pattern group.

Regarding the types of project, Figure 8 presents the details of the three patterns, compared to the entire sample. The analysis indicates that for all types of projects, the intrinsically motivated pattern was the most important pattern. The only exception was societal development projects where the task driven pattern was the most important.

Regarding the age of the respondents, Table 7 shows the distribution of the stimulus patterns across the age groups.

Table 7. Distribution of patterns over the age groups.

		Pragmatic Pattern	Intrinsically Motivated Pattern	Task Driven Pattern
Age groups	18 to 24	0.0%	80.0%	20.0%
	25 to 34	12.8%	79.5%	7.7%
	35 to 44	19.2%	69.2%	11.5%
	45 to 54	7.1%	71.4%	21.4%
	55 to 64	13.3%	80.0%	6.7%
Total sample		13.4%	75.3%	11.3%

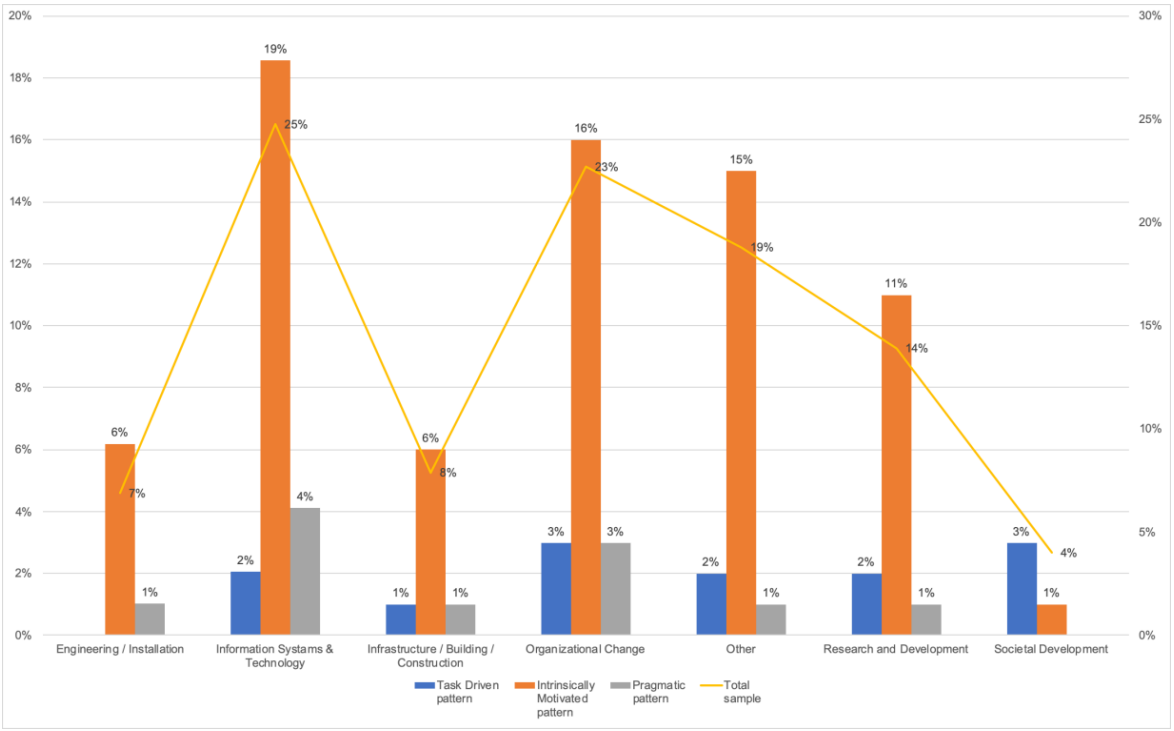

Figure 8. Types of projects per stimulus pattern group.

Perhaps surprisingly, given the values that are often attributed to younger generations [61], the study did not show a remarkable difference in distribution of the three patterns over the different age groups. In fact, the intrinsically motivated pattern was equally represented in both the youngest and the eldest age group in the sample. Despite the dominant stimulus pattern, intrinsically motivated, not showing too much difference between the age groups, Table 6 did show that the other patterns were sometimes over- or underrepresented in certain age groups. For example, the task driven pattern was relatively overrepresented in the 18 to 24 year age group, whereas the 35 to 44 years age group shows a relative overrepresentation of the pragmatic pattern.

Table 8 presents the distribution of the stimulus patterns by gender of the respondents. From this table it shows that the task driven pattern was underrepresented in the female group.

Table 8. Distribution of patterns by gender.

		Pragmatic Pattern	Intrinsically Motivated Pattern	Task Driven Pattern
Gender	Male	12.7%	71.4%	15.9%
	Female	13.9%	83.3%	2.8%
Total sample		13.4%	75.3%	11.3%

The results indicate that irrespective of a project managers' age, gender or the type of project involved with, incorporating sustainability was a personal trait. The results highlight that project managers in this study were intrinsically motivated to incorporate sustainability into their projects. This type of motivation was at the end of the day preferable as it is more sustainable.

4.4. Discussion

It was highlighted in the literature review, that current literature on sustainable project management focuses on the sustainability of the project's product or the sustainability of the project's processes. Little or no research has been done on the skills and behaviors that project managers should master to

deliver sustainable projects. This study contributes to the current body of knowledge and addresses this gap where little or no information is available about the behavior of project managers with regards to sustainable project management.

The results of this study builds upon the study of Silvius et al. [12] that identified three stimuli patterns for the consideration of sustainability by the project manager: Intrinsically motivated, task driven and pragmatic. An aspect that was not addressed by the study of Silvius et al. [12] is the correlations of these three patterns with the characteristics of the project managers that populate these patterns and the characteristics of their projects. Although the results of the study reported in this article indicate that overall that the intrinsically motivated pattern is the most dominant pattern, the detailed analyses as per Figures 7 and 8 indicates that there were differences within the industries as well as the types of projects. The task driven pattern was more prevalent when the data was analyzed by the industry with the financial services and government industries were the forerunners. This implies that the project managers were stimulated to address sustainability based on the project's requirements or objectives. These results are an anomaly and require further investigation and analysis as it contradicts the results based on the types of projects.

The most interesting result of this study, however, might be that the most dominant pattern was that of being intrinsically motivated, irrespective of the types of projects, with societal development projects as an outlier, age and gender as well as the industry in which the project manager was employed. This implies that the project manager was the only determinant of the stimulus that would be employed to decide on sustainability aspects of the project. In order to promote sustainable project management and to reinforce corporate sustainability efforts, project owners or sponsors need to include this as a consideration in the selection and appointment of project managers.

The results indicate that irrespective of everything else, the type of pattern that determines a project manager's behavior is a personal trait. It raises then the question what project owners and sponsors can do in this regard. Can project managers that are not intrinsically motivated be coached to be sustainable project managers? Potentially, this is an area of concern that can be addressed by the various competency standards [62].

A potential explanation for the dominance of the intrinsically motivated pattern in the results of the study is the so-called person–organization 'fit' [63] that suggests that employees seek organizations that match their values [64]. Considering sustainability will, in these situations, be both intrinsically motivated as task driven, but may be experienced by the employee as motivated by his or her personal beliefs.

5. Conclusions

Two research questions were raised by this study i.e., (i) what is the dominating pattern that project managers exhibit and (ii) is there a correlation between the three patterns. The results indicate that the most dominant pattern was that of being intrinsically motivated. This was followed by the pragmatic and task driven patterns. The results also indicate that there was a correlation between these three patterns albeit not that strong. Project managers that were task driven, had a negative impact on the other two patterns.

The results of this study highlight that project managers exhibited one of the three stimuli as a dominant stimulus but were also influenced by the other two stimuli. The positive aspect was that the intrinsically motivated stimulus was the more dominant stimulus. This study did not focus on the effect that this had on the intention to be more sustainable project managers. It can be derived that project managers with a dominant intrinsically motivated stimulus should be more open to change their behavior towards sustainability.

Various limitations were identified. The first limitation was the sample size. The sample size made it challenging to generalize the results and at best, the results provided some indication about the stimuli pattern of project managers. Another limitation was the fact that the projects were skewed

towards the change and IT projects. A limited percentage of the projects focused on the engineering and construction projects.

To overcome the sample limitations, the survey can be run again using other ways to extract responses from a wider population. Future research can investigate the results in more detail with regards to the impact of the industry on the stimuli patterns but this requires a much greater sample size.

Author Contributions: Authors worked jointly on the development of the study, the research methodology and the data collection. Literature background was provided by G.S.; Data analysis was done by C.M.

Funding: This research received no external funding.

Conflicts of Interest: The authors declare no conflict of interest.

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