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## Considering sustainability in projects: exploring the perspective of suppliers

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### **Abstract:**

Projects play an important role in the development towards a more sustainable society. Companies are integrating sustainability in their strategies, processes and actions. In the implementation of strategies, projects play an essential role. The relationship between sustainability and project management is therefore being addressed in a growing number of studies and publications and sustainability can be considered one of the recent trends in project management. However, there is still a gap between the literature on sustainability in project management and what is carried out in practice. A logical enabler for the consideration of sustainability in projects may be the demand of the client in the project, although the supplier's strategy may also be an enabler of sustainability. This article therefore reports a study into the enablers of the integration of sustainability in projects as perceived by project suppliers. The study used Q-methodology to explore different subjective patterns of perceived enablers. Based on the factor analysis of 19 Q-sorts, we discovered three distinct patterns of enablers of the integration of sustainability, that we labelled as "Benefits driven", "Demand and intrinsic motivation driven" and "Demand and Strategy driven". As expected, the study found that for project suppliers, integrating sustainability in projects is strongly dependent on the demand and willingness of the customer to pay for sustainability. However, adoption of sustainability could also be a differentiator for suppliers. It should therefore be questioned whether a contractor should wait for the customer to ask for sustainability, or whether he should proactively take action himself.

### **Keywords:**

sustainability; project management; project suppliers; Q-methodology.

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## 1. Introduction

Concerns about the sustainability of natural resources may date back as far as the early 18th century. Already in 1713, the Saxon Mining Officer Hans Carl von Carlowitz published the first comprehensive treatise about sustainable yield forestry [6]. Despite these early warnings about the effects of human actions on the balance of nature, the more contemporary concerns about sustainability and the use of natural resources did not attract broad attention until the second half of last century. The 1972 book *“The Limits to Growth”* [34] predicts that the exponential growth of world population and world economy will result in overshooting the planet’s capacity of natural resources. Today, it is estimated that mankind is using up 1.5 to 1.6 times earth’s annual bio capacity every year [47]. The concerns about the (un)sustainability of mankind’s ecological footprint inspired leading companies to integrate sustainability into their cultural values and corporate strategies. These companies *“address sustainability throughout their business operations and make it core to the way they do business”* [22].

One of the critical competencies to realize these strategies is the *“ability to lead and mobilize change”* [22]. Development towards a sustainable society requires change [43] and it is argued that projects play a crucial role in the sustainable development of organizations and society [31]. Consequently, the relationship between sustainability and project management is being discussed in a growing number of publications [1][41]. Nevertheless, Økland [36] concludes that still a gap exists between the literature on sustainability in project management and what is carried out in practice. *“Sustainability thinking in project management seems to be regarded as extrinsically motivated; it must be pushed onto the project either by external stakeholders, policies or legislation”* [36].

This extrinsic motivation can logically be expected when the execution of a project is contracted to an external supplier. A situation that is frequently found in for example construction, consulting, information technology or event management projects. The project ‘owner’ in this situation outsources the realization of the project to a more specialized contractor or supplier [23]. The supplier performs the project to the specifications and criteria of its client, the project owner. The extent to which sustainability is considered in these specifications and criteria is primarily decided by the project owner, although Goedknegt [23] concludes that the project organization itself *“can wield influence to adhering to the sustainability principles”*. *“By having knowledge of sustainability, skills to operationalize the knowledge and grasp opportunities and the attitude to show example behavior, they can wield a lot of influence within their own scope of the project and sometimes even beyond their own scope.”* [23]. An interesting question for the supplier of the project will be whether this ‘pushing’ of sustainability in the project is appreciated by the project owner and pays off.

As the suppliers may be balancing their own sustainability ambitions and the consideration of sustainability that is included in the project specifications, this paper reports an explorative study into the suppliers’ perspective of the enablers for integration of sustainability in projects. In order to be able to identify different subjective perspectives, the study deployed Q-methodology as research strategy. Q-methodology has shown its usability in the context of project management research and provides a foundation for the systematic study of subjectivity [5].

The remainder of this article is structured as follows. The following section provides a brief review on the barriers and enablers of sustainability, as found in the literature. Section 3 describes the research approach the study deployed and develops the Q-sort statements. Section 4, presents the findings of the study and describes three factors that were found in the analysis. The closing section, section 5, presents the conclusion of the study and the recommendations that were derived from this.

## 2. Background

### 2.1. Sustainability and projects

The earlier mentioned “*Limits to Growth*” report, fuelled a public debate, leading to installation of the UN ‘World Commission on Development and Environment’, named the Brundtland Commission after its chair. In their report, the Brundtland commission defines sustainable development as “*development that meets the needs of the present without compromising the ability of future generations to meet their own needs*” [52]. By stating that “*In its broadest sense, sustainable development strategy aims at promoting harmony among human beings and between humanity and nature*”, the report implies that sustainability requires also a social and an environmental perspective, next to the economic perspective, on development and performance. In his book “*Cannibals with Forks: the Triple Bottom Line of 21st Century Business*”, John Elkington identifies this as the ‘Triple Bottom Line’ (TBL) or ‘Triple-P (People, Planet, Profit)’ concept: Sustainability is about the balance or harmony between economic sustainability, social sustainability and environmental sustainability [15].

The Triple Bottom Line helped in operationalizing the concept of sustainability. However, this operationalization also introduces the risk that the interrelations between the three perspectives are overseen and that the social, environmental and economic perspectives are each considered in isolation. A holistic understanding of the integration of economic, environmental and social perspectives is therefore considered one of the key-concepts of sustainability [30].

Dyllick and Hockerts [12] conclude that sustainability is about consuming the income and not the capital. This aspect is a common realm in business from the economic perspective. However, from a social or environmental perspective, the impacts of human actions and behaviour may not be visible in the short-term. In order not to compromise “*the ability of future generations to meet their needs*”, as stated in the Brundtland definition, sustainability therefore requires a balance between both short and long term and a life-cycle orientation. Sustainability implies that “*the natural capital remains intact. This means that the source and sink functions of the environment should not be degraded. Therefore, the extraction of renewable resources should not exceed the rate at which they are renewed, and the absorptive capacity of the environment to assimilate waste, should not be exceeded*” [21].

The International Institute for Sustainable Development elaborated on the Brundtland definition of sustainable development in a definition more focused on sustainable management of organizations: “*Adopting business strategies and activities that meet the needs of the enterprise and its stakeholders today while protecting, sustaining and enhancing the human and natural resources that will be needed in the future*” [8]. Next to the concepts of Triple Bottom Line and life-cycle orientation discussed earlier, this definition also mentions the interests of stakeholders. In the so called ‘stakeholder theory’, Freeman [18] developed the notion that all stakeholders of a company or an organization, and not just the shareholders/financiers, have the right and legitimacy to receive adequate management attention that takes into account their interests [25]. The interests of all stakeholders should be embraced by the organization and win-win situations should be sought [16].

In the context of organizations, sustainable development relates to the concepts of (Corporate) Social Responsibility (CSR) [13]. (C)SR is defined by the International Organization for Standardization (ISO) 26000 as the “*responsibility of an organization for the impacts of its decisions and activities on society and the environment, through transparent and ethical behaviour that: contributes to sustainable development, including health and the welfare of society; takes into account the expectations of stakeholders; is in compliance with applicable law and consistent with international norms of behaviour; is integrated throughout the organization and practiced in its relationships*” [24].

Next to the concepts mentioned before, this definition highlights the responsibility or accountability that an organization has for the societal impact of its decisions and actions, and the transparency and ethicality of its behaviour. With the mentioning of ethics and norms of behaviour, a normative aspect is introduced. Sustainability is a value based concept, reflecting values and ethical considerations of society [38]. And its integration into business decisions and actions

should go beyond being compliant with legal obligations. Dahlsrud [7] therefore points out the voluntariness dimension of CSR.

With the growing attention for the role of projects in sustainable development [31], it appears that the relationship between sustainability and project management can be interpreted in two ways [42]: the sustainability of the project's *product* (the deliverable that the project realizes) and the sustainability of the project's *process* (the delivery and management of the project).

The Triple Bottom line perspectives provide input for integrating sustainability requirements into the content related aspects of the project, such as the specifications and design of the project's deliverable [1][14], materials used [2], benefits to be achieved [43], quality and success criteria [33]. Studies on the integration of sustainability into project management that take this content related perspective, often focus on operationalizing the Triple Bottom Line by developing sets of indicators on the different perspectives (for example Bell and Morse [3]; Fernández-Sánchez and Rodríguez-López [17]; Keeble et al. [26]; Martens and Carvalho [32]). 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.

Some studies focus on the integration of the dimensions of sustainability into the *processes* of project management and delivery, such as the identification and engagement of stakeholders [16], the process of procurement in the project [35], the development of the business case [49], the identification and management of project risks [39], the communication in and by the project [37], and the selection and organization of the project team [41]. Gareis et al. [19], observe that this perspective has received less attention than the content oriented perspective. A potential explanation for this is the temporary nature of projects [19]. This temporariness of projects may lead to the view that the sustainability, or unsustainability, of the project's process is less impactful. However, Labuschagne and Brent [29], point out that in the process of developing and delivering the project, also many content related aspects are decided and that therefore a project's process and product interact.

## 2.2. Barriers and enablers for sustainability adoption

Several studies (for example Kumar and Rahman [27] and Stewart et al. [45]) addressed the barriers and/or enablers of the adoption of sustainability in organizations. Where a barrier is defined as a factor that hinders implementation of a sustainability approach or measure [45], an enabler is defined as a factor that helps the implementation of sustainability [28]. Enablers and barriers, therefore, can be considered as opposites.

Kumar and Rahman [27] performed a systematic review of existing literature on the adoption of sustainability practices through supply relationships. Table 1 shows the enablers and barriers they found.

Table 1: Enablers of and barriers to the adoption of sustainability (based on Kumar and Rahman [27]).

Enabler	Barriers
Awareness	Lack of awareness
Top management commitment and support	Lack of top management commitment
Competitive and marketing advantage	Perception of low economic return
External pressure Demand of customer and other stakeholders	Poor demand forecasting
Incentives and support by various agencies	No support from government Lack of money
Capacity building and development	No capability Lack of training Lack of education Lack of human resources capability

Enabler	Barriers
	Lack of knowledge No technology sharing
Sharing resources	Lack of resources
Joint efforts and planning	Lack of integration Resistance from suppliers
Monitoring and auditing supply chain partners	Outdated auditing standards
Information sharing	No information sharing
Knowing and solving supply chain partners' problems	Cultural difference
Trust and commitment among partners	Lack of partner trust
Long term partnership	Poor supplier commitment Focus on short term profitability
Cost reduction	Increased cost of adoption

The results of Kumar and Rahman [27] confirm that enablers and barriers are mostly different ends of the same variable. In our study, we will therefore focus on enablers and reformulate the barriers found in earlier studies as enablers. In their study, Stewart et al. [45] found a total of 59 barriers, distributed over eight categories. They categorize the barriers in *internal or organizational-related* barriers and *external or industry-related* barriers. The internal related barriers consist of *structural dimensions, political dimensions, human dimensions* and *cultural dimensions*. The external related barriers consist of *regulation, market, technology and tools* and *value network* (Table 2).

Table 2: Categorization of enablers of and barriers to the adoption of sustainability (based on Stewart et al. [45]).

Internal enablers	
Structural dimensions	The structural dimension focuses on the structural element of the organization. Examples are the strategy, the design of its units and subunits, the rules and roles as well as the goals and policies.
Political dimensions	The political dimension focuses on the way to allocate scarce resources, the competing interests, building power bases and the fights for power and advantage.
Human dimensions	The human dimension focuses on understanding people, their strengths and weaknesses, their rationale and emotion as well as their desires and fears. It emphasizes support, empowerment and development of people.
Cultural dimensions	The cultural dimension focuses on meaning, beliefs and faith, for example how humans make sense of the chaotic and ambiguous world in which they live, take responsibility and getting room for out of the box ideas.
External enablers	
Regulation	Regulation focusses on prescribing and encouraging regulation, like labor legislation, environmental legislation, standards and subsidies.
Market	Market focusses on the demand of the customer, influence of the customer, level of competition in the market and knowledge amongst customers.
Technology and Tool	Technology and Tool focusses on eliminating risk, making things measurable and comparable. Examples are dependency on available technology, tool customization, frameworks and benchmarks.
Value Network	Value Network focusses on the complexity of implementing sustainability approaches and the related high dependence on factors whose control is located beyond the company boundaries. Intense collaboration within the value network is often required for implementing sustainability.

The non-adoption of performance measurement systems is highlighted as a common internal barrier across approach types and the lack of industry-specific information, benchmark or reference cases is outlined as a recurrent challenge. It is suggested to perform future research that could focus on identification of criticality and priority areas depending on parameters such as company size or sector as well as groups (of employees).

In a study on enablers of green procurement in construction projects, Wong et al. [51] found 36 enablers that correspond mostly with the categories of Stewart et al. [45]. Other studies on enablers and barriers were performed by Akadiri [2] and George et al. [20]. These studies all found sets of enablers and barriers that were specific to the situations and context they studied. As the enablers of and barriers to the adoption of sustainability that organizations experience are logically context dependent, it may not be possible to develop a generic list of enablers/barriers. We therefore selected the categorization of enablers/barriers as summarized in Table 2 for the exploration of the supplier's perspective on enablers for the integration of sustainability in projects.

### 3. Research approach

This section presents the research strategy and research design of the study. As the nature of the study is explorative, we selected Q-methodology as research strategy. Q-methodology analyzes different patterns of behavior that may appear, instead of focusing on a single average behavioral pattern. Q-methodology has its roots in psychology and in social science to study people's subjectivity and has shown its usability in the context of project management research [40]; [46]. Q-methodology differs from R-methodology (surveys and questionnaires) in that the latter asks participants to express views on isolated statements, whereas Q-methodology identifies participants' views on statements in the context of the valuation of all statements presented [11]. Furthermore, as opposed to R-methodology, Q-Methodology intends to show different answering patterns among the population.

In Q-methodology, the participants are presented with a set of statements about the topic of the study [50], called the Q-set. Participants, called the P set, are asked to rank-order the statements from their individual point of view, according to some preference, judgment or feeling about them, mostly using a quasi-normal distribution. By 'Q-sorting' the statements, the participants give their subjective meaning to the statements, and in this way they reveal their subjective viewpoint [44] or personal perspective [4]. As conceptual model of the enablers of the adoption of sustainability by suppliers, we selected the categorization proposed by Stewart et al. [45], as provided in Table 2. In the Q-set of statements, each statement was related to one of the categories of enablers of our conceptual model. The statements were formulated as answers to the 'umbrella question' that was formulated as "*It is possible for me to integrate sustainability into my project when...*". For example: "It is possible for me to integrate sustainability into my project when... I am more aware of sustainability". In Q-methodology there is no clear rule for the number of statements in the sort. However, generally speaking, a Q-set of around 40 statements is considered satisfactory [50]. In line with this, we formulated 39 statements for our study. The numbering of statements was not visible during sorting, to prevent the participants categorizing them as representing behavioral, normative or control beliefs.

As the generation of potential statements for the Q-set does not need to be theory driven [50], the statements were formulated by the research team and validated in a pilot with three respondents. In the formulation of statements, it was ensured that all statements were written in the same style, extreme statements were avoided and double negatives were avoided [10]. In this way, a balanced Q-set was obtained which is presented in Table 3.

The statements were printed on individual cards [9], that the participants were asked to rank-order from "Strongly disagree" to "Strongly agree" on a Q-sort diagram as illustrated in Figure 1. We used a symmetrical diagram, as is normally preferred in Q-methodology.

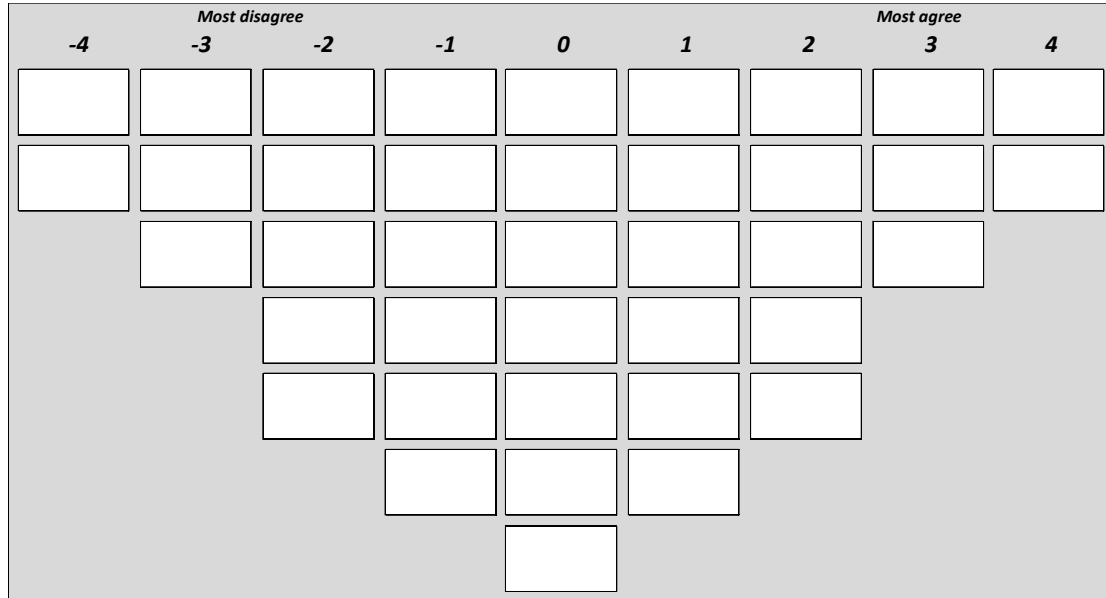


Figure 1: Q-sort diagram

Table 3: Overview of categories and statements

Category		Statement
Internal enablers	Structural dimensions	1 extra money is available
		2 sustainability is integrated in the processes of our company
		3 it is clear how liability is arranged
		4 sustainability is integrated in the vision and strategy of my company
		5 there is measurement system for sustainability
Political dimensions		6 it reduces costs
		7 extra resources (people) are available
		8 the organisation focuses on the long term
		9 I can motivate choices better
		10 there are departments of the organisation that support me
Human dimensions		11 management supports sustainability
		12 I can attend a training or education concerning sustainability
		13 I had more knowledge of sustainability
		14 I am more aware of sustainability
		15 the uncertainties caused are being accepted by stakeholders
		16 it has my interest
Cultural dimensions		17 I get room for trying things
		18 there is more commitment for sustainability in my company
		19 there is more commitment for sustainability in my project team
		20 sustainability is considered as company's responsibility



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Category		Statement	
External enablers	Regulation	21	it is forced by legislation
		22	it is supported or encouraged by the government
		23	there is certification for sustainability of projects
	Market	24	my client wants to pay extra for sustainability
		25	my competitor or colleague does it as well
		26	the client asks for sustainability
		27	I can influence my client
		28	it is expected by society
	Technology and Tool	29	risks of sustainable alternatives are known
		30	there are sustainable alternatives
		31	there is method for comparing the sustainability of alternatives
		32	it does not cost extra resources
33		a sustainable technique has other advantages for the company	
Value Network	34	I can work closer together with suppliers	
	35	I know that suppliers are willing to help	
	36	I know that it is not worsening my bargaining power	
	37	I can trust my suppliers	
	38	I know that stakeholders of the project support sustainability	
	39	I can assess my supplier objectively on their sustainability performance	

Data collection was done in structured face-to-face interviews. Before the sorting of the statements, the participants were asked a number of initial questions about their demographical information and their work context. After the sort, the participants were asked some post-questions, these questions were designed to find more details about the motivation of the participants to rank certain statements.

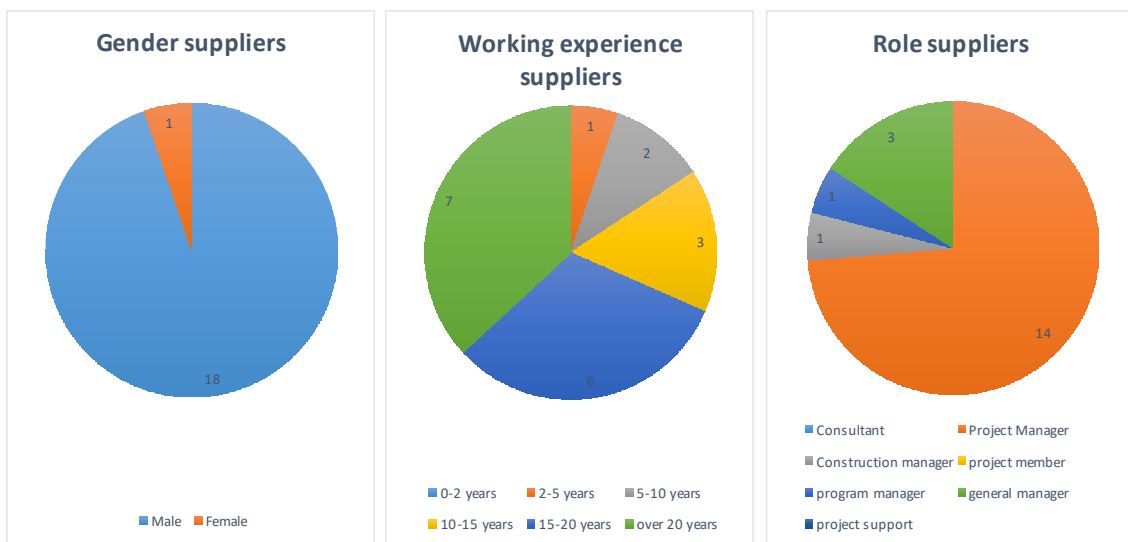


Figure 2: Gender, working experience and role of suppliers

As Q-methodology aims to reveal (and to explicate) some of the main viewpoints that are favored by a particular group of participants, large numbers of participants are not required for a Q-methodological study [24]. In our study, 19 participants of 9 companies participated. Sampling was done using purposive sampling by inviting a mix of engineering companies and construction companies. As presented in figure 2, 18 of them were male and one is female. Over 80% has more than 10 years of working experience and 75% qualified themselves as project managers. Three qualified themselves as general managers, one as program manager and one as a construction manager. Data collection took place in the Netherlands, in the Fall of 2016.

#### 4. Findings

Based on the Kaiser-Guttman criterion, significant factor loading and a less strict applied Humphey's rule, three factors could be extracted from the data, resulting in sum of variance explained of 36%, which is satisfactory [24]. Based on a varimax rotation with additional manual rotations, 12 participants could be related to the factors. Table 4 presents the top 10 ranked statements for the three factors. The bottom 10 ranked statements of the factors are presented in table 5. Bold statements are distinguishing statements per factor, the italic statements are consensus statements for all three factors.

Table 4: Overview of top 10 ranked statements per factor.

Factor 1	Factor 2	Factor 3
6 <b>it reduces costs</b>	26 the client asks for sustainability	26 the client asks for sustainability
24 <i>my client wants to pay extra for sustainability</i>	24 <i>my client wants to pay extra for sustainability</i>	24 <i>my client wants to pay extra for sustainability</i>
11 management supports sustainability	22 <b>it is supported or encouraged by the government</b>	4 sustainability is integrated in the vision and strategy of my company
4 sustainability is integrated in the vision and strategy of my company	8 the organisation focuses on the long term	20 <i>sustainability is considered as company's responsibility</i>
8 the organisation focuses on the long term	1 extra money is available	17 <i>I get room for trying things</i>
20 <i>sustainability is considered as company's responsibility</i>	20 <i>sustainability is considered as company's responsibility</i>	1 <i>extra money is available</i>
33 <b>a sustainable technique has other advantages for the company</b>	19 <b>there is more commitment for sustainability in my project team</b>	38 <i>I know that stakeholders of the project support sustainability</i>
32 <b>it does not cost extra resources</b>	17 <i>I get room for trying things</i>	6 it reduces costs
38 <i>I know that stakeholders of the project support sustainability</i>	21 <b>it is forced by legislation</b>	11 management supports sustainability
26 <b>the client asks for sustainability</b>	16 <b>It has my interest</b>	30 there are sustainable alternatives

Table 4 shows that statements 20 and 24 score relatively high in all three factors. This means that suppliers in general consider it important for the integration of sustainability in a project, that the client wants to pay for sustainability and that sustainability is considered as a responsibility within the company. The overview of bottom ranked statements in table 5 shows that there are no consensus statements which appear in all factors' bottom 10. Consensus statements that appear are statements 13, "Having knowledge about sustainability", 39, "Being able to assess suppliers on their sustainability performance" and 31, "there is a method for comparing the sustainability of alternatives". They all score at the bottom half of the ranking, which cause them to be indicated as consensus statements.

The distinguishing statements indicate that the viewpoint of factor 1 is more focusing on reducing costs and making benefits out of a sustainable technique, and although the demand of the client in the top 10 ranking, it does not score as high as in the other factors. Interest and whether choices can be motivated are less important. If it saves costs or generates extra benefits, motivation of sustainability might sell itself.

The distinguishing statements of factor 2 indicate that legislation, support of the government, commitment for sustainability in the project team and interest are important aspects for integration of sustainability. The commitment seems to be more important than integration in the vision and strategy of the company, indicating that structures are less important than culture.

In the top 10 statements of factor 3, there are no distinguishing statements, this means that these statements score also high in one or all other factors. Distinguishing statements on the bottom 10 show that the focusing on the long term, certification of sustainability and interest are seen of less importance than in other factors. Table 6 presents the Z-scores for the three factors as a result of the data analysis.

Table 5: Overview of bottom 10 ranked statements per factor.

Factor 1		Factor 2		Factor 3	
34	I can work closer together with suppliers	13	I had more knowledge of sustainability	25	my competitor or colleague does it as well
31	there is a method for comparing the sustainability of alternatives	39	I can assess my supplier objectively on their sustainability performance	5	there is measurement system for sustainability
25	my competitor or colleague does it as well	35	I know that suppliers are willing to help	27	I can influence my client
<b>16</b>	<b>it has my interest</b>	34	I can work closer together with suppliers	<b>8</b>	<b>the organisation focuses on the long term</b>
14	I am more aware of sustainability	5	there is measurement system for sustainability	13	I had more knowledge of sustainability
39	I can assess my supplier objectively on their sustainability performance	12	I can attend a training or education concerning sustainability	14	I am more aware of sustainability
15	the uncertainties caused are being accepted by stakeholders	<b>36</b>	<b>I know that it is not worsening my bargaining power</b>	12	I can attend a training or education concerning sustainability
<b>9</b>	<b>I can motivate choices better</b>	<b>4</b>	<b>sustainability is integrated in the vision and strategy of my company</b>	<b>23</b>	<b>there is certification for sustainability of projects</b>
37	I can trust my suppliers	3	it is clear how liability is arranged	37	I can trust my suppliers
3	it is clear how liability is arranged	<b>25</b>	<b>my competitor or colleague does it as well</b>	<b>16</b>	<b>It has my interest</b>

Table 6: Overview of Z-scores per factor.

Internal enablers					External enablers				
Category	Statement	Z-score factor 1	Z-score factor 2	Z-score factor 3	Category	Statement	Z-score factor 1	Z-score factor 2	Z-score factor 3
Structural dimension	1	0,467	1,387	1,091	Regulation	21	0,001	0,957	-0,487
	2	0,495	-0,178	0,197		22	-0,574	1,469	-0,711
	3	-2,228	-1,763	0,178		23	0,082	-0,602	-1,849
	4	1,421	-1,546	1,516	Market	24	1,551	1,543	1,733
	5	0,057	-1,231	-0,759		25	-0,904	-1,823	-0,755
Political dimension	6	1,990	0,352	0,866	26	0,682	1,553	1,868	
	7	0,500	-0,320	-0,665	27	-0,673	0,524	-0,909	
	8	1,327	1,399	-0,936	28	-0,474	0,068	0,290	
	9	-1,472	0,029	-0,155	Technology and Tool	29	-0,654	-0,163	0,468
	10	0,627	-0,245	0,267		30	-0,291	0,738	0,670
Human	11	1,519	0,455	0,851	31	-0,821	-0,134	-0,158	

Internal enablers					External enablers				
Category	Statement	Z-score factor 1	Z-score factor 2	Z-score factor 3	Category	Statement	Z-score factor 1	Z-score factor 2	Z-score factor 3
dimension	12	-0,517	-1,428	-1,381	Value Network	32	0,885	-0,397	-0,174
	13	-0,417	-0,779	-1,091		33	1,274	0,719	-0,294
	14	-0,953	0,131	-1,269		34	-0,723	-0,990	0,197
	15	-1,253	-0,773	0,375		35	-0,502	-0,929	0,487
	16	-0,909	0,805	-2,023		36	0,283	-1,482	0,472
Cultural dimension	17	0,631	0,985	1,288	37	-1,633	-0,579	-1,892	
	18	0,395	0,200	0,580	38	0,804	0,296	1,022	
	19	-0,201	1,241	-0,042	39	-1,097	-0,847	-0,248	
	20	1,305	1,359	1,381					

Based on this distribution and on interviews with participants related to the factors, the factors will be described in more detail in the sections 4.1, 4.2 and 4.3.

4.1 Factor 1

The distribution of Z-scores for this factor are presented in Figure 3. This figure shows per category of statements the cumulative Z-scores of the two highest scoring statements plus the scores of statements that score relative high compared to other factors and the cumulative Z-scores of the two lowest scoring statements plus the scores of statements that score relative low compared to the other factors.

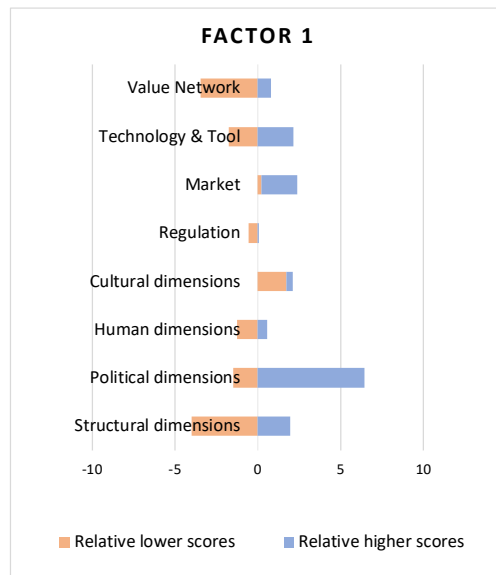


Figure 3: Distribution of statements over categories for Factor 1.

Figure 3 shows that factor 1 has high scores on structural dimensions, political dimensions, market and technology & tool. The biggest peaks in the relative low scores are in the structural dimension, cultural dimension, technology & tool and value network. Both higher scores and lower scores are distributed over internal and external categories. This

means that the enablers for integrating sustainability in projects for factor 1 are considered to be both in the internal organization and in the external organization.

From the interviews, it turns out that there are tensions between costs and benefits in the projects executed. Cost reduction is supported by focusing on the long term, which allows for more investments in sustainable tools and techniques. This viewpoint causes the dominant relative higher score on the political dimension. If a sustainable technique has other advantages for the company, considering sustainability is further enabled and together with the enabler that sustainability does not cost any resources, this viewpoint causes the relative high score in the category technology & tool. In order to improve the benefits, it is seen as an enabler when the client asks for sustainability and is willing to pay for it, causing a high score on market. Integration of sustainability in processes, vision and strategy and management support are facilitating to considering sustainability in the projects causing the relative higher scores on the structural and human dimension.

Commitment for sustainability in the project team and getting room to try things are not relatively low awarded in this factor, which causes the relative low score in the cultural dimension. In the structural dimension, liability issues and availability of money are considered to be of low influence. Participants indicate that money should be paid by the customer and should not come from the internal organization. Risks and being able to compare the sustainability on the one hand and cooperation with suppliers, trusting suppliers and being able to assess suppliers objectively on the other hand cause relative low scores on the categories technology & tool and value network respectively.

The participants related to factor 1 are focused on generating money from sustainability, either by saving costs or generating extra money by the preparedness of the customer to ask and pay for sustainability. We labelled this factor therefore as “Benefits driven” (*Sustainability if it has benefits*).

#### 4.2 Factor 2

Figure 4 presents the distribution of Z-scores per category for factor 2. This factor has high scores on regulation and market. The low scores are in the structural dimension, human dimension, cultural dimension, market and value network. The higher scores are rather external oriented and the lower scores are both internal and external oriented. This means that the enablers for integrating sustainability in projects for factor 2 are highly in the external organization and not in the internal organization.

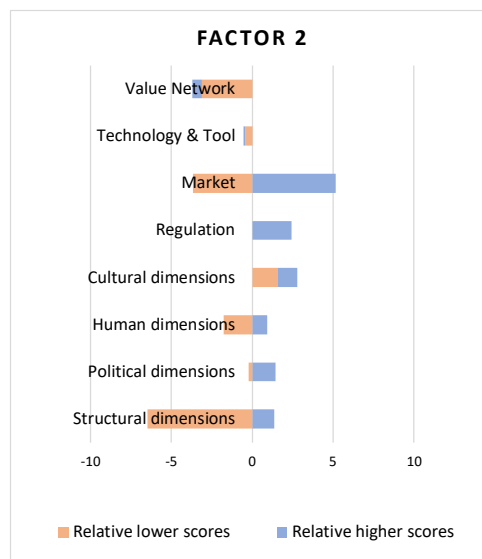


Figure 4: Distribution of statements over categories for Factor 2.

Participants associated to factor 2 see intrinsic motivation for implementing sustainability as the driving force for integrating sustainability in projects, it has to be there. These participants have interest for sustainability, that is why they do not see interest as an enabler. As a result, they have a lot of knowledge, causing training, education and having knowledge not to be awarded as enabler. This results in a relative lower score on the category human dimension. Knowing how means also that getting support of the organization is not seen as an enabler. Together with the conviction that sustainability cost (initially) money, which is contrary to saving costs, causes it a higher score on the political dimension. The importance of intrinsic motivation also causes commitment of the company for sustainability, seeing it as a company's responsibility, integrating sustainability in processes and vision and strategy not to be awarded as important enablers, relative to other factors. This results in relative lower scores in the cultural and structural dimension. Although the score in the cultural dimension is relative lower, it is still awarded with a cumulative positive Z-score.

Relative high scores in the market category are the result of the high awarding of the enablers that clients are asking and willing to pay for sustainability. It helps when the client can be influenced based on arguments in this respect. Support is experienced when legislation and support or encouragement of the government is in place. This forces clients to look into sustainability. This causes a relative high score on the category regulation.

Intrinsic motivation distinguishes participants related to this factor, they are motivated and award other internal enablers for that reason relative low. In the external enablers, the willingness of the client to pay or sustainability and whether the client is asking for sustainability is awarded high. For this reason, we labelled this factor as "Demand and intrinsic motivation driven" (*Willing to integrate sustainability if it is asked and paid for*).

#### 4.3 Factor 3

Figure 5 presents the distribution of Z-scores per category for this factor.

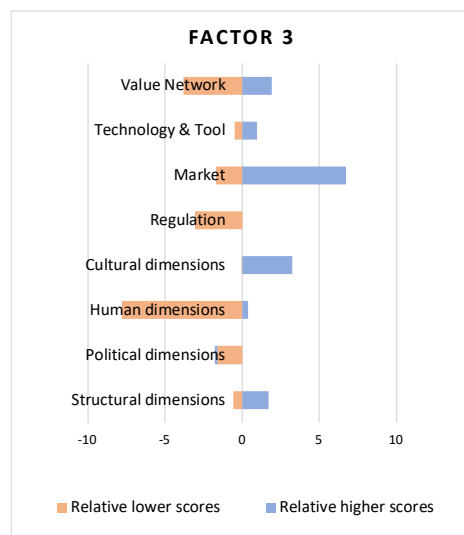


Figure 5: Distribution of statements over categories for Factor 3.

Factor 3 has high scores on cultural dimensions, market, technology and tool and value network. The low scores are in human dimensions and cultural dimension. The higher scores are external oriented and the lower scores are distributed

over internal and external categories. This means that the enablers for integrating sustainability in projects for factor 3 are considered to be rather in the external organization than in the internal organization.

The demand of the customer and the willingness to pay for sustainability are important enablers for participants related to factor 3, causing the relative high score in the category the market. If that is in place, room for trying things emerges, together with commitment of the company for sustainability and seeing sustainability as a company's responsibility causing relative high scores in the category cultural dimension. Whether sustainability is integrated in the vision and strategy of the company is also important to the participants related to this factor. Participants are then enabled to choose for sustainable alternatives if available and if those alternatives can be assessed on their sustainability and if the risks of those alternatives are known, considering sustainability is further enabled. This results in a relative higher score in technology and tool category. Participants see possibilities to cooperate with suppliers, such that the supplier can be trusted and can be assessed objectively on their sustainability performance, although the value of that contribution is considered limited and that other suppliers should be selected if they cannot be trusted. This causes a relative higher score in the category value network.

Participants argue that there is enough knowledge of sustainability, knowledge, training and education is there for relative low scored, causing a high relative lower score in the category human dimension. It is subsequently questioned whether the government or governmental organisation should try to influence integration of sustainability. This results in a low score on the regulation category.

Demand of the customer is very important for participants related to factor 3. The demand enables participants related to factor 3 to bring sustainability in the vision and strategy into practice. This factor is therefore labelled as "Demand and Strategy driven" (*Sustainability if it is asked for and fits our strategy*).

In general, it can be seen that the factor's scores in the individual categories differ, this is in line with the characterizations of the statements. It can also be seen that the higher scores are dominant on the external categories and that the lowest scores are on the internal categories. The high score on the political dimension for factor 1 is an exception to the described pattern. This high score is merely caused by statement 6: "it reduces costs". This means that suppliers in general perceive more enablers outside the organization than inside the organization, although they see enablers in the cultural and structural dimension as well.

## 5. Conclusions

The study reported in this paper set out to investigate: "What enablers for integration of sustainability in projects are perceived by project suppliers?" The study found that the enablers perceived by suppliers in general are both internally oriented and externally oriented. High ranked enabler categories are the market, structural dimension and cultural dimension. Specific enablers which are high rated and thus strongly perceived are "my client wants to pay extra for sustainability" and "the client asks for sustainability". Both enablers are in the category market. In the cultural dimension, "sustainability is seen as a company's responsibility" is high rated and in the structural dimension the rating of the enablers differs per factor, but in general "sustainability is integrated in the vision and strategy of my company" and "extra money is available" score high. It can be concluded that suppliers perceive enablers for integrating sustainability the most in the external organization in the category market and thus see enablers in the demand of the customer and influence of the customer. Other important enablers are internal oriented in the categories, structural dimension and cultural dimension and thus focus on strategies, rules, roles, goals, policies but also on meaning, beliefs and faith.

Next to these generic findings, our study also found three different patterns of enablers, that we labelled:

- Factor 1: Benefits driven (*Sustainability if it has benefits*);
- Factor 2: Demand and intrinsic motivation driven (*Willing to integrate sustainability if it is asked and paid for*);
- Factor 3: Demand and Strategy driven (*Sustainability if it is asked for and fits our strategy*).

As it appears from this study, for suppliers integrating sustainability in projects is strongly dependent on the demand and willingness of the customer to pay for sustainability. On the one hand, customers can take that into account into contracting strategies. On the other hand, adoption of sustainability in the supplier's policy could be a successful measure for integration of sustainability in projects as well. In that respect, it should be questioned whether a contractor should wait for the customer to ask for it or should take action by himself and differentiate himself from its competitors.

## References

- [1] W. Aarseth, T. Ahola, K. Aaltonen, A. Økland and B. Andersen, "Project sustainability strategies: A systematic literature review," *International Journal of Project Management*, vol. 35, no. 6, pp. 1071–1083, 2017.
- [2] P. O. Akadiri, "Understanding barriers affecting the selection of sustainable materials in building projects," *Journal of Building Engineering*, vol. 4, pp. 86-93, 2015.
- [3] S. Bell and S. Morse, "Measuring Sustainability Learning from doing," London, Earthscan, 2003.
- [4] M. Brouwer, "Q is accounting for tastes," *Journal of Advertising Research*, vol. 39, no. 2, pp. 35-39, 1999.
- [5] S. Brown, "Political Subjectivity - Application of Q Methodology in Political Science," New Haven and London, USA and UK, Yale University Press, 1980.
- [6] H.C. von Carlowitz, "Sylvicultura Oeconomica: Oder Haußwirthliche Nachricht und Naturmäßige Anweisung zur Wilden Baum-Zucht," Leipzig, Germany, Braun, 1713.
- [7] A. Dahlsrud, "How corporate social responsibility is defined: an analysis of 37 definitions", *Corporate Social Responsibility and Environmental Management*, vol. 15, no. 1, pp. 1–13, 2008.
- [8] Deloitte & Touche, "Business strategy for sustainable development: leadership and accountability for the 90s," International Institute for Sustainable Development, Diane Publishing, 1992.
- [9] G. Denzine, "The use of Q methodology in student affairs research and practice", *Student Affairs Journal Online*, 1998.
- [10] J.C. Donner, "Using Q-sorts in participatory processes: An introduction to the methodology," *Social analysis, selected tools and techniques, social development papers*, vol. 36, ed. R.A. Krueger, M.A. Casey, J. Donner, S. Kirsch, and J.N. Maack, The World Bank, Washington, DC., USA, 2001.
- [11] J.S. Dryzek and A. Berejikian, "Reconstitutive democratic theory," *American Political Science Review*, vol. 87, pp. 48-60, 1993.
- [12] T. Dyllick and K. Hockerts, "Beyond the business case for corporate sustainability," *Business Strategy and the Environment*, vol. 11, pp. 130-141, 2002.
- [13] D. Ebner and R.J. Baumgartner (2013, April 12), *The Relationship Between Sustainable Development and Corporate Social Responsibility* [Online], 2006. Available: <http://www.crrconference.org>.
- [14] M. Eid, "Sustainable Development & Project Management," Lambert Academic Publishing, Cologne, Germany, 2009.
- [15] J. Elkington, "Cannibals with Forks: the Triple Bottom Line of 21st Century Business," Oxford, UK, Capstone Publishing Ltc, 1997.
- [16] P. Eskerod and M. Huemann, "Sustainable development and project stakeholder management: what standards say," *International Journal of Managing Projects in Business*, vol. 6, no. 1, pp. 36-50, 2013.



- [17] G. Fernández-Sánchez and F. Rodríguez-López, “A methodology to identify sustainability indicators in construction project management—Application to infrastructure projects in Spain,” *Ecological Indicators* vol. 10, pp. 1193–1201, 2010.
- [18] R.E. Freeman, “Strategic Management: A Stakeholder Approach. Boston, USA, Pitman/Ballinger, 1994.
- [19] R. Gareis, M. Huemann, R-A. Martinuzzi, R-A, with the assistance of C. Weninger and M. Sedlacko, “Project Management & Sustainable Development Principles,” Project Management Institute, Newtown Square, PA, USA, 2013.
- [20] R.A. George, A. Siti-Nabiha, D. Jalaludin, and Y. Abdalla, “Barriers to and enablers of sustainability integration in the performance management systems of an oil and gas company,” *Journal of Cleaner Production*, pp. 1-16, 2016.
- [21] R. Gilbert, D. Stevenson, H. Girardet and R. Stern (Eds.), *Making Cities Work: The Role of Local Authorities in the Urban Environment*, Earthscan Publications Ltd, 1996.
- [22] GlobeScan. (2017, November, 6). *The 2017 Sustainability Leaders: Celebrating 20 Years of Leadership* [Online], 2017. Available at: <https://www.globescan.com/component/edocman/?view=document&id=275&Itemid=591>.
- [23] D. Goedknecht, “Responsibility for Adhering to Sustainability in Project Management,” 7th Nordic Conference on Construction Economics and Organization, Trondheim, Norway, pp. 145-154, 2013.
- [24] International Organization for Standardization. *ISO 26000 Guidance on Social Responsibility*, Geneva, 2010.
- [25] S.D. Julian, J.C. Ofori-Dankwa and R.T. Justis, “Understanding strategic responses to interest group pressures,” *Strategic Management Journal*, vol. 29, pp. 963-984, 2008.
- [26] J.J. Keeble, S. Topiol, and S. Berkeley, “Using Indicators to Measure Sustainability Performance at a Corporate and Project Level,” *Journal of Business Ethics*, vol. 44 no. 2-3, pp. 149-158, 2003.
- [27] D. Kumar and Z. Rahman, “Sustainability adoption through buyer supplier relationship across supply chain: A literature review and conceptual framework,” *International strategic management review*, vol. 3, pp. 110-127, 2015.
- [28] S.-Y. Lee and R. D. Klassen, “Drivers and Enablers That Foster Environmental Management Capabilities in Small- and Medium-Sized Suppliers in Supply Chains,” *Production and Operations Management*, pp. 573–586, 2008.
- [29] C. Labuschagne and A.C. Brent, “Sustainable Project Life Cycle Management: the need to integrate life cycles in the manufacturing sector,” *International Journal of Project Management*, vol. 23, no. 2, pp. 159-168, 2005.
- [30] M. K. Linnenluecke, S. V. Russell, and A. Griffiths, “Subcultures and sustainability practices: The impact on understanding corporate sustainability,” *Business Strategy and the Environment*, vol. 18, no. 7, pp. 432-452, 2009.
- [31] S. Marcelino-Sádaba, A. Pérez-Ezcurdia, L.F. González-Jaen, “Using Project Management as a way to sustainability. From a comprehensive review to a framework definition,” *Journal of Cleaner Production*, vol. 99, pp. 1-16, 2015.
- [32] P. Martens, “Sustainability: science or fiction?”, *Sustainability: Science, Practice, & Policy*, vol. 2 no. 1, pp. 36-41, 2006.
- [33] M.L. Martens and M.M. Carvalho, “Sustainability and success variables in the project management context: an expert panel,” *Project Management Journal*, vol. 47, no. 6, pp. 24-43, 2016.
- [34] Meadows, D. H., Meadows, D. L., Randers, J. and Behrens, W. W. (1972). *The Limits to Growth*. Universe Books.
- [35] K.R. Molenaar and N. Sobin, “A synthesis of best-value procurement practices for sustainable design-build projects in the public sector,” *Journal of Green Building*, vol. 5, no. 4, pp. 148-157, 2010.

- [36] A. Økland, "Gap analysis for incorporating sustainability in project management," *Procedia Computer Science*, vol. 64, pp. 103-109, 2015.
- [37] C. Pade, B. Mallinson and D. Sewry, "An Elaboration of Critical Success Factors for Rural ICT Project Sustainability in Developing Countries: Exploring the Dwesa Case," *The Journal of Information Technology Case and Application*, vol. 10, no. 4, 2008.
- [38] J. Robinson, "Squaring the circle? Some thoughts on the idea of sustainable development," *Ecological Economics*, vol. 48, pp. 369-384, 2004.
- [39] A.J.G. Silvius, "Integrating sustainability into project risk management," in "Managing Project Risks for Competitive Advantage in Changing Business Environments," S. Bodea, A. Purnus, M. Huemann, and M. Hajdu, (Eds.), IGI Global, 2016.
- [40] A.J.G. Silvius, M. Kampinga, S. Paniagua and H. Mooi, "Considering Sustainability in Project Management Decision Making; An investigation using Q-methodology," *International Journal of Project Management*, vol. 35, no. 6, pp. 1133-1150, 2017.
- [41] A.J.G. Silvius and R. Schipper, "Sustainability in Project Management: A literature review and impact analysis," *Social Business*, vol. 4, no. 1, 2014.
- [42] A.J.G. Silvius and R. Schipper, "Developing a Maturity Model for Assessing Sustainable Project Management," *Journal of Modern Project Management*, vol. 3, no 1, pp. 16-27, 2015.
- [43] A.J.G. Silvius, R. Schipper, J. Planko, J. van den Brink and A. Köhler, "*Sustainability in Project Management*," Gower Publishing, 2012.
- [44] N. Smith, "Current systems in psychology: history, theory, research, and applications," Wadsworth, 2001.
- [45] R. Stewart, N. Bey and C. Boks, "Exploration of the barriers to implementing different types of sustainability approaches," *Procedia CIRP*, vol. 48, pp. 22-27, 2016.
- [46] M. Suprpto, H.L.M. Bakker, H.G. Mooi and W. Moree, "Sorting out the essence of owner-contractor collaboration in capital projects delivery," *International Journal of Project Management*, vol. 33, no. 3, pp. 664-683, 2015.
- [47] F. Toderoiu, "Ecological Footprint and Biocapacity: Methodological and Regional and National Dimensions," *Agricultural Economics and Rural Development, New Series*, vol. 7, no. 2, pp. 213-238, 2010.
- [48] R.J. Turner, "Projects and Their Management," in "Handbook of Project Management," J.R. Turner (Ed.), New York, USA, Gower publishing, Routledge, 2014, pp. 19-34.
- [49] C. Weninger and M. Huemann, "Project Initiation: Investment Analysis for Sustainable Development," in "Sustainability Integration for Effective Project Management," A.J.G. Silvius, and J. Tharp (Eds.), IGI Global Publishing, 2013.
- [50] S. Watts, and P. Stenner, "Doing Q methodology: theory, method and interpretation," *Qualitative Research in Psychology*, vol. 2, no. 2, pp. 67-91, 2005.
- [51] J. K. Wong, J.K. Chan and M.J. Wadu, "Facilitating effective green procurement in construction projects: An empirical study of the enablers," *Journal of Cleaner Production*, vol. 135, pp. 859-871, 2016.
- [52] World Commission on Environment and Development, "*Our Common Future*," Oxford University Press, Oxford, UK, 1987.

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