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Factors That Stimulate Project Managers to Consider Sustainability; Exploring the Stimulus Patterns of Canadian Project Managers

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Abstract

As sustainability is being integrated into corporate strategies, the discussions on sustainability have moved from whether it should be addressed in strategy, to how it should be integrated into business practices. And as projects are a vehicle for the implementation of organizational strategies, it is suggested that consideration of sustainability should be integrated into the processes and practices of project management. A pivotal role in this integration is foreseen for the project manager. The project manager has a central position in the project, which provides the opportunity to influence many aspects of the project. However, an opportunity to act is be enough, as many factors or circumstances influence the actual behavior of the project manager with regards to sustainability.

In a European study into the factors that stimulate project managers to address sustainability, three distinct stimulus patterns were revealed. As national or societal culture is known to influence sustainability behavior, the study reported in this paper focuses on exploring the factors that stimulate Canadian project managers to consider sustainability in their projects.

Similar to the European study, this study revealed three distinct stimulus patterns, that were characterized as 'Intrinsically motivated', 'Pragmatic' and 'Normative driven'. The findings of the study confirm the patterns of the earlier study to a large extent. Two of the three patterns of the studies showed similar characteristics. The third pattern of the studies showed partial similarity and partial difference, with the European project managers tending more towards the opportunities for implementation of sustainability, and the Canadian project managers putting more value on the alignment of personal and organizational values.

Keywords: project management, sustainability, sustainable behavior, TPB

1. Introduction

1.1 Introducuction of the Problem

In today's disruptive economy, where consumers' needs and technology are constantly changing, sustainability is increasing becoming a new area of focus for CEOs (Epstein & Rejc, 2014; Lacy et al., 2012). According to the 2010 UN Global Compact—Accenture survey, there is a significant shift of CEO mindsets in believing "*sustainability issues will be critical to the future success of their business*" (Accenture, 2010, p. 13). Corporations are increasing incorporating sustainability as part of their overarching strategies (Lo & Sheu, 2007), and the discussions around sustainability have moved from *whether* sustainability should be addressed in corporate strategy, to *how* sustainability should be integrated (Epstein & Rejc, 2014, p. 23).

Despite the advertised strategies and ambitions with regards to sustainability, many organizations struggle to operationalize these strategies into concrete actions (Chang & Slaubaugh, 2017). As projects are a vehicle for the implementation of organizational strategies (Project Management Institute, 2017), the management of projects is now gaining attention as an essential enabler of the transition of organizations towards sustainability (Marcelino-Sádaba et al., 2015; Morris, 2009; Longman & Mullins, 2004). Several authors (For example Silvius et al., 2012; Marcelino-Sádaba et al., 2015; Silvius, 2015; Huemann & Silvius, 2017) suggest that consideration

of sustainability should be integrated into the processes and practices of project management, and sustainability is considered a new 'school of thought' in project management (Silvius, 2017). This approach, often labelled 'Sustainable Project Management' (SPM), is gaining traction in studies and publications (Silvius & Schipper, 2014; Aarseth et al., 2017; Armenia et al., 2019; Sabini et al., 2019), and SPM is identified as one of the most important global project management trends today (Alvarez-Dionisi et al., 2016).

Despite the growing academic attention for the integration of sustainability concepts into project management, putting SPM into practice still appears to be difficult (Silvius, 2019). A pivotal role in the integration of sustainability is foreseen for the project manager (Maltzman & Shirley, 2013). "*Project and Programme Managers are significantly placed to make contributions to Sustainable Management practices*" (Association for Project Management, 2006, p. 7), and "*Today's project manager fulfils not only traditional roles of project management but also must manage the project in the most efficient and effective manner with respect to sustainability*" (Hwang & Ng, 2013, p. 273). The project manager has a central position in the project and that provides the opportunity to influence many aspects of the project. However, having the opportunity to act may not be enough (Silvius & De Graaf, 2019), as many factors or circumstances influence the actual behavior of the project manager with regards to addressing sustainability in the project.

1.2 Earlier Study

In a European study into the factors that stimulate project managers to address sustainability in their projects, Silvius et al. (2017a) found that different (groups of) project managers are stimulated by different factors. The study revealed three distinct stimulus patterns, that were labelled: "*Intrinsically motivated*", "*Task driven*" and "*Pragmatic*". As the study of Silvius et al. (2017a) was focused on Europe, and national or societal culture is known to influence sustainability behavior (Kang & Moscardo, 2006), it can be questioned whether their findings apply also to other geographical regions. Therefore, a knowledge gap still exists in what factors stimulate non-European project managers to consider sustainability in their projects. The study reported in this paper therefore focuses on exploring the factors that stimulate Canadian project managers to consider sustainability in their projects.

1.3 Research Question

Using Q methodology, the study explored the question *What drivers do project managers in Canada perceive for considering sustainability in their projects?*

The remainder of the article is organized in four paragraphs. Paragraph 2 discusses the concepts of sustainability, sustainable project management, cultural effects on sustainability and selected studies on sustainable behavior. The following paragraph outlines the research design and approach. Paragraph 4 will present the findings of the study and their analysis. Paragraph 5 will provide a discussion in which the findings of the study will be compared with the findings of the earlier study by Silvius et al. (2017a), followed by paragraph 6 that will provide a conclusion and recommendations for future studies.

2. Literature

2.1 Sustainability

Sustainability is a concept of a long history within the corporate context, the earliest publication can be found dating back to over 150 years ago (Dyllick & Hockerts, 2002). This concept became a mantra in 21st century whith organizations "*integrating ideas of sustainability in their marketing, corporate communication, annual reports and their actions*" (Silvius & Schipper, 2014, p. 63). The concept of sustainability "*is understood by instinct, but difficult to express in concrete, operational terms*" (Briassoulis, 2001, p. 410). A foundational starting point is the Brundtland Report, that defines sustainable development as: "*meeting the needs of the present generation without compromising the ability of future generations to meet their own needs*" (World Commission on Development and Environment, 1987, p. 16). Sustainability aims to secure intergenerational equity (Bansal & DesJardine, 2014). This definition is advocating a long-term balanced view that businesses are not used to, and in many cases, do not know how to. To simplify this complex concept, Hopkins (2009) boils the definition down to four words, "*Enough, for all, forever*".

Initially, sustainable development was centered around environmental concerns on a macroeconomic level (Steurer, 2001). Economic and social issues were addressed only as far as they were perceived to be relevant for environmental concerns (Ibid.). In the 1990s, the meaning of sustainable development got broadened by the concept of the 'Triple Bottom Line' (TBL) (Elkington, 1994), which rapidly gained popularity. In this multi-perspective view, sustainability is about the balance or harmony of economic, environmental and social considerations. The TBL concept got operationalized in several sets of sustainability indicators, which could also

be applied on the micro economic level of organizations and companies.

Implementing sustainability in companies does not imply that business executives to become "*tree-hugging environmental activists*" (Willard, 2012, p. 12), rather, it prompts the leadership to evaluate business strategies and proposals with a longer-range view (Werbach, 2009; Willard, 2012). Incorporating sustainability in the business context is pushing business leaders to think beyond the immediate two to three years, rather, it is asking them to think across decades, generations and, in some instances, centuries. Based on these considerations, business sustainability is defined as the ability of firms to "*integrates social, environmental, and economic responsibility*" (Martens & Carvalho, 2017, p. 1085) to "*respond to their short-term financial needs without compromising their (or others') ability to meet their future needs*" (Bansal & DesJardine, 2014, p. 71). Instead of just focusing on short term economic gain, executives should also evaluate new opportunities based on the proposal's impact to environment and social conditions. To embed sustainability in business strategies and processes mean executives need to understand the interdependencies of each dimension of the triple bottom line and see how it can solve the core challenges of the business (Werbach, 2009).

Incorporating sustainability also prompts companies to stretch their considerations to include also the operations of their business partners (Elkington, 2004) and suppliers (Peenstra & Silvius, 2017; Willard, 2012; Baah & Jin, 2019). This was demonstrated through the Nike's and Gap's child labour case studies (Willard, 2012). When the extended supply chains are acting unethically, the source company's (i.e., Nike & Gap) reputation were negatively impacted as a result. This negative reputation will not only lead to economic loss for the company, but it also negatively impacted the community the company operates in and the overall society wellbeing of the impacted community. Therefore, to practice business sustainability, companies need to find the "sweet spot" (Savitz & Weber, 2014, p. 33) where business interest and society interest intersect and seek initiatives that can generate business benefits for the business, society as well as the environment.

2.2 Projects and Sustainability

Projects are defined by their temporary nature (Turner, 2014) and their task orientation. The Project Management Institute defines a project as "*A temporary endeavor undertaken to create a unique product, service, or result*" (Project Management Institute, 2017). This view aligns with the 'task' perspective on projects, in which projects are seen as temporary efforts of carrying out given tasks (Andersen, 2008). The project is ideally detached from the rest of the world and the project team should concentrate fully on carrying out the task. The organisational context of the project should therefore not interfere with the project and the management of the project should fully focus on the planning and control processes within the project, in order to realise the given task in the right quality, on the agreed timeline and budget. However, there is more to projects than just the defined task. In what is considered the 'organisational' perspective on projects, a project is "*a temporary organisation, established by its base organisation to carry out an assignment on its behalf*" (Andersen, 2008). In the organisational perspective, the main purpose of a project is value creation. And as value creation comes from changes the 'base' organisation, a close cooperation between the project and its organizational environment is essential to the success of the project. Project management is therefore focused on the relationships between the project and the environment.

No single perspective is best and the way people perceive reality depends on their position, experience, knowledge and context (Andersen, 2008). However, from a sustainability perspective, the two perspectives are not equally preferable. Sustainable development in essence is "*a process of change*" (World Commission on Development and Environment, 1987). Combining the change perspective on projects and the requirement of change that sustainability entails, Marcelino-Sádaba et al. (2015) observe that "*projects are the ideal instrument for change*". Elaborating on the organisational perspective on projects, the sustainability 'school of thought' in project management adopts a societal perspective on projects and considers projects as instruments to realise societal change (Silvius, 2017). This societal perspective is justified by the growing role projects play in society, which accounts for roughly one third of economic activity (Schoper et al., 2018). However, the role of projects in society is not limited to economic value. The sustainability school of thought elaborates on this societal role by considering also the social and environmental impact of projects. Silvius and Schipper (2014) point at the recognition of this societal context of projects as the starting point of considering sustainability in project management.

After a structured review of the emerging literature on sustainability and project management, Silvius and Schipper (2014) developed the following definition of SPM: "*Sustainable Project Management is the planning, monitoring and controlling of project delivery and support processes, with consideration of the environmental, economic and social aspects of the life-cycle of the project's resources, processes, deliverables and effects, aimed*

at realising benefits for stakeholders, and performed in a transparent, fair and ethical way that includes proactive stakeholder participation." This definition refers to the earlier mentioned triple bottom line concept (Elkington, 1994), as well as the time perspective, that are essential to sustainability. The definition also refers to an orientation on stakeholder's interests that, although originating from the concepts of corporate social responsibility (International Organization for Standardization, 2010), developed as an inseparable element of sustainable development (Steurer, 2001).

The consideration of environmental, economic and social aspects of the project's deliverable influences the specifications and design of that deliverable (Brones et al., 2014; Aarseth et al., 2017), materials used (Akadiri, 2015), quality and success criteria (Ugo, 2017; Martens & Carvalho, 2017), and benefits to be achieved (Weninger & Huemann, 2013; Silvius et al., 2012), SPM, however, also considers the environmental, economic and social aspects of the project's processes of project management and delivery, such as the identification and engagement of stakeholders (Eskerod & Huemann, 2013; Sánchez, 2015), the process of procurement in the project (Molenaar & Sobin, 2010), the development of the business case (Weninger & Huemann, 2013), the monitoring of the project (Sánchez, 2015), the identification and management of project risks (Silvius, 2016), the communication in and by the project (Pade et al., 2008), and the selection and organization of the project team (Silvius & Schipper, 2014). It may therefore be concluded that considering sustainability impacts all aspects of project management.

2.3 Sustainable Behavior of the Project Manager

The project manager has been suggested as one of the main influencers with regards to considering sustainability in project management. Maltzman and Shirley (2013, p. 926) identified project managers as the "*change agent*" of organizations, through delivering changes and benefits in the form of new products, services, processes, resources or partners. Also, Goedknegt (2012) concluded a central role of the project manager, but also pointed out that the fulfillment of that role will depend on the motivation of the project manager. Silvius and Schipper (2014) concluded therefore that sustainable project management will require a "*mind shift*" (Silvius & Schipper, 2014, p. 64) of the project manager. Instead of acting as a subordinate to the project sponsor, project managers should "*develop themselves as specialists in sustainable development and act as partners of and peers to stakeholders*" (Crawford, 2013).

Despite the encouragements found in academic literature, Silvius and De Graaf (2019) comment that the actual behavior of the project manager with regards to sustainability is influenced by the moral compass and personal beliefs of the individual, but also by several other factors, such as the perceived potential benefits that sustainability might bring to the project and the opinions about sustainability of key stakeholders of the project.

In a European study into the factors that stimulate project managers to address sustainability in their projects, Silvius et al. (2017a) found that different (groups of) project managers are stimulated by different factors. The study revealed three distinct stimulus patters, that were labelled: "*Intrinsically motivated*", "*Task driven*" and "*Pragmatic*". *Intrinsically motivated* project managers are stimulated to address sustainability mainly because of their personal beliefs. They care about nature, the planet and the future and feel that caring for sustainability is something they should do. External factors, such as the characteristics of the project, or the opinion of others, do not play a large role in their motivation. A contrast with this group is the *Task driven* project managers. These project managers are stimulated mainly by the project's assignment and the opinion of others. They will consider sustainability when required to do so, but are not strongly self-motivated for sustainability. The third group of project managers, labelled *Pragmatic*, is also not strongly self-motivated to consider sustainability, but will consider sustainability when they have the knowledge and tools and see a good application for sustainability.

As the study of Silvius et al. (2017a) was located in the Netherlands and focused on Europe, it may be questions whether their findings apply also to other geographical regions.

2.4 Geographical and Cultural Differences

In a study of sustainability performance measurement instruments on country level using the TOPSIS methodology, Dias et al. (2017) showed that Western European countries, including the Netherlands, on average rank high on economic and social indicators of sustainability. And although environmental awareness and performance in Western Europe is also high (Yale Center for Environment Law and Policy, 2018), the high consumption levels in Western European countries prevent them from making the top 10 on the environmental indicators of the TOPSIS-based ranking (Dias et al., 2017). Canada also ranks high on economic indicators but tends to score lower that the Western European countries on social and environmental indicators, despite its strong commitment to reduce green gas effects (Sadjadi & Sadi-Nezhad, 2017). The general ranking of TOPSIS places Netherlands in number nine position comparing to other countries around the world. Whereas Canada,

with a lower social and environmental score, did not make the top ten ranked countries in this study (Dias et al., 2017). This result indicates Canada, compare to Netherlands, experienced a lower social indicator in the context of sustainability behavior.

As national or societal culture is found to influence the perception of sustainability and sustainability behavior (Kang & Moscardo, 2006), the cultural differences between the Netherlands and Canada may be one of the factors influencing the consideration of sustainability in these countries/regions. The most widely used characterization of national cultures is that of Hofstede (1980). Based on a study that included more than 120,000 respondents from 50 countries, he identified four dimensions of national cultures:

- PDI (Power Distance Index)

  The power distance index is an indication of the extent to which less powerful members of a society accept unequal distribution of power. It reveals dependence relationships in a country. A low PDI shows limited acceptance of power inequality and less dependence of subordinates on managers. It also shows a preference for consultation and cooperation.

- IDV (Individualism vs. Collectivism)

  In cultures that are considered highly individualistic, individuals are loosely tied and are expected to look out for themselves and their family. In 'collectivist' cultures, people are integrated into strongly cohesive in-groups, and group loyalty lasts a lifetime. In individualistic cultures, time, punctuality and schedules are considered highly important, whereas in collectivistic cultures personal relationships and contacts prevail.

- MAS (Masculinity vs. Femininity)

  In the dichotomy masculine versus feminine, a masculine culture values assertiveness, performance and material success. In a feminine society values like quality of life, tenderness and modesty prevail. In a feminine culture, individuals don't like to stand out or be unique, whereas in a masculine society success and career are valued highly.

- UAI (Uncertainty Avoidance Index)

  The uncertainty avoidance index is defined as "the extent to which the members of a culture feel threatened by uncertain or unknown situations" (Hofstede, 1991). Cultures with a high UAI have a large need for rules and regulations to guide tasks. Cultures with a low UAI are less rule-dependent and are more trusting (Mooij, 2000).

Over the years this model has been enhanced and two new dimensions were added:

- LTO (Long Term Orientation)

  LTO refers to the links a society has with its past, while dealing with the challenges of the present and the future. Countries that score low on this dimension prefer to maintain time-honoured traditions and norms while viewing societal change with suspicion.

- IVR (Indulgence vs. Restraint)

  Indulgence stands for a society that allows relatively free gratification of basic and natural human drives related to enjoying life and having fun. Restraint stands for a society that suppresses gratification of needs and regulates it by means of strict social norms (Hofstede Insights, 2017).

Hofstede's framework of international cultiures has been criticized (Miller et al., 2006), and some authors prefer alternative frameworks such as Schwartz's (1994) because of their more recent nature. The suthors, however, use Hofstede's framework in this study because of its usage and acceptance amongst both academics and practitioners.

When comparing the Hofstede scores for the cultures of Canada and the Netherlands (Figure 1, based on Hofstede Insights, 2017), the first impression id that the cultures of these countries have many similarities.

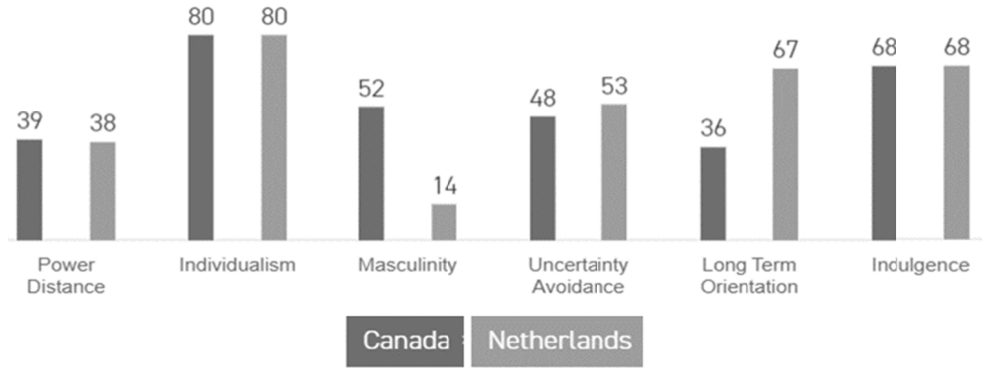

Figure 1. Charcterization of the national cultures of Canada and the Netherlamds (Hofstede Insights, 2017)

On four of the six dimensions of national culture, Canada and the Netherlands score remarkably equal of close. Two other dimensions, however, show a clear difference. These are Masculinty and Long Trem Orientation. Within the context of sustainability, the difference between Canada and the Netherlands in Long Term Orientation deserves attention. According to a recent study of project GLOBE, the 'future orientation' of a societal culture is a predictor for the consideration of sustainability in society and organisations and thereby for sustainability practices (Miska et al., 2018).

Given the difference in score between Canada and the Netherlands it may therefore be expected that Dutch project managers working have a higher tendency to consider sustainability in their projects than Canadian one's. The study reported in this paper therefore focuses on exploring the factors that stimulate Canadian project managers to consider sustainability in their projects.

2.6 Influencing Behaviour

One of the most used frameworks of factors to explain sustainable behavior, and also the model used in the studies of Silvius et al. (2017a) and Silvius and De Graaf (2018), is the Theory of Planned Behavior (TPB) (Ajzen, 1991). TPB aims to better understand, describe, predict and control behavior (Armitage & Conner, 2001), by linking beliefs and behavior. According to the TPB, (intended) human behavior is guided by three kinds of beliefs (Ajzen, 1991):

- 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 belief 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 (Ajzen, 1991).

TPB is a frequently used construct to examine the factors that influence behavior. Armitage and Conner (2001) concluded, based upon a meta-analysis of 185 independent studies that used TPB, that the model has a satisfactory predictive value.

The study reported in this article followed the earlier study of Silvius et al. (2017a) in selecting the TPB as the conceptual starting point for the exploration of project manager stimulus patterns in Canada.

3. Method

This paragraph presents the research strategy and research design of the study. In line with the study by Silvius et al. (2017a), this study also used Q-methodology as research strategy.

3.1 Q-Methodology

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 (For example, Suprapto et al., 2015; Silvius et al., 2017b). In Q methodology, participants will be given a set of statements to sort (Q-sorting) from their own perspective using a Q-sort diagram. This type of sorting allows "*the participants to decide what is meaningful and hence what does (and what does not) have value and significance from their perspective*" (Watts & Stenner, 2005, p. 74). During the Q-sort procedure, each participant will rank the statements from "*Most Agree*" to "*Most Disagree*" and place the statements in the form of a fixed quasi-normal distribution format as shown in Figure 2. For example, each participant will go from right to left, placing the two Most Agreed Q statements in the furthest right-hand column and continue to place each Q statements in the descending order, until the entire diagram is filled. Through this Q-sort procedure, "*the participants give their subjective meaning to the statements and in this way they reveal their subjective viewpoint*" (Smith, 2001) or "*personal perspective*" (Brouwer, 1999).

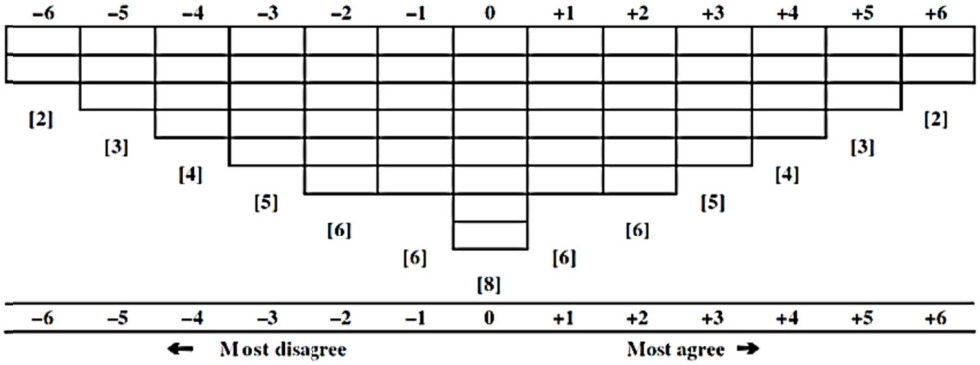

Figure 2. Sample Q sort diagram (Watts & Stenner, 2005)

3.2 Q-Set Statements

The Q-set of statements for this research were based on the three categories of TPB. The statements were generated through a combination of literature review, previous studies, as well as brainstorming and synthesizing literature. According to Watts and Stenner (2005, p. 75), "*a Q set of somewhere between 40 to 80 statements is considered satisfactory*". Furthermore, the same article indicates that "*the generation of potential statements need not be theory driven*". The Q statements are generated as potential answers to an umbrella' question that was formulated as: "*I am stimulated to address sustainability in my project if/because…*".

The set of Q statements include 47 statements, 16 of which were caterorized as referring to the behavioral beliefs, 16 referred to the normative beliefs and the remaining 15 to the control beliefs. The Q-set was tested and refined by piloting the set to selected participants. And although this piloting does not provide a guarantee that the Q-set is complete, this is not considered a problem, as a Q-set never can really be complete (Watts & Stenner, 2005). Table 1 presents the total Q-set. The statements were randomly numbered in order to avoid influencing the participant.

Throughout the paper, we will, for clarity purposes, display the statements that refer to behavioral beliefs in a red colour, the statements that refer to normative beliefs in blue, and the statements that refer to control beliefs in green.

Table 1. Q-set of statements used in the study

Category	Number	Statement
Behavioral	25	Sustainability is a necessary innovation
Behavioral	30	Sustainability is a leadership challenge
Behavioral	26	It is important to act socially responsible
Behavioral	40	Sustainability is a set of enabling strategies that will help meet existing goals
Behavioral	2	Sustainability has to be on everyone's agenda
Behavioral	39	Sustainability is smart business
Behavioral	35	I want my company/project to be viewed as an organization that solve big problems for customers and the world
Behavioral	1	I understand the risk of not engaging in sustainability
Behavioral	27	It makes good business sense to be sustainable
Behavioral	42	It will help reduce or eliminate waste
Behavioral	7	It will reduce energy use and climate change impact
Behavioral	6	Growth and sustainability are complements of each other
Behavioral	28	Sustainability is an opportunity to re-invest back to my community
Behavioral	44	Sustainability is a good risk reduction strategy
Behavioral	13	I am rewarded for it
Behavioral	11	I have a personal interest in sustainability
Normative	3	My company has a product take back / recycle program
Normative	18	My company choose to work with suppliers who meet the company's eco-efficiency policy
Normative	19	My company has a sustainability department
Normative	45	Sustainability in projects create long term success for my company
Normative	32	A growing population believes businesses has a crucial role to play in sustainability
Normative	36	Sustainability is becoming an increasingly necessary part of every manager's portfolio
Normative	16	My company has policies on incorporating sustainability
Normative	8	My project plan has related sustainability KPIs
Normative	17	Sustainability is one of my company's strategic goal
Normative	9	My company has an energy reduction target for next 3-5 years
Normative	10	Sustainability consideration is part of my company's project selection criteria
Normative	14	Client(s) asked for it
Normative	22	PMI name it in their code of conduct
Normative	21	Key stakeholder(s) find it important (Steering committee/Project Executive/Project Sponsor)
Normative	4	My company has a triple bottom line policy / framework
Normative	20	Colleagues are open to it and/or interested in it
Control	43	I can influence key executives/change leaders to consider sustainability
Control	15	There are existing processes I can follow to incorporate sustainability into my projects
Control	29	Sustainability helps improve project team morale
Control	24	Changing behaviours is the most expedient way to change status quo
Control	23	I can engage/influence my stakeholders to get buy-in for sustainability issue
Control	38	I have been trained on sustainability
Control	5	It provides more opportunity for my project team to be creative in designing the solution for my project
Control	41	My project team and I have direct control/influence over choosing renewal or "green" material for project use
Control	33	The project and/or product is well suited to it
Control	37	It is part of the project plan or requirements
Control	31	The project budget allowed for sustainability resources (experts, materials, and/or equipment)
Control	12	I have experience managing sustainability issues
Control	47	I know exactly what it means by sustainability issues
Control	46	I can see the result of my work
Control	47	I know exactly what it means by sustainability issues
Control	34	Sustainability will have a positive ROI and/or manageable pay back period

3.3 Data Collection

The research was carried out in a structure interview format in order to allow the researcher to explain the process and observe the entire process of Q sorting. All but one of the interviews were carried out in person, with the remaining participant chosing to participate online. At the beginning of the interview, a brief background of the research was shared with each participant along with an overview of how Q sorting works was provided. During this initial conversation, participants were encouraged to talk about their work in the context of project

management and sustainability. After the sort, the participants were asked some post sorting questions about the rationale behind their ranking order of the statements. These statements provided some qualitative information for the research. In addition, demographics information was collected towards the end of the interview.

For face to face interviews, a paper-based Q sort diagram (Denzine, 1998) was used. For the online interview, participant was using the Lloyd's Q-sorting website (nowhereroad.com/qsort/) to carry out the study. For both face to face and online interviews, a copy of the completed Q sort diagram was captured for analysis purpose.

3.4 Sample

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 (Watts & Stenner, 2005). A sample (P-set) of between 40 and 60 participants is considered most effective (Stainton Rogers, 1995). In our study, in total, 45 participants participated (44 face-to-face and 1 online).

Sampling was done using purposive sampling on project management events and project management networks. This group of participants was selected to represent different industries and experience level. Interviews to collect data were scheduled during March 2018 to April 2018, in the City of Calgary. Table 2 below provides a summary of the demographics of the participants.

Table 2. Demographics of the P-set.

Question	Answer Category	Percentage
Gender	Male	44%
	Female	56%
Age	25–34 years old	27%
	35–44 years old	47%
	45–54 years old	16%
	55–64 years old	11%
Position (multiple answers allowed)	Project or program management	84%
	Portfolio management	27%
	Business development	20%
	General management	24%
	Financial management	9%
	IT management	9%
	HR management	9%
	Other	33%
Type of Projects (multiple answers allowed)	Organizational change	31%
	Information system or technology	24%
	Infrastructure	29%
	Construction	49%
	Research and Development	11%
	Real Estate	4%
	Other	44%
Industry (multiple answers allowed)	Agriculture	7%
	Industrial	16%
	Energy	64%
	Construction	29%
	Health Care	7%
	Wholesale and retail	2%
	Logistics	4%
	Finance	2%
	Real Estate	4%
	Human Resources	0%
	IT and Communications	11%
	Management consultancy	13%
	Public Sector	27%
	Education	4%
	Other	11%
Project Budget Size (multiple answers allowed)	<$1 Million	35%
	$1–$10 Million	33%
	$10–$100 Million	16%
	>$100 Million	16%

The sample of participant was almost equally split between male and female, with a slightly higher representation of female project managers the authors considered this as positive, as many project management studies are biased towards male respondents.

The age distribution of the sample showed a pattern that the authors considered as normal for the project management with almost half of the respondents being between 35 and 44 years of age and the other half of the sample equally split between younger than 35 years and older than 44 years. In terms of positions, the dominant majority of the participant indicated their positions are either project or program management, which was also the intention. It should be noted that participants could select multiple positions when answering this question.

The type of projects the participants were active in showed a wide diversity, which also fitted the intentions of the researchers. Also, the industries the participants represented reflected this diversity. The researchers therefore feel that the results of the study are not dominated by a particular type of project or industry.

In terms of project budget size, most of the participants indicates their project sizes are between small (<$1 million) to medium ($1–$10 million). Larger sized projects, $10–$1000 million and >$100 million, both represented approximately 15% of the sample.

3.5 Analysis

After the data collection process, individual Q-sorts were entered into the PQ Method software, version 2.35 (Smolck, 2018). for compilation and factor analysis. The analysis completed was using the original Brown (1980) centroid factor analysis. This analysis method uses data reduction techniques to find similar groupings of results based on participants' subjective meaning of the topic (Ramlo, 2016). Since this study is explorative in nature, where there might be more than one single answer (Brown, 1980), therefore a centroid factor analysis would fit the purpose of this study instead of the more modern Principal Components factor analysis (PCA). Brown (1980) also argued that PCA would provide better solutions statistically but "*limit the scientific process of exploring alternative explanation because of the violating assumptions of a singular, best mathematical solution*". This concept aligns well with the research topic of this dissertation, as the integration of sustainability and project management is an emerging field (Huemann & Silvius, 2017; Marten & Carvalho, 2016), abduction reasoning could provide additional insights to bring new knowledge to this domain (Ramlo, 2016).

4. Results

This paragraph presents the findings of the research. The first section will provide the result of the centroid factor analysis of the Q-sorts and the patterns identified. Section 4.2 will provide the detailed analysis of the Q statements that form the patterns found. Section 4.3 will provide the analysis of the patterns identified. Section 4.4 covers the least and most defining statements.

4.1 Factor Analysis

As a first step in the analysis, a principal components factor analysis was performed in which the eigenvalues of the data set were calculated. Following the Kaiser-Guttman criterion (Yeomans & Golder, 1982), the factors with an eigenvalue greater than or equal to 1 were considered relevant. This resulted in four factors. As the fourth factor consisted of only two Q sorts, it formed a "*single case*" (Watts & Stenner, 2005) which represented not truly a shared view between the Q sorts. For this reason, it was discarded and the analysis based on three distinct factors.

The three factors have a total explained Variance of 34%, which is considered satisfactory (Watts & Stenner, 2005). Based on auto flagging function within PQ method, 33 Q-sorts were flagged in a factor. Three more Q-sorts that showed scores in excess of 0.4 were manually flagged. In total therefore 36 of the 45 participants (80%) could be flagged in one of the factors, which is quite satisfactory. The measure of internal consistency of the factors, Composite Reliability, can be considered 'excellent', with scores between 0.941 and 0.989 (see Table 3).

Table 3. Factor statistics.

	Factor 1	Factor 2	Factor 3
Number of defining variables	23	9	4
Average Rel. Coef.	0.800	0.800	0.800
Composite Reliability	0.989	0.973	0.941
S.E. of Z-Scores	0.104	0.164	0.243

Table 4 shows the correlation between the factors.

Table 4. Factor correlations

	Factor 1	Factor 2	Factor 3
Factor 1	1	-0.1128	0.2346
Factor 2	-0.1128	1	-0.0678
Factor 3	0.2346	-0.0678	1

From Table 4 it can be concluded that the three factors are weakly correlated, which makes it distinct from each other. The factors therefore appear to have a satisfactory level of uniqueness.

4.2 Analyzing the Three Factors

As the factors represent distinct stimulus patterns of the project managers, we will further address them as 'patterns'. Table 5 presents the 15 top-ranked statements for each pattern, from highest ranked to less high ranked. The statements are colour coded (red for behavioral beliefs, blue for normative beliefs and green for control beliefs) to show the TPB category they belong to. In addition, *bold* statements are indicating that these statements are distinguishing statements, significant at P<0.05, with *bold italic* indicating distinguishing statements, significanct at P<0.01. The *underlined* statements are statements that have a high level of consensus between the three patterns.

This ranking table provides a visual view to see the highest and lowest ranked statements in different TPB categories. This provide context and analysis on what makes each pattern distinguished from others. A further analysis and description of the patterns follows in paragraph 4.3.

Table 5. Top-ranked statements per answering pattern

Pattern 1			Pattern 2			Pattern 3		
Rank	Statement	Z Score	Rank	Statement	Z Score	Rank	Statement	Z Score
1	***26. It is important to act socially responsible***	1,905	1	***14. Client(s) asked for it***	2,45	1	35. I want my company/project to be viewed as an organization that solve big problems for customers and the world	1,61
2	***27. It makes good business sense to be sustainable***	1,627	2	***21. Key stake-holder(s) find it important (Steering committee/Project Executive/Project Sponsor)***	2,145	2	***17. Sustainability is one of my company's strategic goal***	1,599
3	***39. Sustainability is smart business***	1,575	3	**31. The project budget allowed for sustainability resources**	1,606	3	***30. Sustainability is a leadership challenge***	1,787
4	***11. I have a personal interest in sustainability***	1,544	4	***37. It is part of the project plan or requirements***	1,412	4	***9. My company has an energy reduction target for next 3-5 years***	1,253
5	35. I want my company/project to be viewed as an organization that solve big problems for customers and the world	1,335	5	***8. My project plan has related sustainability KPIs***	1,409	5	***16. My company has policies on incorporating sustainability***	1,202
6	45. Sustainability in projects create long term success for my company	1,157	6	***10. Sustainability consideration is part of my company's project selection criteria***	1,368	6	***26. It is important to act socially responsible***	0,552
7	***25. Sustainability is an innovation***	1,106	7	45. Sustainability in projects create long term success for my company	1,11	7	45. Sustainability in projects create long term success for my company	1,253

8	***28. Sustainability is an opportunity to re-invest back to my community***	1,091	8	***43. I can influence key executives/change leaders to consider sustainability***	1,092	8	44. Sustainability is a good risk reduction strategy	1,448
9	**7. It will reduce energy use and climate change impact**	1,041	9	**34. Sustainability will have a positive ROI and/or managable pay back period**	0,883	9	**31. The project budget allowed for sustainability resources (experts, materials, and/or equipment)**	0,516
10	44. Sustainability is a good risk reduction strategy	1,041	10	***23. I can engage / influence my stakeholder to get buy-in for sustainability issue***	0,741	10	***19. My company has a sustainability department***	0,531
11	***30. Sustainability is a leadership challenge***	0,965	11	***46. I can see the result of my work***	0,728	11	***4. My company has a triple bottom line policy/framework***	0,365
12	***2. Sustainability has to be on everyone's agenda***	0,925	12	***35. I want my company/project to be viewed as an organization that solve big problems for customers and the world***	0,702	12	5. It provides more opportunity for my project team to be creative in designing the solution for my project	0,787
13	**24. Changing behaviours is the most expedient way to change status quo**	0,853	13	***41. My project team and I have direct control/influence over choosing renewal or "green" material for project use***	0,644	13	42. It will help reduce or eliminate waste	0,549
14	1. I understand the risk of not engaging in sustainability	0,843	14	7. It will reduce energy use and climate change impact	0,545	14	1. I understand the risk of not engaging in sustainability	0,737
15	***6. Growth and sustainability are complements of each other***	0,777	15	42. It will help reduce or eliminate waste	0,472	15	32. A growing population believes businesses has a crucial role to play in sustainability	0,3

Statements in bold are distinguishing statements (Significance at P < .05)
Statements in bod italics are distinguishing statements (Significance at P < .01)
Underlined statements are consensus statements (all non-significant)

In Red Statements of Behavioural beliefs
In Blue Statements of Normative beliefs
In Green Statements of Control beliefs

A first observation that can be made from Table 5 is that almost all top-ranked statements in each of the patterns are distinguishing statements. Only one consensus statement shows up in the top-ranked statements of the patterns, which shows that each pattern is unique and distinct from the other patterns.

Another observation should be that the TPB categories of statements are not equally distributed in the top-ranked statements of the patterns. Statements that refer to the behavioral beliefs are dominating the high ranked statements of pattern 1, whereas high ranked statements of pattern 2 appears to be dominated by the control and normative beliefs. The high ranked statements of pattern 3 are showing predominantly a mixture of behavioral and normative belief.

Following the style of Table 5, Table 6 presents the 15 lowest ranked statements for each pattern. Similar to Table 5, the following table colour code the statements (red, blue and green) to show the categories they relate to. Also, the distinguishing statements are indicated in the same way as in Table 5.

Table 6. Bottom ranked statements per answering pattern.

Pattern 1			**Pattern 2**			**Pattern 3**		
rank	Statement	Z Score	rank	Statement	Z Score	rank	Statement	Z Score
33	***16. My company has policies on incorporating sustainability***	-0,665	33	20. Colleagues are open to it and/or interested in it	-0,497	33	***40. Sustability is a set of enabling strategies that will help meet existing goals***	-0,664
34	***15. There are existing processes I can follow to incorporate sustainability into my projects***	-0,709	34	18. My company choose to work with suppliers who meet the company's eco-efficiency policy	-0,52	34	6. Growth and sustainability are complements of each other	-0,524
35	**38. I have been trained on sustainability**	-0,711	35	39. Sustainability is smart business	-0,568	35	21. Key stakeholder(s) find it important (Steering committee/Project Executive/Project Sponsor)	-0,531
36	***37. It is part of the project plan or requirements***	-0,731	36	2. Sustainability has to be on everyone's agenda	-0,575	36	8. My project plan has related sustainability KPIs	-0,137
37	14. Client(s) asked for it	-0,864	37	***32. A growing population believes businesses has a crucial role to play in sustainability***	-0,688	37	28. Sustainability is an opportunity to re-invest back to my community	-1,322
38	***4. My company has a triple bottom line policy/framework***	-0,96	38	***9. My company has an energy reduction target for next 3-5 years***	-0,689	38	12. I have experience managing sustainability issues	-0,22
39	8. My project plan has related sustainability KPIs	-1,052	39	***30. Sustainability is a leadership challenge***	-0,829	39	14. Client(s) asked for it	-0,784
40	***41. My project team and I have direct control/influence over choosing renewal or "green" material for project use***	-1,075	40	***1. I understand the risk of not engaging in sustainability***	-0,98	40	33. The project and/or product is well suited to it	-0,715
41	***3. My company has a product take back / recycle program***	-1,082	41	***24. Changing behaviours is the most expedient way to change status quo***	-1,055	41	2. Sustainability has to be on everyone's agenda	-1,318
42	19. My company has a sustainability department	-1,309	42	***29. Sustainability helps improve project team morale***	-1,075	42	***46. I can see the result of my work***	-0,989
43	***18. My company choose to work with suppliers who meet the company's eco-efficiency policy***	-1,343	43	***5. It provides more opportunity for my project team to be creative in designing the solution for my project***	-1,202	43	***22. PMI name it in their code of conduct***	-1,802
44	***10. Sustainability consideration is part of my company's project selection criteria***	-1,349	44	19. My company has a sustainability department	-1,366	44	13. I am rewarded for it	-1,946
45	***31. The project budget allowed for sustainability resources (experts, materials, and/or equipment)***	-1,541	45	***4. My company has a triple bottom line policy/framework***	-1,559	45	***41. My project team and I have direct control/influence over choosing renewal or "green" material for project use***	-1,632
46	13. I am rewarded for it	-1,747	46	***3. My company has a product take back / recycle program***	-1,854	46	***15. There are existing processes I can follow to incorporate sustainability into my projects***	-1,989

47	***9. My company has an energy reduction target for next 3-5 years***	-1,77	47	***22. PMI name it in their code of conduct***	-2,291	47	***38. I have been trained on sustainability***	-2,336
Statements in bold are distinguishing statements (Significance at P < .05)						In Red	Statements of Behavioural beliefs	
Statements in bod italics are distinguishing statements (Significance at P < .01)						In Blue	Statements of Normative beliefs	
Underlined statements are consensus statements (all non-significant)						In Green	Statements of Control beliefs	

Also, from this table it shows that the three patterns are quite distinct, both in distinguishing statements as in the underlying beliefs of the statements.

These characterizations become clearer when we summarize the ranking of the different categories of statements for each answering pattern. Table 7 presents the percentual representation of the three categories of statements in both the 15 top-ranked statements (shown in Table 5) and the 15 bottom-ranked statements (shown in Table 6) of the different patterns.

Table 7. Summary of categorization of statements in top and bottom-ranked statements per pattern.

	Pattern 1: Intrinsically motivated		Pattern 2: Pragmatic		Pattern 3: Normative driven	
	Category	% state-ments	Category	% state-ments	Category	% state-ments
Top-ranked statements	Behavioral beliefs	87%	Behavioral beliefs	20%	Behavioral beliefs	40%
	Normative beliefs	7%	Normative beliefs	33%	Normative beliefs	47%
	Control beliefs	7%	Control beliefs	47%	Control beliefs	13%
Bottom-ranked statements	Behavioral beliefs	7%	Behavioral beliefs	27%	Behavioral beliefs	33%
	Normative beliefs	60%	Normative beliefs	53%	Normative beliefs	27%
	Control beliefs	33%	Control beliefs	20%	Control beliefs	40%

With each category of beliefs accounting for approximately one third of statements in the Q-set, a 'normal' distribution of statements, both top-tanked and in bottom-ranked, would therefore be 33% / 33% / 33%. Table 7, however, shows a clear distinction in the representation of the different categories for each of the three patterns.

Pattern 1 consists of 87% of top-ranked statements as factors to think about sustainability. Pattern 2 shows almost half of the top-ranked statements belongs to the control beliefs as key factors to consider sustainability. Pattern 3 is made up with a combination of subjective norms beliefs and behavioral beliefs statements. Based on the representation of the different categories of TPB beliefs in the top- and bottom ranked statements of each pattern, we labelled the patterns as: Pattern 1: '*Intrinsically motivated*'; Pattern 2: '*Pragmatic*'; Pattern 3: '*Normative driven*'.

4.3 Description of the Patterns

Combining the results presented in Table 7 with the qualitative feedback during the interviews, this paragraph describes the three identified patterns.

- Pattern 1 – **Intrinsically motivated**

  23 participants could be classified in this pattern. Figure 3 shows the representation of the different categories of statements in both the bottom-ranked (left half of the figure) and top-ranked (right half of the figure) statements in this pattern.

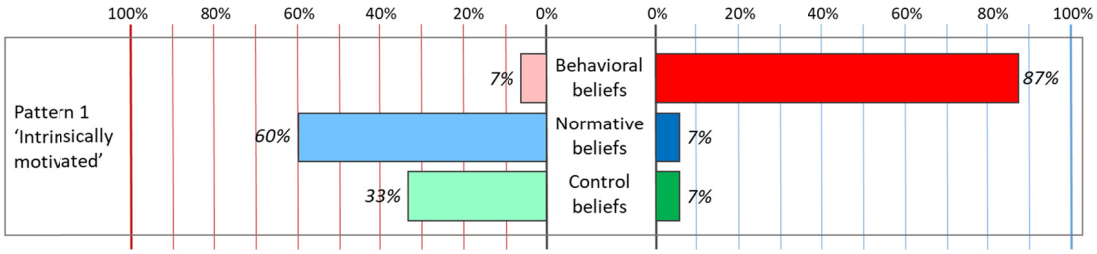

Figure 3. Representation of the different categories of statements in the bottom-ranked statements (left half of the figure) and top-ranked statements (right half of the figure) for pattern 1

From this Figure, it shows that a dominating percentage of top-ranked statements belongs to the behavioural beliefs category. This group of participants are motivated to consider sustainability in their projects because of their personal values, they believe sustainability is important and the "right thing" (Tharp, 2012) to do. The top-ranked statements in this pattern are mostly idealistic statements that speaks to high level personal beliefs, although a number of statements are also related to the 'business sense' of sustainability. During the interview with the participants, when asked why they have chose the two most agreed statements, a number of the participants have responses surrounding personal beliefs, personal values and generally believing that sustainability will bring benefits to their company and their clients. This group of participants are not influenced to practice sustainability because of external support or opinion of others or based on the characteristics of the project. As shows from Figure 4, normative beliefs and control beliefs consist of very small percentage in the top-ranked statements.

There was a total of 26 statements that were distinguishing for this pattern. Table 8 shows these defining statements, categorized in 'high scoring defining statements' (defining statements with a Z score >1), 'middle scoring defining statements' (with a Z score between 1 and -1) and 'low scoring defining statements (with a Z score lower than -1).

Table 8. Most defining statements for Pattern 1 – Intrinsically motivated

Most Defining Statement for Factor 1 – Intrinsically motivated			
#	Statement	Category	Z Score
High scoring defining statements			
26	It is important to act socially responsible	Behavioral	1.91*
27	It makes good business sense to be sustainable	Behavioral	1.63*
39	Sustainability is smart business	Behavioral	1.58*
11	I have a personal interest in sustainability	Behavioral	1.54*
25	Sustainability is an innovation	Behavioral	1.11*
28	Sustainability is an opportunity to re-invest back to my community	Behavioral	1.09*
7	It will reduce energy use and climate change impact	Behavioral	1,04
Middle scoring defining statements			
30	Sustainability is a leadership challenge	Behavioral	0.96*
2	Sustainability has to be on everyone's agenda	Behavioral	0.93*
24	Changing behaviours is the most expedient way to change status quo	Control	0,85
6	Growth and sustainability are complement of each other	Behavioral	0.78*
34	Sustainability will have a positive ROI and/or managable pay back period	Control	0,45
46	I can see the result of my work	Control	-0.01*
22	PMI name it in their code of conduct	Normative	-0.42*
43	I can influence key executives/change leaders to consider sustainability	Control	-0.57*
16	My company has policies on incorporating sustainability	Normative	-0.67*
15	There are existing processes I can follow to incorporate sustainability into my projects	Control	-0.71*
38	I have been trained on sustainability	Control	-0,71
37	It is part of the project plan or requirements	Control	-0.73*
4	My company has a triple bottom line policy/framework	Normative	-0.96*
Low scoring defining statements			
41	My project team and I have direct control/influence over choosing renewal or "green" material for project use	Control	-1.08*
3	My company has a product take back/recycle program	Normative	-1.08*
18	My company choose to work with suppliers who meet the company's eco-efficiency policy	Normative	-1.34*
10	Sustainability consideration is part of my company's project selection criteria	Normative	-1.35*
31	The project budget allowed for sustainability resources (experts, materials, and/or equipment)	Control	-1.54*
9	My company has an energy reduction target for next 3–5 years	Normative	-1.77*

Note. P < .05; asterisk (*) indicates P < .01.

This table shows that the high scoring defining statements for this pattern are predominantly related to the behavioral beliefs, whereas low scoring defining statements are mostly related to the normative expectations of others and the motivation to comply with these expectations.

- Pattern 2 – **Pragmatic**

  In our study, 9 participants were flagged into this pattern. Figure 4 shows the representation of the different categories of statements in bottom-ranked and top-ranked statements in this pattern.

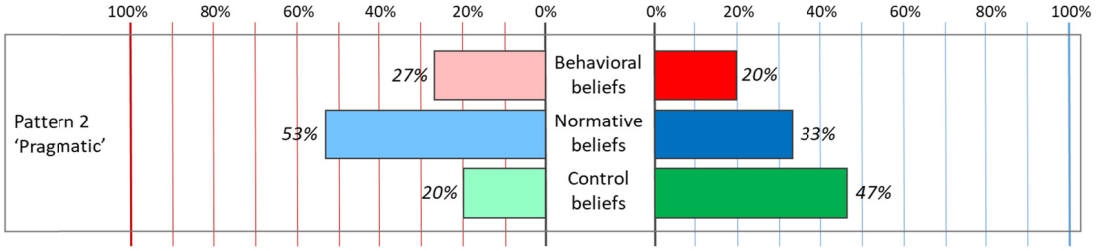

Figure 4. Representation of the different categories of statements in the bottom-ranked statements (left half of the figure) and top-ranked statements (right half of the figure) for pattern 2

From Figure 4 it shows that this pattern scores high on the control beliefs and the participants were stimulated to consider sustainability mainly because they feel that the nature of the project fits the topic of sustainability and/or that they have an impact on the sustainability of the project. For example, participants from the industries of real estate, construction and real estates have mentioned their projects are natural candidates to have sustainability components because of laws and regulations, therefore, their projects will allocate resources (budget or human or processes) to mitigate negative risks that might arise. Figure 4 also shoows that for this pattern, the normative beliefs was a second motivator to consider sustainability. This speaks to the external requirements, such as law and regulations, as their support to consider sustainability. This group is not strongly personally motivated to consider sustainability in the context of a project.

The survey response of this group of participants are usually surrounding the topic of industry regulations and companies' policies. At least one participant also mentioned that her previous experience and training also motivated her to consider sustainability within her projects.

There was a total of 32 defining statements for this pattern, as shown by Table 9.

Table 9. Most defining statements for Pattern 2 – Pragmatic

Most Defining Statements for factor 2 – Pragmatic			
#	Statement	Category	Z Score
High scoring defining statements			
14	Client(s) asked for it	Normative	2.45*
21	Key stakeholder(s) find it important (Steering committee/Project Executive/Project Sponsor)	Normative	2.14*
31	The project budget allowed for sustainability resources (experts, materials, and/or equipment)	Control	1,61
37	It is part of the project plan or requirements	Control	1.41*
8	My project plan has related sustainability KPIs	Normative	1.41*
10	Sustainability consideration is part of my company's project selection criteria	Normative	1.37*
43	I can influence key executives/change leaders to consider sustainability	Control	1.09*
Middle scoring defining statements			
34	Sustainability will have a positive ROI and/or managable pay back period	Control	0,88
23	I can engage/influence my stakeholder to get buy-in for sustainability issue	Control	0.74*
46	I can see the result of my work	Control	0.73*
35	I want my company/project to be viewed as an organization that solve big problems for customers and the world	Behavioral	0.70*
41	My project team and I have direct control/influence over choosing renewal or "green" material for project use	Control	0.64*
33	The project and/or product is well suited to it	Control	0.11*
44	Sustainability is a good risk reduction strategy	Behavioral	0.09*
13	I am rewarded for it	Behavioral	0.06*
28	Sustainability is an opportunity to re-invest back to my community	Behavioral	-0,07
26	It is important to act socially responsible	Behavioral	-0.07*
16	My company has policies on incorporating sustainability	Normative	-0.13*
15	There are existing processes I can follow to incorporate sustainability into my projects	Control	-0.15*
11	I have a personal interest in sustainability	Behavioral	-0,27
36	Sustainability is becoming an increasingly necessary part of every manager's portfolio	Normative	-0,31
38	I have been trained on sustainability	Control	-0,31
32	A growing population believes businesses has a crucial role to play in sustainability	Normative	-0.69*
9	My company has an energy reduction target for next 3–5 years	Normative	-0.69*
30	Sustainability is a leadership challenge	Behavioral	-0.83*
1	I understand the risk of not engaging in sustainability	Behavioral	-0.98*
Low scoring defining statements			
24	Changing behaviours is the most expedient way to change status quo	Control	-1.06*
29	Sustainability helps improve project team morale	Control	-1.08*
5	It provides more opportunity for my project team to be creative in designing the solution for my project	Control	-1.20*
4	My company has a triple bottom line policy/framework	Normative	-1.56*
3	My company has a product take back/recycle program	Normative	-1.85*
22	PMI name it in their code of conduct	Normative	-2.29*

Note. P < .05; asterisk (*) indicates P < .01.

The high and low scoring defining statements both show statements of the normative and and control categories. Statements referring to the behavioral beliefs are less defining in this pattern.

- Pattern 3 – **Normative driven**

  This pattern was defined by the preferences of 4 participants of the sample. Figure 5 shows the representation of the different categories of statements in bottom-ranked and top-ranked statements in this pattern.

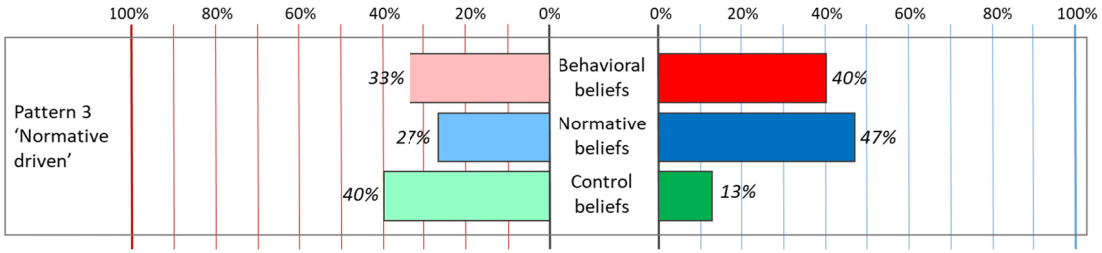

Figure 5. Representation of the different categories of statements in the bottom-ranked statements (left half of the figure) and top-ranked statements (right half of the figure) for pattern 3

From this Figure it shows that in this pattern, the top ranked statements consist of both normative and behavioural categories. This pattern can be characterized as stimulated by normative beliefs, because this group of participants will consider sustainability in their projects when they are getting some level of external support (ie from their company's strategic goals, policies, or dedicated departments), along with their personal values. The participants in this pattern are not stimulated by the level of control they perceive over sustainability.

There was a total of 22 defining statements for this factor (Table 10).

Table 10. Most defining statements for Pattern 3 – Normative driven

Most Defining Statements for Factor 3 – Normative Driven			
#	Statement	Category	Z Score
High scoring defining statements			
17	Sustainability is one of my company's strategic goal	Normative	1.79*
30	Sustainability is a leadership challenge	Behavioral	1.71*
9	My company has an energy reduction target for next 3-5 years	Normative	1.63*
16	My company has policies on incorporating sustainability	Normative	1.35*
26	It is important to act socially responsible	Behavioral	1.05*
Middle scoring defining statements			
31	The project budget allowed for sustainability resources (experts, materials, and/or equipment)	Control	0,9
19	My company has a sustainability department	Normative	0.68*
4	My company has a triple bottom line policy/framework	Normative	0.66*
37	It is part of the project plan or requirements	Control	0.43*
11	I have a personal interest in sustainability	Behavioral	0,38
10	Sustainability consideration is part of my company's project selection criteria	Normative	0.33*
24	Changing behaviours is the most expedient way to change status quo	Control	0,18
3	My company has a product take back / recycle program	Normative	0.17*
43	I can influence key executives/change leaders to consider sustainability	Control	0.14*
34	Sustainability will have a positive ROI and/or managable pay back period	Control	-0,13
40	Sustability is a set of enabling strategies that will help meet existing goals	Behavioral	-0.55*
28	Sustainability is an opportunity to re-invest back to my community	Behavioral	-0,73
Low scoring defining statements			
46	I can see the result of my work	Control	-1.17*
22	PMI name it in their code of conduct	Normative	-1.37*
41	My project team and I have direct control/influence over choosing renewal or "green" material for project use	Control	-1.82*
15	There are existing processes I can follow to incorporate sustainability into my projects	Control	-2.00*
38	I have been trained on sustainability	Control	-2.52*

Note. P < .05; asterisk (*) indicates P < .01.

In line with the characterization of this pattern that shows from Table 7, the high scoring defining statements are either of the behavioral or normative categories, with the control category standing out in the low scoring defining statements.

4.4 Consensus Statements

Each pattern has its own defining statements that permits them to be distinguish from each other so unique patterns can be formed. These defining statements were shown in Tables 8–10. Table 11 complements this analysis, by presenting the statements which were not very defining for any pattern, because the participants showed a relatively high level of consensus on the agreement with these statements. The statements are grouped in statements where there was consensus on agreeing with the statement (with an average Z score≥1), statements where there was consensus on a middle score for the statement (with an average Z score of between 1 and -1) and statements where there was consensus on disagreeing with the statement (with an average Z score≤-1).

Table 11. Overview of consensus statements.

#	Statement	Category	Score in pattern			Consensus rank
			Pattern 1	Pattern 2	Pattern 3	
Consensus on agreeing with the statement						
45	Sustainability in projects create long term success for my company	Normative	3	3	3	2
35	I want my company/project to be viewed as an organization that solve big problems for customers and the world	Behavioural	4	2	5	12
42	It will help reduce or eliminate waste	Behavioural	1	1	2	1
25	Sustainability is a necessary innovation	Behavioural	3	0	0	16
Consensus on a middle score for the statement						
20	Colleagues are open to it and/or interested in it	Normative	0	-1	0	4
47	I know exactly what it means by sustainability issues	Control	0	1	-1	3
36	Sustainability is becoming an increasingly necessary part of every manager's portfolio	Normative	0	-1	1	6
40	Sustainability is a set of enabling strategies that will help meet existing goals	Behavioural	0	1	-1	7
23	I can engage/influence my stakeholders to get buy-in for sustainability issue	Control	-1	2	0	13
32	A growing population believes businesses has a crucial role to play in sustainability	Normative	1	-2	1	15
33	The project and/or product is well suited to it	Control	-1	1	-3	11
44	Sustainability is a good risk reduction strategy	Behavioural	2	1	-3	10
Consensus on disagreeing with the statement						
12	I have experience managing sustainability issues	Control	0	-1	-2	5
18	My company choose to work with suppliers who meet the company's eco-efficiency policy	Normative	-4	-2	-1	14

Statement #45 "Sustainability in projects create long term success for my company" and statement #42 "It will help reduce or eliminate waste" are both highly ranked consensus statements across all three patterns. Reflecting on this finding along with the qualitative comments from the interview, this could lead to two further observations. The first being project managers are stimulated to consider sustainability because it will create long term success for their company (statement #45). This aligns with the suggestions from literature review that sustainability requires project manager to think long term (Dyllick & Hockerts, 2002; Goedknegt, 2012; Willard, 2012). And the second observation is that statement #45 shows up in the top 15 ranked statements across all three statements. This could be an indicator that most project managers believe their actions needs to be align with business needs; which could be tied to the suggestions from the literature review that projects are a natural vehicle to implement corporate strategies (Marcelino-Sádaba, González-Jaen, & Pérez-Ezcurdia, 2015; Shenhar & Patanakul, 2014; Morris, 2009; Longman & Mullins, 2004).

Based on the top-ranked statements in Table 5, statements #35 and #45 shows up as top-ranked statements across all three patterns. These two statements not only are ideal in nature, in addition both statements refer to the linkage of projects, organizations and sustainability. Statement #35 – "I want my company/project to be viewed as an organization that solve big problems for customers and the world" and statement #45 – "Sustainability in projects create long term success for my company". This observation could be an indicator that project managers in Canada has a strong tie to their organization; if organizations are more active in promoting sustainability practices, then it would stimulate project managers to incorporate sustainability in their projects.

5. Discussion

This paragraph compares and discuss the similarity and differences between the study reported in this paper and the European based study by Silvius et al. (2017a). As both studies deployed the similar conceptual foundation, the TPB model, and a similar research methodology, Q-methodology, their results can be compared in order to reveal differences between the stimulus patterns of European project managers and Canadean project managers.

A similarity between the two studies is that both studies identified three distinct stimulus patterns of project managers. The studies also labelled two of the patterns similarly (Intrinsically motivated and Pragmatic). However, as the labels that the authors choose for their patterns is not a finding from the data analysis, but merely a subjective choice that aims to give meaning to the patterns, we need to look beyond the labelling. Table 12 therefore presents a comparison of the three patterns of both studies, with the patterns that promise most

similarity are presented as pairs next to each other. For visual comparison, the highest percentages are indicated in bold.

Table 12. Comparison of patterns from this study and the study by Silvius et al. (2007)

		This study	Study of Silvius et al. (2007)	This study	Study of Silvius et al. (2007)	This study	Study of Silvius et al. (2007)
		Pattern 1	Pattern 2	Pattern 2	Pattern 1	Pattern 3	Pattern 3
		Intrinsically motivated	Intrinsically motivated	Pragmatic	Pragmatic	Normative driven	Task driven
	Category	% state ments		% state ments		% state ments	
Top-ranked statements	Behavioral beliefs	**87%**	**60%**	20%	20%	**40%**	20%
	Normative beliefs	7%	7%	33%	27%	**47%**	**40%**
	Control beliefs	7%	33%	**47%**	**53%**	13%	**40%**
Bottom-ranked statements	Behavioral beliefs	7%	20%	27%	27%	33%	33%
	Normative beliefs	**60%**	33%	**53%**	**40%**	27%	**40%**
	Control beliefs	33%	**47%**	20%	33%	**40%**	27%

From this table it appears that the two similarly labelled patterns indeed provide a high similarity on the distribution of top and bottom rankes statements over the different beliefs.

The *Intrinsically motivated* pattern appears a bit more outspoken in the Canadian study than in the European study by Silvius et al. (2007a). In both studies, the top-ranked statements are dominated by the behavioral beliefs category. In the bottom-ranked statements, the two studies show a difference. For the Canadian project managers that were identified as intrinsically motivated, the bottom-ranked statements are dominated by the normative beliefs category, whereas for the European project managers, the control beliefs category is most present in the bottom-ranked statements, although less dominant than in the Canadian study.

The *Pragmatic* pattern shows in both studies a more balanced score over the three beliefs categories, with in both studies a highest presence of control beliefs statements in the top-ranked statements and normative beliefs in the bottom-ranked statements.

The third pattern, *Normative driven*/*Task driven*, shows less similarity between the two studies, although still some. In the top-scoring statements, both studies show two strongly present categories of statements. For the Canadian study this was behavioral and normative and for the European study normative and control. Both studies share a relatively high score of normative beliefs in the top-scoring statements of thie third pattern, but differ in the beliefs category that these normative beliefs are paired with. In the bottom-ranked statements also a difference appears, although in both studies the differences between the beliefs categories of the bottom-ranked statements are relatively small. Also, in these patterns, the Canadian project managers appear a bit more outspoken, with the high scoring behavioral and normative beliefs contrasted by a domination of the bottom-ranked statements by the control beliefs.

From the comparison of this study with the study of Silvius et al. (2017a) we can draw two conclusions. The first conclusion is that the findings of the two studies present a substantial level of similarity. Two of the three patterns show similar characteristics and the similarity between the chosen labels for these patterns is understandable and justified. The third pattern shows partial similarity and partial difference, which leads to a second conclusion: This third stimulus patterns of the Canadian study shows a difference from the third pattern of the study by Silvius et al. (2017a). Based on this conclusion, it may be questioned whether this difference should be attribute to societal culture being an influence of sustainability practice within project context?

Reviewing the Q statement analysis, the third pattern of our study is associated to normative beliefs and behavioural beliefs. Based on the TPB definition, this group of project managers is likely to consider sustainability when there is "*support given by significant others such as friends, family or authoritative figures*" (Ajzen, 1991) and if the individual has personal values aligning with the benefits of implementing sustainability practices. In Table 5, it is observed that this support was provided by the organization and related policies as stimuli to the project manager to consider sustainability. For example, expressed in the following normative statements:

- Statement #17 – "Sustainability is one of my company's strategic goal"
- Statement #9 – "My company has an energy reduction target for next 3–5 years"

- Statement #16 – "My company has policies on incorporating sustainability"
- Statement #19 – "My company has a sustainability department"
- Statement #4 – "My company has a triple bottom line policy/framework"
- Statement #32 – "A growing population believes businesses has a crucial role to play in sustainability"

A common theme of these top-ranked statements which formed this new pattern is related to the organization and policies. The participants in this study were all working in Canadian based companies, therefore, it could be argued that these companies shared a common societal culture. According to Hofstede (2011), societal culture forms the values that are deeply rooted in human minds and it in turn influence the way people perceive their surrounding areas and how they react to situations. In the finding of this study, the companies were demonstrated to be a driving force for project managers to consider sustainability. If this group of project managers have the support of their company and it is also their personal values, then they would consider the incorporation of sustainability in their projects. From this analysis, society culture could have a partial impact on the project managers' consideration to incorporate sustainability in their projects.

Although this finding speaks to the impact of societal culture could have on the adoption of sustainability within a project context, one note to make is that normative belief is also part of the third pattern found in the study by Silvius et al. (2017a). So, the difference in the third may go beyond cultural impact from the supporting organization. The difference lies in the personal beliefs of the project manager. With normative beliefs being equal in both studies, project managers in Europe are motivated to consider sustainability when they feel they can control and manage these projects within their ability. This speaks to the competence of the project manager (ie training, experience, access to sustainability experts etc). However, the Canada's study shows besides the support the project manager will get from the organization, the project manager's personal values also needs to be aligned before they are willing to consider sustainability in their projects. Based on this analysis, societal culture is only a partial driver for project manager to consider sustainability, thereby contradicting the GLOBE study (Miska et al., 2018) which concluded that culture is a consistent predictor for sustainability practices.

6. Conclusion

The study reported in this paper set out to investigate *What drivers do project managers in Canada perceive for considering sustainability in their projects?* The study was inspired by a study by Silvius et al. (2017a), that found that different (groups of) project managers are stimulated by different factors, that were labelled: "*Intrinsically motivated*", "*Task driven*" and "*Pragmatic*". As the study of Silvius et al. (2017a) was focused on Europe, and national or societal culture is known to influence sustainability behavior (Kang & Moscardo, 2006), it could be questioned whether their findings apply also to other geographical regions. Using Q methodology, the study reported in this paper explored the factors that stimulate Canadian project managers to consider sustainability in their projects. The Theory of Planned Behaviour (Ajzen, 1991) was used as conceptual starting point for the stimulus of sustainable behavior.

Similar to the study by Silvius et al. (2017a), the study revealed three distinct stimulus patterns, that were characterized as 'Intrinsically motivated', 'Pragmatic' and 'Normative driven'.

In the pattern that was represented by most respondents in the sample, Intrinsically motivated, the top-ranked statements were dominated by the behavioural beliefs category. This group of participants was motivated to consider sustainability in their projects because of their personal values. They were not stimulated by external support or opinion of others or the characteristics of the project.

The second most occurring pattern in the sample, Pragmatic, scored high on the control beliefs. The participants that were categorized in this pattern were stimulated to consider sustainability mainly because they feel that the nature of the project fits the topic of sustainability and/or that they have an impact on the sustainability of the project. They were not strongly personally motivated to consider sustainability in the context of a project.

The third pattern, Normative driven, was defined by 4 participants in the sample. In this pattern, the top ranked statements consisted of both normative and behavioural categories. These project managers were stimulated by external support or pressure to consider sustainability (i.e., from their company's strategic goals, policies, or dedicated departments), and their personal values. The participants in this pattern were not stimulated by the level of control they perceive over sustainability.

The findings of the study confirm the patterns found by Silvius et al. (2017a) to a large extent. Two of the three patterns of the studies, Intrinsically, motivated and Pragmatic, showed similar characteristics. In both studies the Intrinsically motivated pattern was most represented in the sample, with the Pragmatic pattern trailing in second

place.

The third pattern of the studies showed partlial similarity and partlial difference, with the European project managers tending more towards the opportunities for implementation of sustainability, and the Canadian project managers putting more value on the alignment of personal and organizational values.

The study's result shows that project managers in Canada are driven to consider sustainability because of their personal beliefs, their perceived ability to control sustainability issues along with getting support from their organizations. Should Canada want to accelerate the awareness and adoption of sustainability practice in projects, it is recommended that organizations to provide necessary support through companies' strategies, policies and expertise to the project teams. In addition, selection of project managers who have personal interests and values would also help speed up the adoption of sustainability in project context.

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