



Sustainability in Project Management:

Eight principles in practice

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ABSTRACT

This research studies the eight principles of sustainability applied in Project Management. To be more precise the research fulfils four objectives which are: *firstly*, to review and identify key principles of sustainability in project management from existing literature; *secondly*, to adopt a multiple case study method to assess the applicability of the principles in project management; *thirdly*, to determine the barriers that impede certain principles to be applied in projects and the resulting trade-offs; and *lastly*, to refine the concept of sustainability in project management.

The study adopts a subjectivist ontological viewpoint and an interpretivist epistemological outlook. The paper deductively studies the research question and adopts a qualitative mono-method research design, with a multiple case study strategy. The project case studies analysed belong to six different industries namely Pharmaceutical, Information Technology (IT), Automotive, Transportation, Furniture and Fast-moving consumer goods (FMCG). All case studies fulfil the criteria of being multinational organisations, operating in the private sector, having sustainability as a strategic pillar and projects executed in developed countries with a similar macroeconomic climate. The data has been collected through the semi-structured interview technique and examined using a thematic analysis. The results show that not all eight principles of sustainability are implemented in project management despite of multiple proactive endeavours of engaging in social and environmentally focused business practices. The two principles that show a limited applicability in project management are *values and ethics* as well as *consuming income and not capital*.

The theoretical contribution of the research is realised through the first collective analysis of the eight principles of sustainability and their implementation in project management through empirical case studies. An additional contribution is through the selection of case studies from industries that have not been examined before. The practical implication of the research is to offer guidance to organisations on what principles they need to build their sustainability project management practices on and to point out the commonly faced barriers and trade-offs.

Keywords

Sustainability, sustainable development, project, project management, CSR, Corporate Social Responsibility

ABBREVIATIONS AND ACRONYMS

4C - Common Code for the Coffee Community
APM - Association for Project Management
CAR - Corrective Action Report
CO₂ - Carbon dioxide
COC - Certificate of Conformity
CRA - Clinical Research Associate
CSI - Client Satisfaction Index
CSR - Corporate Social Responsibility
EU - European Union
FAI - First Article Inspection
FDA - Food and Drug Administration
FMCG - Fast Moving Consumer Goods
FTE - Full Time Employees
GAP - Good Agricultural Practices
GDP - Gross Domestic Product
GMO - Genetically Modified Organisms
ILO - International Labour Organisation
IPMA - International Project Management Association
ISO - International Standards Organisation
IST - Information System Technology
IT - Information Technology
KPI - Key Performance Indicator
NDA - Non-Disclosure Agreement
NGO - Non-Government Organisation
NZ - New Zealand
OBS - Organisational Breakdown Structure
PAR - Preventive Action Report
PMBok - Project Management Book of Knowledge
PMI - Project Management Institute
PSI - Pre Shipment Inspection
R&D - Research and Development
RFQ - Request for Quotation
RIE - Rapid Improvement Events
RoHS - Restriction of Hazardous Substances
RSP - Respondent
SCS - Scientific Certification Systems
SIE - Sustainable Improvement Events
SOP - Standard Operation Procedures
SQCDPE - Safety, Quality, Cost, Delivery, People & Environment
TBL - Triple-bottom-line
Triple P - People, Planet, Profit
UK - United Kingdom
US - United States
USDA - United States Department of Agriculture

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CHAPTER 1. INTRODUCTION

This chapter commences with the presentation of the rationale behind choosing the proposed research topic for the present Master's thesis. It then provides an understanding of the existing literature from the field while spotting the gap that is addressed later in the paper. The thesis ends with the presentation of the research question as well as the purpose of the study, which have been guiding the authors throughout the entire research process.

1.1 CHOICE OF SUBJECT

We are two Master's students currently undertaking a programme in Strategic Project Management with backgrounds in Management Consultancy and Project Management. Recent years of study and professional work have fuelled our interest in sustainability and its application in the business world. For us, sustainability in project management means delivering value to our prospective workplaces without compromising the lives and work opportunities of future generations and without interfering in the ecosystem. To be equipped with theoretical and practical understanding on how to achieve this ambition, we channelled our efforts towards further improving our knowledge on this topic by means of this research opportunity.

Sustainable project management is a field of study currently in its infancy but with great potential given the many benefits projects offer as vehicles of change. The incorporation of sustainability in project management can be used as a lever to deliver all projects sustainably. By exploring how the eight principles of sustainability have been applied to this field as well as elaborating on the definition of sustainable project management, the authors aim to attain an accelerated adoption of sustainability in organisations. Furthermore, the authors intend to close the gap between theory and application by pointing out the barriers and trade-offs faced by organisations in various industries.

1.2 THEORETICAL BACKGROUND AND KNOWLEDGE GAPS

The Brundtland Report gives the most adopted definition of sustainable development, which is "to meet the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987, p.41). An analysis of the WCED definition suggests that it is nature, life support systems and community that need to be sustained and people, economy and society that need to be developed (Kates et al., 2005, p.11). Thus the authors see congruency in the terms 'sustainability' and 'sustainable development' thereby allowing the use of these terms synonymously throughout the thesis (Marcuse, 1998, p.105; Sartori et al., 2014, p.1).

Another frequently cited definition for sustainable development is the triple-bottom-line also called the 'Triple-P' or 'TBL' which emphasises the consideration for the *environment* (planet), *social* (people) and *economic* (profit) impact of the business (Elkington, 1997, p.1; Schieg, 2009, p.316). These definitions fuelled the development of multiple other interpretations of the concepts in literature, which have been found to amount to 103 as reported by White (2013, p.215). Sustainable development, an integrative concept (Pintér et al., 2012, p.21), also encompasses intra- and inter-generational equity and stakeholder involvement in the planning and decision making process (Ness et al., 2007, p.498). Furthermore, the temporal and spatial aspects of

present vs. future and local vs. global respectively and the uncertainties associated with them are often acknowledged by academics and decision makers (Gasparatos et al., 2009, p.246). With a common consensus on the key elements of sustainable development, the concept is still developing often being adapted to the context of the organisation, their culture and policies (Bell & Morse, 2008, p.12).

Sustainability has been incorporated at multiple levels ranging from macro or global to micro or project. At a macro level, global organisations have taken a lead on bringing attention to common causes such as: continued support for human life on earth, long-term maintenance of biological and agricultural resources, stable human populations, limited growth economies, small scale, self-reliance and quality (Brown et al., 1987, p.713-717). These endeavours have been adopted by national governments while being focused on country specific themes. The most common objectives are: social progress which encompasses community health, education and inclusion; protection of the environment, species and their habitat; prudent environmental resource usage and maintenance of economic growth and employment (Shearlock et al., 2000, p.81).

To contribute and complement the national sustainable development agenda, organisations are seen as the next level at which sustainable development is integrated. Organisations can implement sustainable development at strategic, process and operational levels. At the strategic level the integration happens in the strategy, vision and mission of the company (Labuschagne & Brent, 2005, p.160). For example, companies like Unilever, General Electric and Walmart have shown integration at a strategic level through measures of designating corporate sustainability officers, integrating sustainability in their corporate communication strategy and producing sustainability reports (Planko & Silvius, 2012, p.10). Integration at the operational level involves a change in production and procurement systems to incorporate environmental management systems. Additionally, it involves the adoption of reporting systems that assess, evaluate and monitor the business processes based on the triple bottom line criteria (Labuschagne & Brent, 2005, p.160; Planko & Silvius, 2012, p.10-12).

To evaluate the level of integration of sustainability in an organisation Willard (2005, p.27-29) developed a model, which defines five sustainability stages namely: *pre-compliance*, *compliance*, *beyond compliance*, *integrated strategy* and finally *purpose and passion* (see Figure 1). On a scale of reactive to proactive consideration, the *pre-compliance* stage is perceived as most reactive and the *purpose and passion* stage is regarded as most proactive. The above stages along with the definition of sustainable development aim to simultaneously urge organisations to reduce the bad done whilst driving a prompt action to do good (Planko & Silvius, 2012, p.13).

Finally, sustainability integration at the project or operational level is necessary as the traditional project management techniques provide a limited consideration for sustainable development (Labuschagne & Brent, 2005, p.160). If realised, it can gain reputation for the project, reduce financial risks and potential litigations as well as develop a competitive edge (Schieg, 2009, p.318). Based on Willard's model (2005, p.27), the authors try to establish the difference between the constructs of 'sustainability projects/corporate social responsibility (CSR) projects' and 'project sustainability'. While undertaking CSR projects is a more reactive, short-term approach where organisations tend to cover up or compensate for the amount of bad done to people and the planet, project sustainability is a more proactive, long-term approach where

organisations focus efforts towards doing good and delivering all projects sustainably. In lieu of the above, the authors aim to study the integration of sustainable development in project management processes and practices, thereby proactively driving a change towards an accelerated achievement of the vision set by the Brundtland commission in 1987.

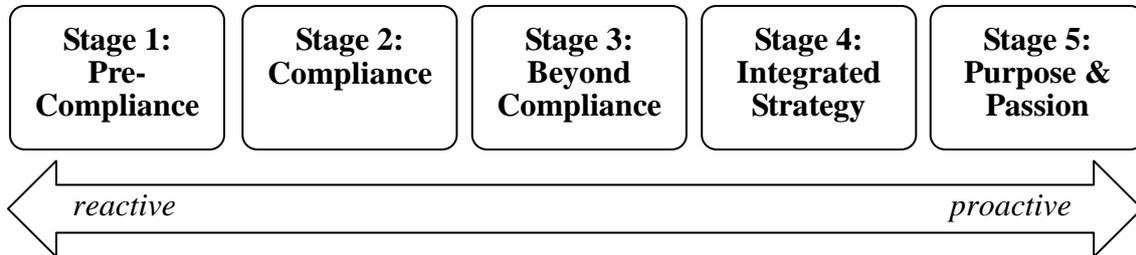


Figure 1. The five sustainability stages.
Adapted from Willard, 2005, p.28

The concept of sustainability has been linked to project management in prior research (Gareis et al., 2009 and 2013; Silvius et al., 2012 and 2013; Silvius & Schipper, 2010 and 2012; Martens & Cavalho, 2013; Tufinio et al., 2013; Marcelino-Sadaba et al., 2015), with more than 200 publications (articles, conference papers, books, book chapters) written up to date mostly dating from the past five years (Økland, 2015, p.103). This sudden growth in interest can be explained in terms of the emergence of this field as well as a shift in terminology from CSR to “sustainability” or variations of the word “sustainable” as focus has moved away from enterprise and supply chain to projects (Økland, 2015, p.104). Since project management entails the application of knowledge, skills, tools and techniques to project activities to meet pre-set requirements (PMI, 2013, p.554), sustainability is ought to be applied to all these components.

The upsurge in interest to incorporate sustainability in project management is given by the many benefits projects offer as vehicles towards addressing the challenges imposed by a range of unsustainability threats (APM, 2006, p.1; Marcelino-Sadaba et al., 2015, p.2). Projects are frequently utilised as means of realising objectives within an organisation's strategic plan (PMI, 2013, p.10). Furthermore, they are perceived as optimum means to bring about change both to industry practices and industry culture (Silvius, 2012, p.7). Since they connect the present and the future of a company, they have the potential to transform today’s objectives in real future outcomes (Marcelino-Sadaba et al., 2015, p.3). Projects improve connections between sustainable initiatives and corporate strategy, which are essential for achieving organisational success (Porter & Kramer, 2006, p.83). The potential held by projects in attaining a more sustainable future is also given by their significant share in the world’s economic activities as nearly one third of the world’s gross domestic product (total GDP) is realised through projects (Messikomer et al., 2011, p.19; Økland, 2015, p.103).

Along with scholars, practitioners have also expressed an interest in understanding the linkage between sustainable development and project management (Silvius, 2013, p.1). Association for Project Management’s (APM) President Tom Taylor along with International Project Management Association’s (IPMA) Vice-President Mary McKinlay have both called for Project and Programme Managers’ to take responsibility for and contribute towards Sustainable Management practices (Silvius, 2012, p.1). Despite an increase in the number of publications focused around sustainability and

project management, the existence of a gap between models, tools and frameworks suggested by academic articles and practice recommended by standards, is evident (Økland, 2015, p.104; Tufinio, 2013, p.99). The lack of consideration of sustainability in major project management frameworks such as Project Management Body of Knowledge (PMBok), Prince2 and ISO 21500:2012 also hinders project managers' ability to deliver projects sustainably (Marcelino-Sadaba et al., 2015, p. 1). In lieu of the above, there is a need for further studies to clarify concepts and bring about unanimity over sustainability considerations that ought to be made by project managers.

Prior to exploring ways to link sustainable development to project management, one needs to understand the 'natural differences' between the characteristics of the two fields to successfully implement the former field in the latter one (Silvius and Schipper, 2012, p.30). Given the universally accepted definition of a project, which is a "temporary endeavor undertaken to create a unique product, service, or result" (PMI, 2013, p.2), the short-term orientation of projects is evident, conflicting the short and long-term orientation inherent to sustainable development. Furthermore, the projects' focus on deliverables or results is contradictory to the life cycle orientation central to sustainable development (Silvius & Schipper, 2012, p.30). If the two fields are fused together, project management would need to stretch its system boundaries beyond its total life cycle (initiation, planning, execution, control and close-out) by also considering the project's result called the asset, the product or service produced by the asset and their corresponding lifecycles. Since the three life cycles, the *project*, the *asset* and the *product* life cycle interact and relate to each other, sustainability thinking in project management requires the involvement of all three considerations with the additional benefit of simultaneously allowing for a long-term perspective (Labuschagne & Brent, 2005, p.162).

A further dissimilarity that needs to be addressed is the emphasis of project management on the interests of the sponsors versus the focus of sustainable development on the interest of present and future generations (Silvius & Schipper, 2012, p.30). This difference can be eliminated through project decisions that take into consideration the interest of all stakeholders. Since the effect of a project may outlive the project itself, additional stakeholder groups may be formed during project execution, which were not existent when decisions were made or activities were carried out. Therefore, to adopt sustainable thinking, project managers need to contemplate the interests of both current and future stakeholders (Økland, 2015, p.105). Similarly, projects are built around considerations of scope, time, and budget whereas the building pillars of sustainable development are people, planet, profit (Silvius & Schipper, 2012, p.30; Silvius, 2012, p.6.). To tackle this dissimilarity, project managers need to additionally balance and harmonise the economic, social and environmental interests of each project delivered (Silvius, 2012, p.2; Silvius & Schipper, 2014, p.69; Økland, 2015, p.104). Finally, traditional project management tools and practices intend to reduce complexity through the breakdown of various deliverables, schedules, processes and responsibilities whereas sustainable development increases complexity by considering the interrelations between multiple projects as well as dimensions (Silvius & Schipper, 2012, p.30). To incorporate sustainability thinking into projects, project management needs to embrace this complexity and allow for multiple considerations to be made during project management decision-making.

Literature has attempted to provide a definition to sustainability in project management through a multitude of dimensions suggested and discussed by various authors (Gareis, 2009, p.7-8; Gareis, 2013, p.135; Goedknecht & Silvius, 2012, p.3; Lambuschagne & Brent, 2004, p. 107-108, Messikomer et al., 2011, p.18; Økland, 2015, p.104-105; Silvius et al., 2012, p.38-40, Turner, 2010, p.162-163). The eight dimensions identified, also referred to as principles of sustainable development in project management, are: (1) balancing or harmonising social, environmental and economic interests; (2) local, regional and global orientation; (3) both short-term and long-term orientation; (4) values and ethics; (5) transparency and accountability; (6) stakeholder participation; (7) risk reduction and (8) consuming income and not capital. In an endeavour to differentiate their own work and continue to provide further empirical support to it, none of the researchers have considered all eight principles collectively, thus pointing out an existing gap. The authors believe that it is important to study all eight principles together as its integration will provide a holistic view on incorporating sustainability in project management whilst laying down an empirically tested foundation for further studies. This presents the main theoretical contribution of the thesis.

Despite of the rising attention on clarifying the fundamentals of sustainable project management, only a few authors have attempted to define the concept. Ning et al. (2009, p.1) emphasise the need to undertake business activities without negatively impacting future generations through a diminishing use of finite resources, energy, pollution and waste. Deland (2009, p.1) calls for minimisation in use of both resources and labour throughout all phases of a project. Tam (2010, p.18) incorporates all three pillars of sustainability, social, environmental and economic, in his definition by urging for a promotion of positive and reduction of negative sustainability impacts over project phases. Silvius & Schipper (2012, p.40) define project and project management as “the development, delivery and management of project-organised change in policies, processes, resources, assets or organisations, with consideration of the six principles of sustainability, in the project, its result and its effect”. These six principles include (1), (2), (3), (4), (5) and (8) from the above-mentioned list. When reflecting over these definitions, it appears that none have succeeded in incorporating the essence of all eight principles addressed by literature. Hence through this work, the authors also aim to contribute to literature through a refined definition of sustainable project management by bringing together the eight fundamentals of this concept in one model.

Prior research has seen a concentration of case studies in the building and construction, manufacturing, regional development and energy industry with very little focus on the limitations that industries face in incorporating sustainability at an operational level (Silvius & Schipper, 2014, p.67). An additional theoretical contribution is the analysis of new industries and identification of possible barriers that can impede the implementation of sustainability considerations in project management. Nevertheless, it is out of the scope of this study to question the validity of the proposed principles.

1.3 RESEARCH QUESTION

How are the eight principles of sustainability applied in project management?

1.4 PURPOSE

The main aim of the paper is to understand how the eight principles of sustainability are incorporated in project management. To achieve this objective, this paper will do the following:

- (a) Review and identify key principles of sustainability in project management in existing literature.
- (b) Adopt the multiple case study method to assess the applicability of the principles in project management.
- (c) Determine the barriers that impede certain principles to be applied in projects and the resulting trade-offs.
- (d) Refine the concept of sustainability in project management

The paper adopts a qualitative research design, with a multiple case study strategy aided by the semi-structured interview technique for data collection. The theoretical contribution will be through the very first collective consideration of the eight principles of sustainability and their implementation in project management through empirical case studies. The practical implication of the research will be realised through offering guidance to organisations on what principles to build sustainability policies on while pointing out the commonly faced barriers and trade-offs.

CHAPTER 2. THEORETICAL FRAMEWORK

This chapter commences with reviewing the most notable works in the field under study. Then it presents and critically analyses the theoretical discussion on how to balance and harmonise social, environmental and economic interests, consider the spatial and temporal dimensions of a project, emphasise value and ethics as well as transparency and accountability in project management practices, reduce risk, engage stakeholders and consume income and not capital, as principles of sustainability in project management. Each subchapter ends with the hypothesis of the corresponding principle. The final subchapter then presents the theoretical model constructed by the authors, which lays the foundation of the present research.

2.1 SUSTAINABILITY IN PROJECT MANAGEMENT

The concept of sustainable development within the project management context has continuously evolved over the past decade highlighting various views over the fundamentals that processes and procedures should build on (see Table 1). One of the first contributors to this field was Labuschagne & Brent (2004, p.104), who revised project management frameworks in the process industry to include two core principles of sustainable development, which are intragenerational and intergenerational equity. This highlights early endeavours of introducing the spatial and temporal element of sustainable development in project management practices. Despite the fact that the authors (2004, p.103) name only two out of the eight principles present in project management literature, their work briefly touches upon other sustainability related considerations to be made. Labuschagne & Brent (2004, p.107) argue that project evaluation criteria focuses on financial indicators with very limited questions on environmental factors and no mention of social factors. Therefore their contribution to the field is made through the development of a model to assess projects based on the triple bottom line definition of sustainability. Furthermore, as part of social sustainability, the authors (2004, p.107) highlight stakeholder participation as an important criteria to assess, while arguing that organisations need to be accountable for the impact they exert over the triple P.

In an attempt to relate sustainable development to project management while pointing out challenges and potentials to its implementation, Gareis et al. (2009, p.6) differentiate content-related definitions of sustainable development from process-related one. The authors argue that the former present less relevance to the study of sustainability integration in project management as they are focused on contents of projects and their results (eg. climate change, clean energy, public health, social inclusion) rather than the management of them. By contrast the latter provide for the guiding principles of sustainable development, which coincide with the fundamentals proposed by Labuschagne & Brent (2004, p.107) with an additional emphasis on values and ethics as well as risk reduction instead of accountability.

Influential publications that followed are dated from the past five years, these being triggered by an increasing interest in developing models that can break down the existing barriers between the two fields. In a PMI (Project Management Institute) study centered around assessing how eight sustainability principles can be considered in order to improve the quality of the project assignment and of the project management process, the authors (Messikomer et al., 2011, p.58) referred to a simultaneous and balanced

economic, ecologic and social orientation, as well as a temporal, spatial and value based orientation as principles that can offer possibilities and limits to sustainable development.

Following researches (Turner, 2010; Goedknecht & Silvius, 2012; Silvius et al., 2012; Gareis, 2013; Økland, 2015) build upon the aforementioned four principles identified by Messikomer et al. (2011, p.59), highlighting the core fundamentals that literature perceives as crucial for ensuring sustainability in projects and corresponding processes. An exception to this is Økland (2015, p.104) who disregards the principle of balancing and harmonising the people, planet and profit pillars as well as value and ethical considerations as fundamentals of sustainable project management. Nevertheless, the author stresses the importance of developing within the limits of the social, ecological and economic systems as these are interconnected and influence each other in a highly complex way. This fundamental is complemented with the spatial and temporal dimensions as well as with considerations about reducing risk and making an accurate risk assessment as part of preventing the occurrence of negative externalities over any of the three Ps.

In addition to the four fundamentals highlighted by Messikomer et al. (2011, p.59), other authors also referred to transparency and accountability (Goedknecht & Silvius, 2012, p.3; Silvius et al., 2012, p.39), stakeholder participation (Turner, 2010, p.169; Goedknecht & Silvius, 2012, p.3), risk reduction (Turner, 2010, p.169; Goedknecht & Silvius, 2012, p.3) and consuming income and not capital (Silvius et al., 2012, p.39). Goedknecht & Silvius (2012, p.3) make a separate consideration of transparency and accountability as well as stakeholders and participation, but given the significant overlap between the interpretation of these fundamentals as well as the suggestion of grouping them supported by the majority of the authors, the paper jointly discusses transparency and accountability as well as stakeholder participation.

The above argumentation highlights the existence of various opinions on the fundamentals of sustainable development in the context of project management. Since no previous research has brought the varying principles under one framework, the authors propose to give equal consideration to all eight principles identified in literature.

Table 1. Sustainability principles in project management.

Sources	Sustainability principles							
	Balancing or harmonising social, environmental and economic interests	Short-term and long-term orientation	Local, regional and global orientation	Values & Ethics	Transparency & accountability	Stakeholder participation	Risk reduction	Consuming income and not capital
Gareis et al., 2009	X	X	X	X		X	X	
Gareis, 2013	X	X	X	X				
Goedknecht & Silvius, 2012	X	X	X	X	XX	XX	X	
Lambuschagne & Brent, 2004	X	X	X		X	X		
Messikomer et al., 2011	X	X	X	X				
Økland, 2015		X	X				X	X
Silvius et al., 2012	X	X	X	X	X			X
Turner, 2010	X	X	X	X		X	X	

(Note: XX refers to authors who have considered the two terms as two separate principles)

2.2 BALANCED OR HARMONISED CONSIDERATION OF SOCIAL, ENVIRONMENTAL AND ECONOMIC INTERESTS

The first to build a case for simultaneous and equal consideration of economic, environmental and social goals when delivering products and services was Elkington (1997, p.1). Through his work, he underlined that business objectives are inseparable from the environment and society in which organisations operate and thereby sustainable development needs to build on all three pillars concurrently. Environmental sustainability refers to keeping the natural capital intact. Social sustainability highlights the unity and continuity of the society with practices that allow people to work towards shared goals. Individual's existential needs of health and well-being, nutrition, safety, educational and cultural expression should be met (Gilbert et al, 1996, p.11). Economic sustainability can be interpreted in terms of present generations performing economic activities without burdening future generations through the creation of liabilities (Schieg, 2009, p.316). An alternative definition states that economic sustainability occurs when the environmentally and socially sustainable solution is financially feasible (Gilbert et al, 1996, p.11). Several authors have since used the triple bottom line, also referred to as 'Triple-P' for *people, planet, profit*, in their interpretation of sustainability (Gareis et al., 2009, p.7; Massikomer et al., 2011, p.59; Silvius & Schipper, 2012, p.2; Gareis et al., 2013, p.135; Tufinio et al., 2013, p.93; Økland, 2015, p.104).

A literature review on sustainability in project management performed by Silvius & Schipper (2014, p.67) reported that 86% of 164 publications referred to the triple bottom line when conceptualising sustainability, but their consideration of the three pillars is different: 96% of the papers discuss the economic dimension, 89% discuss the social dimension and 86% discuss the environmental dimension. Previous findings further support the occasional ignorance of the social and environmental dimensions of sustainability (Labuschagne & Brent, 2004; p.107; Labuschagne et al. 2005, p.378; Silvius et al. 2013, p.10) which can be explained by organisational endeavour to primarily compensate and reward investors' capital (Martens & Carvalho, 2013 p. 3). Additionally, the level of consideration of the three pillars differs in projects based on the macroeconomic climate of a country. For example, projects show a bigger emphasis on environmental concerns in Western Europe as compared to a prevalent social consideration in Africa (Silvius & Schipper, 2010, p.2).

Along the same line, current project management guides, such as PMBOK (PMI, 2013, p.141-254), still place an emphasis on the delivery of projects within the constraint of time, cost and scope, also referred to as the *iron triangle* (Silvius et al, 2012, p. 38). Despite the fact that the success of projects has started to be assessed using multiple criteria, additional considerations are still not reflected in practice as the triple-constraint drives project managers' attention on the profit 'P'. Hence, the social and environmental pillars get less attention (Labuschagne & Brent, 2004; p.107; Silvius & Schipper, 2010, p.3).

Nevertheless, the economic, environmental and social dimensions of sustainability need to be seen as interrelated as they are influencing each other in different ways (Silvius et al, 2012, p. 38; Silvius & Schipper, 2014, p. 69; Goedknecht & Silvius, 2012, p. 3). Their balance and harmonious relationship can be perceived either as a reactive or proactive approach to sustainability. Whilst the former intends to compensate for negative effects of doing business, the latter focusses on creating good effects from the start. Examples

are compensating unhealthy working conditions by higher salaries and moving to more sustainable business processes that eliminate the cause of unsustainability, respectively (Silvius, 2012, p. 3).

Whilst signs of an endeavour towards balancing people, planet and profit considerations when planning and delivering projects are already present, evidence suggests that the economic pillar still prevails in project management decisions and practices. The authors believe that a proactive approach towards harmoniously combining the three pillars is needed and hence would like to explore the application of it in project management thereby leading to the hypothesis:

H1: The principle of balanced or harmonised social, environmental and economic interests is not applied in project management.

2.3 LOCAL, REGIONAL AND GLOBAL ORIENTATION

Globalisation has gained companies access to international markets and simultaneously increased their influence over multiple geographic areas. As a result, their activities are influenced by international stakeholders regardless of their national or international orientation (Silvius et al., 2012, p.38-39; Silvius & Schipper, 2014, p.69). Alike permanent organisations, projects, which are temporary organisations, are also part of and impact the economic, environmental and social processes at various spatial levels (Hollin, 2001, p.402). For instance, a company outsourcing part of the supply chain of its project to other countries will need to take into consideration the working conditions of that specific country, which can be seen as a global orientation. By contrast, consultation with stakeholders from the local community about externalities of a project that can affect their living conditions can be seen as a local approach (Silvius et al., 2012, p.50).

To tackle the challenges presented by these highly interrelated networks of processes and organisations and to assure intra-generational equity (Labuschagne & Brent, 2004; p.104) sustainable development has to be coordinated across all levels ranging from global to regional and local (Massikomer et al., 2011, p.59; Goedknecht & Silvius, 2012, p. 3; Gareis et al., 2013, p.135; Marcelino-Sadaba et al., 2015, p. 8; Økland, 2015, p.104) and institutional responses have to address corresponding problems (Gareis et al., 2009, p. 7).

Since projects are part of a global system of interrelated organisations, the consideration of the triple-bottom-line at local, regional and global levels has been agreed to be essential in order to deliver sustainable projects. Nevertheless, evidence of its considerations in practice is limited, hence the authors aim to assess how this principle has been adopted by project management processes thereby leading to the hypothesis:

H2: The principle of having a local, regional and global orientation is not applied in project management.

2.4 SHORT-TERM AND LONG-TERM ORIENTATION

Sustainability is often studied as prudent resource utilisation and points out the need for movement from rapid improvement events (RIE) to sustainable improvement events

(SIE) in project management processes (Badiru, 2010, p.31) by giving equal consideration to both short and long-term consequences (Silvius & Schipper, 2014, p.69). Sustainability in the short-term provides solutions to a limited problem and in the long-term present's solution pertaining to a wider set of challenges (Okland, 2015, p.107). Von Carlowitz, in the eighteenth century, viewed forest management from a long-term intergenerational perspective to balance wood consumption and reproduction, which can be seen as the earliest consideration of the temporal aspects of sustainability (Eskerod & Huemann, 2013, p. 38). Since then, sustainable development literature has emphasised the importance of aligning long-term strategic management with short-term project management needs (Herazo et al., 2012, p. 86), which subsequently may build reputation for project-based organisations (Schieg, 2009, p. 318).

While strategic plans can be executed using project management tools, incorporating sustainability in projects requires the adoption of systems such as Environmental and Social Management Systems that equally concentrate on the long and short-term consequences (Sánchez & Vanclay, 2012, p.1). Case studies on construction, built environment and technology industries have shown the adoption of sustainable project management practices to build long-term value (Brent et al., 2005, p.631; Eid, 2002, p.1; Herazo et al., 2012, p.84; Al-Saleh & Taleb, 2010, p.52). However, firms listed on the stock market still tend to focus on short-term gains rather than a long-term vision. Additionally, in the economic perspective, discounted cash flows hold more significance than future cash flows thereby showing an inclination towards short-term gains and an inconsideration for long-term consequences (Silvius, 2013, p. 58).

The integration of the long and short-term orientation is often considered to be stretching the domains of project management as projects are temporary endeavours and project management practices inherently concentrate only on the project lifecycle (initiation, planning, execution, control and close-out) that once completed hold no continuation in value for the organisation (Silvius & Schipper, 2012, p.38). By focusing on the project's end result called the asset, the product or service produced by the asset and their corresponding lifecycles apart from the project lifecycle (Labuschagne & Brent, 2005, p.162) strategic alignment can be ensured. It is the permanent organisation that is seen to provide the long-term orientation through its vision, mission, strategy (Messikomer, 2011, p.70). It can be argued that the boundary between the permanent and temporary organisation is slimming from a strategic alignment perspective, especially in project-based organisations and projects initiate investments, the benefits of which are realised only in the long-term. For example, project benefits like client retention, stakeholder satisfaction and cost savings are obtained only once the project has been completed (Silvius & Schipper, 2012, p.38; Messikomer, 2011, p.70; Gareis et al., 2009, p.9; Gareis, 2013, p.16). It's often suggested that the long-term view should be presented by the stakeholders involved (Goedknecht & Silvius, 2012, p.8). This strengthens the case for the integration of the short and long-term aspects in project management calling for a focus on the project, asset and product lifecycle concurrently.

With only a handful of industries seen to practice sustainability through this dimension and with minimal studies over the barriers, the authors aim to examine if the dimension is integrated in project management practices thereby leading to the hypothesis:

H3: The principle of having short-term and long-term orientation is not applied in project management.

2.5 VALUES AND ETHICS CONSIDERATION

A unified value driven, ethical approach practiced by the organisation and its stakeholders is found to be an important consideration for integrating sustainable development in project management practices (Mishra et al., 2011, p.338). Sustainable development, a normative concept, reflects the values and ethical considerations of the project managers, the organisation they belong to and the client (Silvius & Schipper, 2014, p.69; Gareis et al., 2009, p.6; Goedknegt & Silvius, 2012, p.3). ‘Values’ underpin the attitudes and behaviours of project managers and team members. ‘Ethics’ are imbibed in the organisational culture as norms and rules that focus on imparting fairness and solidarity both inter and intra-generations, to strive for inclusion, participation, traceability and trust (Eskerod & Huemann, 2013, p.39-41) and/or to set up practices of integrity, credibility and reputation (Schieg, 2009, p.315). While the two concepts of ‘values’ and ‘ethics’ are rather broad, multiple authors consider it to be the way we *view* things rather than *do* things (Silvius, 2013, p. 58).

Projects and project managers form the medium through which ethical considerations are practiced (Messikomer et al., 2011, p.36). However, these are affected by the project context and the personal values of the project manager (Silvius & Schipper, 2012, p.39; Gareis, 2013, p.2). Due to the capitalist environment that businesses thrive in and the economic interest driven definition of success, malpractices are frequently sought to by project stakeholders. Such malpractices often lead to negative outcomes such as resource depletion, business bankruptcy, economic recession, species extinction, political tension and others (Mishra et al., 2011, p.338).

In order to instill ethics and similar values in project managers, professional bodies for management have written down codes of conduct and ethics and have formalised their awareness through training programmes and certifications. While these codes address the interactions between a project manager and the different stakeholders and organisations, Article 2.2.1. of the PMI ® Code of Ethics and Professional Conduct makes explicit the environmental and societal facet in the decisions made by the project manager (Silvius & Schipper, 2012, p.39-40).

Although this dimension of sustainable development has been addressed in literature, its practice seems utopic, requiring a mutual agreement amongst organisations, project managers and stakeholders on the required business trade-offs to deliver all projects sustainably. Thus the authors aim to map the ethical and value considerations made by organisations, the subsequent business trade-offs and respective benefits that are achieved, which ensure the successful practical application of this dimension. The resulting hypothesis to be tested is:

H4: The principle of integrating values and ethics consideration is not applied in project management.

2.6 TRANSPARENCY AND ACCOUNTABILITY CONSIDERATION

Another dimension of sustainability considered for project management practices is transparency and accountability. Transparency refers to the avoidance of a black-box methodology and disclosure of the policies, decisions, activities and the subsequent

environmental and societal impact of these. It also involves a “clear, accurate and complete portrayal, to a reasonable and sufficient degree”, of all the above (Hemphill, 2011, p.307). This allows stakeholders to evaluate and address any arising potential issues thereby contributing to an adherence to sustainable practices (Silvius & Schipper, 2014, p.69).

Transparency in the context of project management implies that project managers disclose all decisions, relevant events and impacts to stakeholders. However, the presence of an organisational structure with formal reporting protocols makes this dimension rather difficult to adhere to. Often the goal of such structures is to influence the perception of the stakeholder on the project, which can be seen as logical. However, with multiple stakeholder groups including the government and society, transparency can enforce the delivery of all projects sustainably (Silvius, 2013, p. 58).

Accountability as a sustainability dimension implies that an organisation owns the impacts of its actions, decisions and policies on the environment and society (Silvius & Schipper, 2014, p.69). Additionally, this dimension calls for actions to prevent the recurrence of negative impacts on the environment and society in the future (Hemphill, 2011, p.307). In project management practices the Organisation Breakdown Structure (OBS) assigns tasks to an individual and makes them accountable for it. While the accountable is usually questioned when the activity performs poorly on the cost, time, quality and scope criteria, it is important that the person be held responsible from the triple-bottom-line perspective. Thus it calls for an integration of the environmental and social indicators in work progress reports (Silvius & Schipper, 2012, p.39).

The authors of the study consider the transparency and accountability dimension of sustainability to be a subset of the values and ethics dimension. Nevertheless, the authors do not consider the practice of one dimension to imply the practice of another and vice versa. Thus it is interesting to see how project managers practice accountability and transparency in conjunction with the values and ethics dimension thereby leading to the hypothesis:

H5: The principle of integrating transparency and accountability consideration is not applied in project management.

2.7 RISK REDUCTION

Risk in project management is often referred to either as an opportunity or a challenge (Caron, 2013, p.51). Given this, risk reduction refers to the minimisation of the negative impacts of project management interactions and decisions on the environment, society and income required to assure financial sustainability (Turner, 2010, p.169; Okland, 2015, p.106). The Deepwater Horizon oil-spill is one such example where societal and environmental risks were high and due to inappropriate management led to a disaster (Silvius & Schipper, 2014, p.70). The indeterminacy, complexity, nonlinearity and irreversibility of the society - environment interactions, make it easier to prevent rather than ameliorate adverse impacts leading to the formulation of the precautionary principle (Gareis et al. 2009, p.10; Goedknecht & Silvius, 2012, p.3).

Project managers, when dealing with sustainability, future scenarios and evolutionary trends, face an unavoidable degree of uncertainty, ambiguity and ignorance thereby

posing a significant challenge on how knowledge is produced, distributed and used (Giampetro & Ramos, 2005, p.123; Gareis et al., 2009, p.6). Given this and the success criteria of projects, which is mainly defined by the iron triangle, project managers are solely accustomed to considering risks pertaining to the unfulfilment of the financial success criteria. Hence there is a need for the consideration and evaluation of risks associated to society and environment that can arise from the project.

The aim of the authors is to understand how project Risk Registers incorporate societal, environmental and financial threats and the corresponding precautionary procedures and response actions developed for the same thereby leading to the hypothesis:

H6: The principle of risk reduction is not applied in project management.

2.8 STAKEHOLDER PARTICIPATION

PMI (2013, p.30) defines stakeholders as “an individual, group, or organisation who may affect, be affected by, or perceive itself to be affected by a decision or activity”. With this definition in mind, stakeholder participation is needed to reach a consensus over the meaning of a sustainable product or process within the context of a specific project (Achterkamp & Vos, 2006, p.540) as well as over the indicators used to assess its sustainability (Singh et al., 2007, p.574). Stakeholder participation studies focus on various themes, each highlighting the need to implement this principle in project management practices (Marcelino-Sadaba et al., 2015, p.9) as it may encourage social and individual learning leading to an enhanced society, augmented citizens as well as a reduction of uncertainty resulted from imperfect information (Gareis et al., 2009, p.8).

To gain stakeholder participation, Porter & Kramer (2011, p.65-68) stresses the importance of creating shared value amongst stakeholders, arguing that prioritising shareholders’ short-term gains may result in the delivery of unsuccessful projects in terms of value delivered, which is unsustainable in itself. Thomson et al. (2009, p. 991) discuss the different types of knowledge on sustainability held by stakeholders, while Tam et al (2007, p.3106) contribute with a communication-mapping model stressing the need for better cooperation between project participants. Labuschagne & Brent (2004, p.102) proposes evaluating the standard of information sharing and the degree of stakeholder influence as part of project evaluation criteria. Singh et al. (2007, p.570) calls for the involvement of stakeholders when setting sustainability assessment rates. Thabrew et al. (2009, p. 69) believe that intersectional integration of projects is needed to meet sustainability targets. De Brucker (2013, p. 129) emphasises the importance of involving different stakeholders in decision-making, as not enough consideration is given to those groups that are key at only particular moments of the project.

ISO 26000 as cited by Silvius & Schipper (2014, p.70) underline that proactive stakeholder engagement requires a process of dialogue and consensus-building amongst all stakeholders, who come together to define the problems that need to be addressed, develop feasible solutions to these problems, proactively implement them through collaboration and finally monitor and evaluate the outcome (Hemmati, 2002, p.2; Gareis et al., 2009, p.8; Goedknecht & Silvius, 2012, p.3). Furthermore, incorporating sustainability thinking in PMI’s (2013, p.30) stakeholder definition increases the number of stakeholders than what the Stakeholder Registry would have normally reflected (Økland, 2015, p.105). The challenge that the increased number of

stakeholders presents to a project is the need to balance their interests while maintaining equilibrium between economic gains and environmental as well as social targets (Marcelino-Sadaba et al., 2015, p.9).

To implement sustainability into project management, decisions need to be made at multiple levels of the society, ranging from a private individual level to a business level and a national as well as international communities and organisations level (Hanssen, 1999, p.37). This requires better communication amongst firms, between firms and consumers as well as between firms and authorities leading to improved cooperation. Rules, regulations, standards and processes set up by authorities can often represent barriers at national or international level to the implementation of sustainability into project management processes (Marcelino-Sadaba et al., 2015, p.9). Nevertheless, studies show that local and regional governments can often facilitate the design and application of sustainable practices to projects (Brandoni and Polonara, 2012, p.336-337). It's interesting to point out that Goedknecht & Silvius (2012, p.3-4) treat stakeholders and participation as two separate principles. While the former refers to adhering to international laws and regulations as well as respecting human rights, the latter embraces the concept of stakeholder engagement.

Achterkamp & Vos (2006, p.525) propose a framework for stakeholder participation in sustainable projects that aids in determining which stakeholders should be involved in a particular phase of the project and the contribution they can make to it. To complement the triple P sustainability criteria used by many organisations, they introduce an additional consideration focused on the undesired effects of projects, which in their view should be equally distributed amongst all stakeholders without overburdening any group in particular.

Studies on stakeholder engagement are multiple and diverse, rooted in the realisation that adequate consideration needs to be given to every group of stakeholders that can affect the successful delivery of projects. Thus, it's important to study how this principle is implemented in practice in order to establish the existence of possible barriers and the need to develop corresponding response action that could eliminate them. The hypothesis formulated with the above argumentation is:

H7: The principle of stakeholder participation is not applied in project management.

2.9 CONSUMPTION OF INCOME AND NOT CAPITAL

On an environmental level the incorporation of this principle implies undertaking project activities that won't degrade nature's ability to produce or generate resources or energy, hence maintaining the source and sink function of the environment (Silvius & Schipper, 2014, p.70). This means that renewable resources should be extracted within the environment's capacity to regenerate and waste produced should not exceed the rate at which it can be assimilated (Gilbert et al., 1996, p.11). On a social level, this principle implies that firms should not exhaust an individual's ability to produce or generate knowledge or labour by mentally or physically overworking them (Silvius et al., 2012, p.51). On an economic level, this principle implies using income obtained from clients or generated from previous projects rather than the company's own capital (Silvius, 2012, p.91). This is vital for ensuring an organisation's financial health, as covering costs by continuously using capital may lead to insolvency. While from an

economic perspective, using income rather than capital is immediately apparent through the financial statement of the company, the environmental and social impacts of projects are not evident in the short-term, resulting in a degradation of resources in the long-term (Silvius & Schipper, 2010, p.2). Therefore sustainability in project management implies managing the economic, environmental and human capital concurrently.

W. Stead & J. Stead (1994, p.15) call for a paradigm shift within project management, encouraging temporary organisations to “view themselves as part of a larger, interconnected, social and ecological network governed by biological and physical processes”. Along the same line system dynamics theory can be used to present the interaction of economic, environmental and social factors within projects highlighting their complex interrelatedness and influence (Meadow & Wright, 2009, p.11-185). Since, no system can grow forever in a finite environment, the existence of a loop constraining the system is needed to balance the loop driving the system (Meadow & Wright, 2009, p.190).

The interpretation of the system dynamics theory (Meadow & Wright, 2009, p.190) in project management, where projects represent the system, the driving loops can be perceived as the activities that utilise environmental, social and economic resources unsustainably. Thus, there is a requirement for constraining loops like CSR projects that can restore the regenerative and assimilative abilities of the environmental and social capital. From a project’s economic standpoint, the continuous use of equity can be seen as the negative driving loop requiring a constraining loop of financial investments attracted from shareholders or external lenders. A lack of constraining loops can result in an irreversible damage to the environment and society as well as organisational bankruptcy, respectively. The more unsustainable practices are diminished, the more requirements for reinforcing loops are reduced.

While the aforementioned interpretation illustrates a reactive approach to sustainability, the incorporation of this principle from a proactive standpoint is needed as it sets standards on the resources to be used as well as on best practices when employing these (Økland, 2015, p.104-105). For instance, an environmental consideration of this principle is the judicious usage of resources in the execution phase of the project. An illustration of a social consideration is the care for the wellbeing of project team members and other stakeholders. Tight project schedules paired with the scarcity of certain resources often place pressure on the project team or the supplier during the project execution phase, which can be seen as ‘consuming capital’ if it leads to hindering one’s ability to perform in the future (Silvius et al., 2012, p.50-51).

Given the authors’ understanding over the importance of delivering projects within the boundaries of the ecosystem, and without the exploitation of human or financial capital, the incorporation of this principle in project management is seen as crucial. Thus, exploring the ways in which a project’s financial, social and environmental capital is managed will help assess whether this principle has been employed in practice whilst clarifying the path towards a better integration of it thereby leading to the hypothesis:

H8: The principle of consuming income and not capital is not applied in project management.

2.10 CONCLUSION

Literature up to date has suggested eight principles of sustainable development in project management which multiple authors have perceived as necessary to assure that future generations will equally benefit of the resources currently available. Despite a growing interest in establishing the fundamentals of sustainable development, researchers have not yet reached an agreement over the core sustainable considerations to be made. Therefore, the authors found it important to bring the varying contributions of multiple researchers in the field of project management and sustainability under one discussion to examine how these eight principles are applied in project management and strengthen the grounds for future research.

Balancing and harmonising social, environmental and economic interests of projects is a significant consideration to be made as business objectives are inseparable from the society and the ecosystem in which organisations operate. Therefore sustainable development can solely be achieved through building on the three pillars concurrently. The study of the temporal and spatial dimensions have been highlighted by all key authors identified (Gareis, 2009, p.7; Gareis, 2013, p.135; Goedknecht & Silvius, 2012, p.3; Lambuschagne & Brent, 2004, p. 107, Messikomer et al., 2011, p.18; Økland, 2015, p.105; Silvius et al., 2012, p.38-39, Turner, 2010, p.162-163) and it's important to the study given the high geographical interconnectedness of projects organisations as well as the need to prevent any negative impact over the quality of life of future generations. Incorporating sustainability considerations in project management implies a unified, value driven, ethical approach over decisions that affect stakeholders and organisations thereby exploring ways of implementing this principle is central to bettering future business relations amongst organisations. Transparency and accountability are important to ensuring sustainable development through projects as it builds trust amongst stakeholders while ensuring that occurred risks and errors are dealt with adequately by responsible parties. To prevent harm to the people, planet and profit pillar of an organisation and to implicitly assure sustainable development, a thorough risk evaluation that addresses all three pillars is needed and therefore the study of this principle is also necessary. The principle of stakeholder participation stresses the need of consulting and engaging with stakeholders to best use the variety of knowledge they possess as well as to maintain their commitment to 3P project goals throughout the whole project lifecycle. Therefore, sustainable development depends on their participation, highlighting the need to explore ways of achieving it. Finally, using income and not capital is perceived as a core principle to sustain people's, planet's and businesses' ability to produce or generate knowledge, labour, resources and profit as much for present as for future generations.

Based on the theoretical framework developed above, the authors were able to develop a model (see Figure 2) that illustrates the eight principles of sustainable development that project management practices need to build on thus serving as basis for the present study. The rationale behind emphasising on the people, planet and profit pillars around project management practices is that triple P considerations need to be made throughout all eight fundamentals proposed by literature. Hence the suggested model aims to guide the research throughout the whole process which will be culminating with practical and theoretical contributions provided to literature.

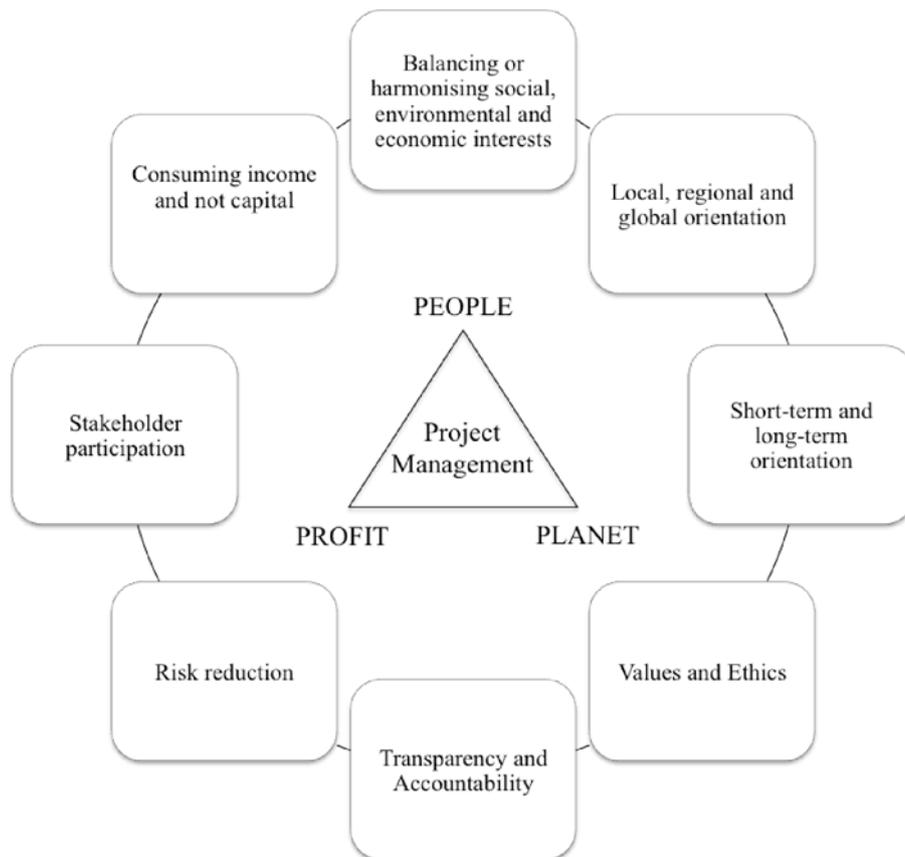


Figure 2. Principles in project management.

CHAPTER 3. METHODOLOGY

This chapter initially introduces the nature of the research as well as the methodology undertaken when conducting the literature search. It then elaborates, explains and justifies the philosophical standpoints of this thesis in terms of ontology, epistemology and axiology. Further on, it provides an understanding of the research approach, methodology and strategy adopted. The chapter subsequently discusses the time horizon, data sampling and data collection method embraced by the authors. Finally the discussion ends with presenting the practical method employed, the ethical considerations made and assessing the quality criteria of the research.

3.1 RESEARCH TYPE

Studies have categorised research into explanatory, descriptive and exploratory based on the open or closed question type (Adams et al., 2007, p.132; Saunders et al., 2012, p.170-172). The research question and the purpose of the study proposed in Chapter 1 indicate towards an **exploratory study** as they seek to understand and gain new knowledge on how the sustainability principles considered by literature are applied in project management activities. This aim is in line with the interpretation of an exploratory research as suggested by multiple authors, which is to gain answers to open questions for the purpose of new knowledge creation (Robson, 2002, p.59; Saunders et al., 2009, p.139 & 2012, p.171; Baxter et al., 2008, p.547-548; Adams et al., 2007, p.20). Furthermore the emphasis of explanatory and descriptive research on establishing causal relationships and gaining an accurate profile of events respectively (Saunders et al., 2012, p.171-172), does not resonate with the open ended nature of the research question under study.

3.2 LITERATURE SEARCH

After identifying the key area of interest to be in the field of sustainability the authors set out to understand the expanse of research done in the area, the concepts and theories developed, the research methods used and the controversies or inconsistencies that exist (Bryman, 2012, p.8). This exercise helped the authors identify the key contributors to the field, focus on a research gap and place the research amidst existing literature. By doing so the authors were able to fulfil the requirements of the degree project with respect to the literature search (Hange, 2014, p.9-10). Through a process of reading, reviewing and tabulating, the final research field was selected to be the “incorporation of sustainability in project management” with neglect spotted on the lack of empirical studies on the collective applicability of the eight sustainability principles.

Any improvement to current knowledge and practice cannot be fully considered until the existing conditions and problems are fully understood (Abidin & Pasquire, 2005, p.175). Hence, as first step, a bibliographic search was carried out in Scopus and in Web of Knowledge databases. As search words, the authors used the terms ‘sustainability’, (interchanged with ‘sustainable’ or ‘sustainable development’) simultaneously with ‘project’ or ‘project management’. The search was repeated with the intersection of ‘CSR’ (interchanged with ‘Corporate Social Responsibility’) and “project” or “project management”, since researchers sometimes referred to project sustainability in terms of CSR activities. Considering that the field is still in an emergent state (Silvius, 2012, p.1; Silvius & Schipper, 2014, p.64; Økland, 2015, p.103), all resulting articles published in

peer-reviewed journals or proceedings of conference papers were considered regardless of their impact factor. Based on the abstracts of the papers an initial selection of less than twenty articles was made. The content of these publications was then reviewed to ensure that the papers chosen were aligned with the proposed research question. This exercise helped in identifying key authors with a substantial contribution to the literature and provided a source to further references relevant to the proposed research question. The additional publications consisted of articles, conference papers, books and book chapters and were downloaded using Umea University's and Heriot-Watt's online library as well as Google Scholars.

3.3 RESEARCH PHILOSOPHY

Research philosophy refers to the development of knowledge and its nature (Saunders et al., 2012, p.127), with its choice being fuelled by researchers' assumptions, personal beliefs, interests and purposes (Taylor & Bogdan, 1998, p.3; Crossan, 2003, p.47-48). The main determinants of the research philosophy embraced by the authors in this work are the nature of the research question and the objective of the present study. Since the philosophical stance that one adopts will determine the nature of the problem identified, the research question and all decisions that are brought throughout the research process, its justification needs to be grounded in well-defined arguments, bringing credibility to the study (Crotty, 1998, p.13). It should be noted that while contributors to the field have taken up differing philosophical stances, the authors of the research are not influenced by those and have chosen a philosophical stance based on their understanding of the nature of reality.

3.3.1 Ontology

Ontology is mainly concerned with the nature of social entities, exploring the assumptions researchers have about the way the world operates (Bryman, 2012, p.32). While the *objectivist* position claims that social entities exist and are independent of social actors, the *subjectivist* perspective, also referred to as constructivism, advocates that social phenomena is a result of the perception and action of the social actor (Saunders et al., 2012, p.130). Since the principles of sustainability in project management do not hold a set of pre-existing characteristics and considerations, their implementation is open to the value judgement and understanding of project managers rather than prescribed by organisations in a normative manner. The sphere of action of project managers on sustainability is rather built up during interactions and negotiations among various stakeholder groups than prescribed by an institution. Furthermore, it can be argued that the way in which each principle is implemented in project management activities is reconstructed for each project, which is unique in its nature (PMI, 2013, p.13). The authors do not claim that sustainability requirements of a project provide no guidance to project managers, hence accepting a certain degree of objective reality, but believe that the consideration and implementation of principles are an endeavour undertaken by each project manager. Therefore, the authors embrace a **constructivist** ontological standpoint.

3.3.2 Epistemology

Epistemology is a philosophic branch, which determines what should be regarded as acceptable knowledge in a field of study (Saunders et al., 2012, p.132; Bryman, 2012, p.27) and explores various ways of understanding the nature of the social and physical world (Easterby-Smith et al., 2012, p.21). Literature proposes four main epistemological

viewpoints that researchers can adopt (Saunders et al., 2012, p.130-137; Bryman, 2012, p.27-32; Bryman and Bell, 2011, pp. 15-17; Wilson, 2014, p.9-11): *positivism*, a stance usually adopted by natural scientists, lies on a preference to study an observable reality that can produce law-like generalisations; *interpretivism* emphasises the need to understand the differences that individualise humans as social actors; *realism* advocates that objects exist independent of the human mind; and *pragmatism* asserts that there are various ways of interpreting the world and conducting a research, hence generating multiple realities.

Given the authors' subjectivist viewpoint as well as the nature of the present research, which is heavily built on multiple interpretations and reflections of ways to apply sustainability principles to project management practices, **interpretivism** deems to be the most appropriate epistemological position for this thesis. Projects, alike business situations, are complex and unique in the way they combine resources to create a product, service or a result (PMI, 2013, p.13). Hence, sustainability considerations made by project managers will highly depend on the nature of the project that is being carried out as well as on contextual characteristics that make up its reality. Philosophical stances such as positivism and realism that advocate law-like generalisations are not adequate to answer the research question as through the reduction of the aforementioned complexity, the study would lose rich insights on implementation methods as well as barriers faced by project managers (Saunders et al., 2012, p.137). Based on the research question the authors have reasoned unambiguously for the interpretivist's stance thus eliminating the use of a pragmatic philosophy that opposes the use of a single philosophical viewpoint (Saunders et al., 2012, p.130).

Project managers, as social actors, play a key role in the application of sustainability considerations to project management and therefore this epistemological stance facilitates understanding of multiple viewpoints on sustainability fundamentals through a cautious assessment of their decisions and actions. To fully embrace this philosophy the present paper aims to enter the social world of the observed project managers and, through a thorough analysis, view the projects from their perspective whilst grasping details of its contexts (Saunders et al., 2012, p.137). The empathetic understanding of sustainability considerations made as well as of the barriers faced by project managers is highlighted through the ambition to comprehend their decisions and actions rather than to explain these, an aspect further supporting the choice of the interpretivist epistemological orientation (Bryman, 2012, p.28).

3.3.3 Axiology

Axiology is a philosophic branch that deals with judgements about values (Saunders et al., 2012, p.137). Since the authors see themselves as interdependent with their research, their value judgement will guide the entire research process from data collection and analysis to the final presentation of the conclusions. **Value included** in the research process will be explicit, for example expressed through the purposive data sampling technique adopted and implicit, indicated through the authors' own interpretation of sustainability considerations made by project managers when delivering projects (Wilson, 2014, p.11). The later illustration highlights the occurrence of a 'double interpretation' (Bryman, 2012, p.31) given that the authors will provide their own explanation to others' interpretation of sustainability practices adopted in the project management field. These value judgements may lead to conclusions that are different from those outlined by other researchers (Saunders et al., 2012, p.139).

3.4 RESEARCH APPROACH

The nature of relationship between theory and social research determines the approach to producing knowledge (Bryman, 2012, p.24). A deductive approach entails developing a theoretical and conceptual framework from existing literature and hypothetically testing its validity through empirical observation, whereas an inductive approach refers to observing the focus of research and, through the employment of various research methods, generating new theory (Greener, 2008, p.16; Wilson, 2014, p.12-13). A third type of research method is given by abduction, which aims to combine the aforementioned approaches by moving back and forth between theory and data (Saunders et al., 2012, p.147). The field till date has seen inductive studies conducted by three contributors (Lambuschagne & Brent, 2004.; Gareis et al., 2009; Silvius & Schipper, 2010) while witnessing a rising number of deductive studies to substantiate the claims and theories by providing industry specific empirical testing. In the context of the study a literature review of 164 articles published showed that 44% of the papers were conceptual in nature and the remaining 56% were deductive empirical studies (Silvius & Schipper, 2012, p.67).

Despite the fact that the qualitative research method selected for this work would more often imply an inductive research approach, the **deductive** approach proves to be the most appropriate as the research question aims to assess how the eight principles of sustainability are applied in project management activities, which is a practical testing of existing theoretical perspectives (Saunders et al., 2012, p. 163). The use of a deductive approach is further supported through the existence of literature in the field, which determines the type of data needed to address the purpose of the thesis. Considering the time constraint under which this work has to be accomplished, the deductive approach was also found to be more feasible as it presents the advantage of being much quicker (Saunders et al., 2009, p.127). Given the availability of theoretical considerations on sustainable project management as well as previously reported findings, the authors were able to deduce a series of propositions that formed the basis for rigorous testing. Thus, existing literature facilitated decision-making on the type of data that had to be collected, on methods to interpret the information collected as well as on ways to relate the findings to literature.

3.5 METHODOLOGY

The methodology that researchers employ in a scientific enquiry can take the form of quantitative, qualitative or mixed approaches. Quantitative research methods are often synonymously used with any data collection technique (eg. questionnaire) or procedure (eg. graphs or statistics) that utilises or produces numerical data (eg. numbers), whereas qualitative methods represent data collection techniques (eg. interview) or procedures (eg. categorising data) that use or generate non-numerical data (eg. words). While these two strategies are perceived as distinctive and contrasting by some authors (Taylor and Bogdan, 1998, p.3-4; Bryman, 2012, p.31; Creswell, 2003, p.18), others regard them as complementary rather than opposing (Bryman & Bell, 2011, p.29) and a third group argues that making the distinction between them is of no use (Layder, 1993, p.110). Despite this academic disagreement over the role and importance of distinguishing between the aforementioned methodological stances, adopting one of the enquiring modalities available was necessary as the choice of a research method guided the data

collection and data analysis technique employed by this thesis. In a pursuit to understand the type of methods used in previous research work, the authors found that nearly 76% of the empirical studies were qualitative and the rest quantitative (Silvius & Schipper, 2012, p.67). Given the above argumentation, the authors of this thesis believe that adopting the dominant research method would be beneficial in addressing the gaps that have been pointed out earlier.

Considering the foremost purpose of this research, which is to gain a deep understanding of the decisions, considerations and actions made by project managers when applying sustainability to project management practices, the choice of a **qualitative** research method is evident. This is also in line with the previous ontological, epistemological and axiological selection made in this paper (Saunders et al., 2012, p.163). A qualitative research method allows the study of one phenomenon, represented by the sustainability principles suggested in literature, from different perspectives, reflected through various ways of employing them in practice (Baxter et al., 2008, p.556). Additionally, it facilitates the exploration of multiple meanings that participants attach to sustainability considerations as well as of contextually influencing factors that aid or impede the implementations of these considerations. Finally, it embodies the social reality of the principles, which continuously change from project to project as a result of emergent surrounding conditions and participants' subjective nature to respond to them (Bryman, 2012, p.31). Therefore, through the employment of a qualitative research method, the authors aim to establish a close relationship with the participants deemed to be necessary to gain cognitive access to their data, which is rich and deep in its nature (Saunders et al., 2012, p.163).

3.6 RESEARCH STRATEGY

'How' questions, as in the case of the present research, are most likely to use **case study** as their research strategy to understand operational links in the context of the study (Yin, 1994, p.6). A case study is described as an empirical enquiry that is conducted when the boundaries between the real-life phenomenon and context are not understandable (Yin, 1994, p.13). In lieu of the above, sustainability principles (the phenomena) have often been customised and adapted to the industry, strategy and culture of a temporary organisation (the context), thereby making the study of the application of the principles subjective and further strengthening the purpose of using case studies.

Through the use of case studies the authors aim to obtain a rich understanding of the exploratory question posed. The choice of a qualitative research methodology eliminates the use of any quantitative strategies like experiments and surveys. Moreover, an interest towards studying the implementation of the principles of sustainability in project management moves from the realm of 'research in action' to 'research about action', thereby eliminating the action research strategy. The use of a deductive approach, which is free from the aspects of storytelling and not requiring a long-term full time access to the contextual setting of the subjects of analysis rules out the use of grounded theory, narrative enquiry and ethnography strategies respectively (Saunders et al. 2012, p.173-190).

Case studies are often classified as single or multiple based on the need of the research being conducted (Baxter et al., 2008, p.549). A single case study represents a critical or

an extremely unique case that is studied for its strong coherence to the phenomenon or the opportunity to analyse a phenomenon that has not been studied before (Saunders et al., 2012, p.179). In contrast, a multiple case study focuses on the replication or generalisation of results thereby allowing a more rigorous examination and strong research (Baxter et al., 2008, p.550). An additional rationale behind using the multiple case studies is given by the agenda to capture maximum variation in the data collected and document uniqueness around key themes (Saunders et al., 2012, p.287-288). For the purpose of the study, the authors have chosen **multiple** case studies solely based on the latter purpose to capture key themes around the research question and help document uniqueness for best practices, barriers and trade-offs while implementing sustainability principles in project management. Additionally, it is noted through an analysis of the previous literature that all qualitative studies carried out used the case study research strategy (Silvius & Schipper, 2012, p.67) thus the authors choice is coherent with that of earlier research conducted in the field.

3.7 TIME HORIZON

Based on the amount of time that the data collection phase of the research is carried out for, there are primarily two types of studies, cross-sectional and longitudinal. On one hand, cross-sectional studies focus on analysing a particular phenomenon at a particular time thereby providing a snapshot. On the other hand, longitudinal studies provide a series of snapshots over a period of time hence holding the ability to study change and development. Owing to the time constraints of completing this research project within two months, the authors consider **cross-sectional** study more suitable. (Saunders et al., 2012, p.190-191).

3.8 DATA COLLECTION AND ANALYSIS

3.8.1 Data collection method

Data collection methods need to be in line with the research philosophy, methodology, approach and strategy. Given that the present paper has been identified with an interpretative philosophy that uses a qualitative research approach to explore various applications of sustainability principles in project management, naturalistic, non-standard and interactive data collection methods are justified (Saunders et al., 2012, p. 163). Since interviews embody all these characteristics, they are one of the most popular qualitative research techniques employed (Saunders et al., 2012, p.373). The availability of several kinds of interviews, differentiated based on formality, structure, level of standardisation and directedness (Saunders et al., 2012, p.374), stresses the importance of choosing a type that is consistent with the proposed research question and objectives as well as the strategy employed.

Interviews are often categorised into various typologies based on the level of formality namely: *structured*, *semi-structured* and *unstructured* interviews (Saunders et al., 2012, p.374). Structured interviews also known as ‘standardised interviews’ or ‘quantitative research interviews’ are based on a predetermined set of questions that are administered by the interviewer. The aim of this is to give each interviewee the same context, to remove any bias by reading out questions as mentioned and in the same tone as well as to aggregate the findings based on questions that have pre-coded answers (Bryman & Bell, 2015, p.211; Saunders et al., 2012, p.374). For this exploratory research, the authors deem the technique unsuitable as their philosophical stance of constructive

interpretivist defies the use of pre-coded or fixed choice answers. On the contrary, unstructured interviews also called ‘informant interview’ are very often used to explore a general area in an informal non-directive manner where the interviewee is allowed to freely talk about the different aspects of the topic (Bryman & Bell, 2015, p.214; Saunders et al., 2012, p.375). This particular type of interview is also unfit for the research due to the deductive approach previously adopted and its focus on the eight principles of sustainability incorporated in project management practices. Therefore it requires answers based on a set of themes pertaining to the fundamentals.

With this consideration in mind, the authors believe that **semi-structured interviews** represent the most suitable data collection methods offering multiple benefits that would substantially enhance the quality of the data collected. Semi-structured interviews, also referred to as qualitative interviews (Bryman, 2012, p.203), are non-standardised, allowing for the preparation of an interview guide, which includes key questions and themes to be covered. Additionally, it enables making changes in order, omissions or additions of questions to assure that the information most relevant to the research question has been obtained (Robson, p.280; Greener, 2008, p.89; p.374; Bryman, 2012, p.471). The themes and type of information that need to be explored are defined through the deductive research approach that the paper adopted. Moreover, the flexible nature of questions aid in guiding the interview towards obtaining the information required for fulfilling the foremost purpose of the work. This also highlights the focused nature of the semi-structured interviews (Saunders et al., 2012, p.375).

Semi-structured interviews are used to understand the ‘how’ of the phenomenon and can be employed in exploratory studies in order to gain understanding of the background or context of a study, which is an objective of the present research (Saunders et al., 2012, p.376-377). They offer the benefit of allowing the discussion to touch upon areas that had not been previously thought of, but which are important for comprehension thereby helping the authors address the research question and objectives. Additionally, they present the advantage of establishing personal contact with the project managers, which is more preferred by participants as compared to questionnaire-based data collection methods. Since the questions addressed to projects managers are complex and open ended, the use of semi-structured interviews is optimum (Saunders et al., 2012, p.379).

Interviews can happen in person, over the phone or through means of using the internet (Saunders et al., 2012, p.405). Since the participants of the study are geographically dispersed and the authors themselves are sustainability conscious, the option of conducting the interviews in person has been removed. On the other hand, to be able to best interpret the reactions, attitude and nonverbal language of project managers whilst interviewing as well as to create a more dynamic and interactive atmosphere, the authors favoured the use of Skype video-calls over the possibility of conducting the interview through phone or other online platforms.

3.8.2 Data sampling

In contrast to probabilistic sampling that is able to specify the probability of a case being included in the research, the non-probabilistic sampling, also called non-random sampling, uses an element of subjective judgement to select the sample for the study (Saunders et al., 2012, p.281). The research question at hand requires an in-depth understanding of the implementation of the eight sustainability principles in project

management by exploring multiple case studies, thus justifying the use of **non-probabilistic** sampling.

Research has pointed out four types of non-probabilistic sampling techniques which are: *quota sampling* to select participants when a sampling frame is not available, *purposive sampling* where participants are chosen on the basis of judgement, *volunteer sampling* where participants volunteer and *haphazard sampling* where participants are included for convenience (Saunders, 2012, p.37). A sampling requirement set by the authors is that the organisations that carried out the projects under scrutiny need to have sustainability integrated as one of their strategic pillars. Furthermore, the authors chose to analyse multinational private companies in order to allow for the assessment of the spatial sustainability principle and harmonised triple-P consideration. Finally the authors also set boundaries to the companies to be headquartered in Europe and North America for ease of access and professional network created in these regions. Thereby, the infancy of the research with only recent speed in publications, along with the aforementioned constraints reduces the number of organisations and projects that inculcate sustainability in their project management practices. With the above understanding, the researchers fulfil the basic assumption of **purposive sampling** of using good judgement and an appropriate strategy to select cases (Tansey, 2007, p.17).

Quota sampling is not suitable to the research question as it is entirely non-random in nature (Bryman, 2012, p.203). Additionally the cases that have been selected by the authors are chosen and have not volunteered for the research thus undermining the case for volunteer sampling (Saunders et al., 2012, p.289). Finally, haphazard or convenience sampling selects cases without any strategy in mind and for the ease of availability thus eliminating its usage in the study (Greener, 2008, p.48). Thus purposive sampling technique is best suited for the research question that the authors aim to study.

Through the research the authors aim to assess the application of the eight principles as well as highlight best practices, barriers and trade-offs faced by organisations when implementing sustainability in project management. To fulfil this objective, the case studies chosen need to possess sufficiently diverse characteristics and provide maximum variation in the data collected. This type of purposive sampling is often referred to as **heterogeneous** or maximum variation sampling, which allows the capture of key themes around the research question and helps document uniqueness. (Saunders et al., 2012, p.287-288). The heterogeneity of the samples selected for the research lies in the industries in which the organisations operate. The authors have made sure that no two case studies belong to the same industry thus securing a better representation to achieve insightful results.

It is to be noted that there are ambiguous or no rules for deciding the sample size that is most relevant to be studied when considering non-probabilistic sampling. However, Saunders (2012, p.45) presents a tabulation of the sample sizes most suitable when considering different research strategies and data collection techniques. As the authors are using the multiple case study strategy by collecting data through semi-structured interviews, the tally corresponds to a sample size of 5-25, which is being fulfilled through this study.

3.8.3 Data analysis

The technique that researchers adopt for analysing qualitative data, recorded through varying strategies, is guided by the research approach, a highly structured or less structured method and the reliance on rules or the researchers' interpretation. While the three criteria help researchers select a data analysis technique, they are by no means an indicator of the analytical rigour or quality of the analysis conducted (Saunders et al., 2012, p.556). Based on the above, multiple authors (Braun & Clarke, 2006, p.80; Attride-Stirling, 2001, p.385; Saunders et al., 2012, p.556-582; Bryman, 2012, p.297-307) have pointed out techniques for analysing qualitative data, which include conversation analysis, content analysis, interpretative phenomenological analysis, template analysis, discourse analysis, narrative analysis, pattern matching, explanation building and thematic analysis .

The deductive approach adopted for this study limits the analytical techniques to pattern matching, explanation building and thematic analysis (Saunders et al., 2012, p.578-580; Braun & Clarke, 2006, p.80; Attride-Stirling, 2001, p.385). While all three techniques are apt for the study, the authors' choice to go with a highly structured method that allows the researchers to rely on their interpretation of the data resonates most with the thematic analysis. With 'pattern matching' having no structure (Saunders et al., 2012, p.579) and 'explanation building' relying more on the methods' rules rather than the interpretation of the researchers (Saunders et al., 2012, p.580), both techniques fall short in fulfilling the choice made by the authors.

The **thematic analysis** is a highly structured method that outlines six different phases and is open to the researchers' interpretation as it allows the setting of codes and themes subjectively (Braun & Clarke, 2006, p.93). The *first phase* of a thematic analysis involves informing oneself of the data that has been collected by taking notes during the interview. This phase is carried out by the authors during the data collection phase and through discussions once the interview has been completed. The *second phase* involves generating codes or segments within the data that strike as most interesting to the authors (Braun & Clarke, 2006, p. 93-94). It is to be noted that the codes can be data-driven or theory-driven. The *third phase* searches for themes within the coded texts in order to collate the long list of codes identified by analysing and sorting them (Braun & Clarke, 2006, p.96). *Phase four* involves reviewing the themes to check for internal homogeneity and external heterogeneity (Braun & Clarke, 2006, p. 97). This step essentially leads the researchers to understand the different themes, how they fit together and the story they tell in order to best answer the research question at hand. In *phase five* the researcher refines, defines and names the different themes to provide compelling paraphrased evidence that suitably and sufficiently answers the hypothesis developed as part of the study. The *final phase* involves the production of a concise, coherent, logical and non-repetitive report that provides an analytical argumentation and conclusion in relation to the research question (Braun & Clarke, 2006, p. 98-101).

The advantages of using the thematic analysis technique are its systematisation and the richness of exploration that allows the authors to unravel the textual data through sense making and intuition (Attride-Stirling, 2001, p.402). Considering the research question under study, this method is best able to capture the subjective experience of the implementation of eight sustainability principles in project management thereby rendering the analysis outside the positivist approach. Given the infancy of the field and

the introduction of the authors to the field of research the analysis provides simple, structured yet insightful method for analysis (Braun & Clarke, 2006, p.101).

3.9 ETHICAL CONSIDERATION

Central to the success of any research conducted within the realm of social science and business studies are the ethical considerations made by the researchers (Saunders et al., 2012, p.208; Ghauri & Grønhaug, 2010, p. 20). Since ethics is interpreted as moral choices that affect decisions, standards and behaviours, in relation to the rights of those who form the subject of a study (Saunders et al., 2012, p.226) it can be argued that defining and following a set of rules that cover all possible moral choices is not feasible (Greener, 2008, p.40). Therefore the ethical considerations adopted by the authors followed recommendations made by Rubin & Babbie (1997, p.60-63) which outline that participation in research should (1) be *voluntary* and based on *informed consent*, (2) ensure there is *no harm to the participants*, (3) be *anonymous* and *confidential* and (4) *not deceive subjects*.

To fulfil the criteria of voluntary participation and informed consent the authors sent eligible participants a *Consent Form* (see Appendix 1), which included information on the purpose of the study, the interview process, the benefits of taking part in the study as well as the rights of participants. The guiding questions of the study were also shared to familiarise participants with the themes the authors aimed to explore and to ensure that they had sufficient time to reflect over the subject of discussion. The authors provided further clarification to the research upon request and answered any questions imposed by participants prior to or during the study. If project managers haven't returned a signed copy of the Consent Form before the initiation of the interview, they were reminded of their rights at the beginning of the interview and their consent was obtained at that point.

To avoid any harm that could affect participants, the authors paid special attention to the physical and psychological comfort of participants throughout the interviewing process as well as in any communication leading to or following the discussion. Conducting Skype interviews presented the benefit of allowing participants to choose a place that comforts them and a time that suits best their personal and professional schedule. Participants were not pressurised to answer questions that they felt uncomfortable with, and were offered the opportunity to withdraw from the study at any point, highlighting the discretionary nature of their participation (Saunders et al., 2012, p.231). Social research may determine participants to see themselves and their own behaviour from a perspective that they have not considered before, which in retrospective can seem immoral or unjust (Rubin & Babbie, 1997, p.61). In the context of this research this means that participants can perceive some of their past actions as being unsustainable leading to questions raised over their own morality. Therefore, the authors continuously emphasised the fact that it's not in the purpose of the study to criticise any of the project managers' past decisions or behaviour, rather to inform literature about what principles of sustainability are applied in project management and what the barriers to applying them are, in case certain sustainability considerations have not previously been made.

To prevent any harm to the identity of participants or the organisation they belong to, the authors offered anonymity to all project managers interviewed throughout the whole paper, as disclosing their names presented no additional benefits to the study.

Furthermore, confidentiality was ensured by not sharing the raw data or the interview transcripts with anyone and deleting the audio recordings of the interviews following their transcription. These two considerations meant that the identification of the source of data or organisation is impossible as enough generalisation has been introduced in presenting the particulars of the projects (Saunders et al., 2012, p.223).

Finally, to not deceive subjects, upon establishing the first contact with them, the authors introduced themselves as well as the purpose of their study. As aforementioned, the guiding questions of the interview were also disclosed to ensure that participants were fully aware of the project aspects the researchers aimed to touch upon. The authors maintained transparency throughout the whole research process and clearly answered any questions as well as addressed any concerns highlighted by participants. All participants were also offered a copy of the final version of the thesis.

Rubin & Babbie (1997, p.63-64) make a further ethical consideration which rather than focusing on behaviours towards participants, is concerned about the way the data is analysed and reported to the research community. They highlight the need to report any shortcomings encountered during the research as well as negative findings related to the study. Hence, as part of the authors' core personal values, the report gives an honest and open account of the whole research process including pitfalls and problems faced during the scientific enquiry. By doing this, the authors aim to promote transparency and accountability and help future scientific researchers prevent or prepare for problems that can impede the elaboration of further studies.

To answer the research question and objectives, a prerequisite for the study was to gain cognitive access to data requiring cooperation from participants (Saunders et al., 2012, p.211). This has been achieved through building relationships with participants via email or phone communication. Communicating the purpose of the study to participants, explaining how their participation will help gain insights in project management practices related to sustainability and offering anonymity and confidentiality to them, were key to building trust and credibility to the present research (Saunders et al., 2012, p.235).

3.10 PRACTICAL METHOD

3.10.1 Interview guide

A script that structures the course of the interview that may contain topics or detailed sequence of carefully worded questions is referred to as an interview guide (Kvale, 2007, p.56-57). In the realm of this study the authors adopt a semi-structured interview method, which outlines topics and suggests questions to be asked. The degree to which the interviewers follow the order and wording of questions is predetermined by the interviewers and is binding to maintain coherence in between subsequent interviews (Kvale, 2007, p.57). For this study the authors chose to follow the order of questions/themes however worded them differently to accommodate the style of participants.

Kvale & Brinkmann (2009, p.103) highlight the first two stages of the interview process as the 'thematising' and 'designing' stages. It is during these stages that the interview guide is formulated. *Thematising* refers to the theoretical clarification of the research question under study and the themes investigated (Kvale & Brinkmann, 2009, p.105). It

addresses the question of ‘why’, which is to clarify the purpose of the study and ‘what’, to obtain answers to the different hypothesis or subject knowledge that need to be tested (Kvale & Brinkmann, 2009, p.105-106). The Interview Guide (Appendix II) prepared for the research is based on the conceptual framework developed in Chapter 2 and is aligned with the methodological stance chosen by the authors.

The next stage is *designing*, which involves planning the techniques and procedures of the ‘how’ of the study (Kvale & Brinkmann, 2009, p.109). With a number of hypotheses the authors of the study have chosen to form 1-3 interview questions pertaining to each hypothesis in order to validate them. This mapping of hypothesis to interview questions has been shown in Appendix 3. It should be noted that while the study provided a guide of interview questions, follow up questions were asked to obtain a clear understanding and holistic answers. Also, given the interconnectedness of the topics and the free flow in the speech of the participants, certain answers encompassed evidence for different hypothesis.

3.10.2 Conducting the interview

Since the first few minutes of any interview has a significant impact on the results grasped from a discussion (Saunders et al., 2012, p.389), the interviewers made sure that apt introductions highlighting the study and the background of the interviewers were made, that appreciation was shown towards the time and effort invested by project managers in taking part in the research, that participants were aware of the ethical considerations made for the study and that the process of the interview was clearly explained to them. This established credibility in the researchers whilst enhancing the interviewee’s level of confidence. If a signed copy of the Consent Form hadn’t been returned prior to the interview, their consent to take part in the study as well as to audio record the conversation was obtained at that point.

Despite the fact that interviews are perceived as a time consuming process (Saunders et al., 2012, p.398), both authors decided to be present during the interview to ensure that all themes were covered appropriately, to discuss results subsequent to the interviews and to have unanimous agreement over the interpretation of the outcomes. Nevertheless, one interviewee was leading the conversation and the other one was contributing through follow up questions to clarify answers and remove any assumptions or biases in the primary investigator’s understanding of the answers.

Skype video calls were chosen as the most preferred mode of interviewing due to the geographic dispersion of the participants (Saunders et al., 2012, p.405) as well as the advantage of observation of their body language and expression. Due to the unavailability of a Skype account or other video chat accounts with one of the participants, the corresponding interview was carried out over the phone, which can potentially impose the challenge of obtaining the participant’s trust required for an exploratory discussion (Saunders et al., 2009, p.349). Previous business relationship with one of the researchers established the trust required to gain engagement from this participant. Nevertheless, the lack of visual contact caused the inability to interpret the nonverbal behaviour of the participant or to visually control the flow of information. A comparison between the Skype interviews and the telephone interview showed no definitive difference in the nature of the responses, hence the telephone interview was judged equally suitable for the purpose of the present study.

Since all interviews were conducted in English, regardless of the mother tongue of the interviewers or the interviewees, the possibility of misunderstandings in terminology was eliminated (Bryman & Bell, 2011, p. 488). The language barriers were minor, as all participants spoke fluent English. The length of the interviews greatly varied from 1h10' to 2h5', which can be a representative characteristic of qualitative interviews (Bryman & Bell, 2011, p. 482).

3.10.3 Transcribing the interview

Audio-recording an interview is deemed to be beneficial (Saunders et al., 2012, p.394) and therefore interviews were first audio-recorded and later transcribed to ensure that the data has been captured accurately. This provides the additional benefit of maintaining focus on what the respondents are discussing without the distraction of taking notes (Bryman & Bell, 2015, p. 493). One interview was not recorded, as the interviewee did not agree to it, but notes were taken to ensure that the responses of the participant are recorded. Hence, the transcript of this interview is not fully congruent with the word order or grammar of the respondent as it principally emphasised on mirroring the content when transcribing the answers.

3.10.4 Research process

The research process was initiated on 22nd September 2015 with the literature review process. The authors delivered a Gantt chart on 6th October 2015 that outlined the schedule for meetings, chapter draft completion and chapter reviews. By presenting a research proposal on 23rd October 2015 and through discussions with the supervisor, the authors were able to focus on the research question for the thesis. The *Introduction* and *Theoretical background* chapter drafts were successfully submitted on 9th November 2015 following which the authors obtained the feedback of the supervisor. Efforts were subsequently concentrated on drafting the *Ethical Consent form* and the *Interview Guide* and were submitted to the supervisor on 17 November 2015. In the meantime the researchers began drafting the *Methodology* chapter for the thesis and submitted the same on 18th November 2015. The data collection phase took place between the 25th of November and the 5th of December 2015. The profiles of the project manager candidates were as detailed in Table 2:

Table 2. Research process.

Project Case Study	Interview Date	Coded ID
Pharmaceutical drug testing	26 November 2015	RSP1
IT solution development	26 November 2015	RSP2
Automobile component packaging solution	27 November 2015	RSP3
Railway electronics delivery	28 November 2015	RSP4
Furniture manufacturing for office space	2 December 2015	RSP5
100% sustainable coffee production	5 December 2015	RSP6

Post data collection the interviews were transcribed. The *Findings and Analysis* chapter was worked upon and the chapter was submitted on 16th of December 2015. Following

this the *Conclusion and Recommendation* chapter was submitted on 18th of December 2015. By putting together the abstract, acknowledgement, abbreviations and acronyms, table of contents, list of figures, list of tables and appendix as well as checking the formatting requirements, the first draft of the thesis manuscript was submitted on 18th December 2015 for the supervisors' feedback. Upon receiving relevant and extensive feedback, the authors were able to produce the final version of the thesis on 29th December 2015. The thesis was submitted and nailed on 4th January 2016 and defended on 12th January 2016.

3.11 QUALITY CRITERIA

The quality of a research study is important in order to evaluate its value in terms of the "truth" of the findings, applicability to other contexts, replication in a similar context and the degree to which the findings stem from the respondents' and context's characteristics and not from biases, motivation, interests and perspectives (Lincoln & Guba, 1985, p.218). In this respect it is fundamental that researchers enquire if the research evidence and recommendations will successfully stand up to a strict scrutiny (Saunders et al., 2012, p.191).

Quality criteria are often split on the basis of the epistemological standpoint of the researcher to be positivist or interpretivist (Saunders et al., 2012, p. 192). While the positivist view suggests evaluating the quality criteria in terms of validity and reliability from an internal and external perspective, the interpretivist view proposes two primary criteria of trustworthiness involving credibility, transferability, dependability and confirmability as well as authenticity (Bryman & Bell, 2015, p.401). While multiple authors have drawn parallels between the positivist and interpretivist criteria, the necessity for the differentiation arises from the view that a single absolute account of social reality is debatable. The parallels that are drawn are as follows: credibility parallels with internal validity, transferability corresponds to external validity, dependability parallels with reliability and confirmability corresponds to objectivity (Bryman & Bell, 2015, p.400; Saunders et al., 2012; p. 192; Lincoln & Guba, 1985, p.219; Yin, 1994, p.32-33). Considering that the authors of the study choose an interpretivist epistemological standpoint and use a qualitative research methodology, the quality criteria of trustworthiness encapsulating credibility, transferability, dependability and confirmability as well as authenticity will be studied.

From an interpretivist perspective, where several different accounts of an aspect of social reality are possible, the *credibility* of the account that the researcher has arrived at is a determinant of its acceptability to others (Bryman & Bell, 2015, p.401). Lincoln & Guba (1985, p.301-316) suggest techniques to test the credibility of the research, which are used here. *Firstly*, the data for the study was collected through semi-structured interviews. Additionally, the focus of the interview on a particular project managed by the participant allowed for greater depth in the study. Thus, through the method of persistent observation the authors were able to increase the probability of producing credible findings. *Secondly*, as the semi-structured interviews were conducted in pairs, while one interviewer assumed the role of the investigator by asking the interview guide questions, the other took the role of the debriefer by taking up an analytic session to probe into and clarify the biases and interpretations of the investigator. Hence, through the use of peer debriefing an external check could be conducted on the enquiry process, thereby increasing credibility. *Finally*, by obtaining permission from the participants to

record the interviews and transcribe them, the authors were able to create transcript archives for later recall and perform comparisons between raw data and findings, thus increasing credibility through referential adequacy.

Qualitative studies as in the case of this research are aligned towards contextual uniqueness and temporal significance of the aspect of the social world under study (Bryman & Bell, 2015, p.402). Thus, *transferability* implies that the findings of a particular study are valid to other contexts or similar context at a different time (Lincoln & Guba, 1985, p.316). By bringing out the best practices of incorporating sustainability to standardised project management practices, the authors see the results of the study to be transferable to other projects and contexts. While the authors of the research do not see the provision of a transferability index under the realm of the study, they are willing to provide the database under relevant ethical considerations to aid transferability judgements.

The criterion of *dependability* adopts an auditing approach where the records of problem formulation, selection of research participants, fieldwork notes, interview transcripts, data analysis and decisions are made accessible to the researchers during the entire course of the research study (Bryman & Bell, 2015, p.403). The authors of the research ensured documentation and archiving of all the above-mentioned study material. At the same time the authors went through a constant process of consulting with the supervisor and literature on research methodology to be able to audit and ensure the practice of proper research procedures. Given that the study generated manageable databases, which were not large, the authors were able to use the auditing approach to evaluate dependability of the research.

The aim of the *confirmability* criterion of trustworthiness is to ensure that the researcher has not allowed personal values or theoretical inclinations to drive the research (Bryman & Bell, 2015, p.403). By doing the thesis in pairs and picking up roles of debriefer and investigator, the authors were able to question and partially eliminate potential biases. Additionally, confirmability is often seen as a re-establishment of other trustworthiness criteria (Lincoln & Guba, 1985, p.319), which have been proven to be successfully considered.

The *authenticity* criterion raises issues pertaining to the wider political impact of the study. In the realm of the research work being conducted by the authors, an *ontological*, *catalytic* and *tactical authenticity* was successfully fulfilled (Bryman & Bell, 2015, p.403). The subjects of the research were project managers, who, in most cases post the completion of the interview, confessed to obtaining a better understanding of the social milieu surrounding the project case study, the organisation and the stakeholders involved thereby showing ontological authenticity. Additionally, by asking questions pertaining to the principles of sustainability, some project managers realised the implicit practice of some of the principles and showed an inclination towards incorporating sustainability in future projects, thus showing evidence of catalytic authenticity. Finally, by proactively requesting for the results of the study, the project managers took the initial steps to engage in an endeavour of delivering all projects sustainably, which fulfils the criterion of tactical authenticity.

CHAPTER 4. EMPIRICAL FINDINGS AND ANALYSIS

This chapter begins by presenting a contextual summary of the six project case studies, describing the organisations that executed the projects, their sustainability orientation and the projects themselves. Subsequently, empirical findings are pointed out from the interviews and are presented under themes and subthemes. Direct quotes have been picked up from interview transcripts to build cases. Finally, an analysis of the data collected is presented to answer the research question and the objectives set for this thesis.

4.1 CASE STUDY INTRODUCTION

To answer the research question, the authors chose six case studies that were selected through the heterogeneous purposive sampling technique and that fulfilled the sample size requirement (Saunders, 2012, p.45). Additionally, the criteria established to select the case studies were: multinational organisations, operating in the private sector, having sustainability as a strategic pillar and projects executed in developed countries with a similar macroeconomic climate. The case studies were heterogeneous in terms of the industries that the projects belonged to. The assumptions in place for selecting the following case studies are enlisted below:

1. To assess the spatial aspects of sustainability it was important to look at multinational organisations.
2. To assess ways of achieving social and environmental sustainability while simultaneously gaining profits, it was necessary to choose samples from the competitive private sector.
3. Sustainability as a strategic pillar often filters down through the systems, processes, practices and policies of a company to the project management level.
4. The location of the research team as well as their professional network influenced the type of data samples they had access to. Therefore the research used projects that were headquartered in developed countries of Europe and USA.

The projects belong to six different industries namely Pharmaceutical, IT (Information Technology), Automotive, Transportation, Furniture and FMCG (Fast-moving consumer goods). Each of them fulfilled the criteria presented above and deemed fit for the study. An advantage of the selection of case studies is that prior research has seen a concentration of case studies in the building and construction, manufacturing, regional development and energy industry (Silvius & Schipper, 2014, p.67). Therefore this empirical study provides findings from new industries.

4.1.1 Case Study I - Pharmaceutical drug testing

The private firm is a global provider of medication adherence programmes focused on the development and commercialisation of bio-pharmaceutical drugs. By engaging in various company and employee led community programmes, advocating compliance and ethics, defining values the company stands for and promoting diversity, the firm places Corporate Citizenship as a principal pillar of its strategy. The organisation and its employees are subject to multiple laws and regulations specific to the pharmaceutical industry and pertaining to their operations at various geographic locations. The project under analysis is managed using traditional project management tools and techniques and is divided in three phases each terminating with a gate that requires a decision on

whether to proceed to the following stage. The first phase of the project has a duration of 8 years and involves a budget of US \$12.5Mn for the provision of project management services along with in-person monitoring and control of trial medical sites as well as of the accuracy of the reported findings. Due to the scale of the project, multiple stakeholders were identified ranging from financial stakeholders including the client organisation and shareholders as well as the Food and Drug Administration (FDA) to project managers, patients, clinicians and medical monitors from different geographic locations. The project team encompassed a project manager, a project coordinator, three clinical research associates, two clinical monitoring project leaders and one investigator.

4.1.2 Case Study II - IT solution development

The private sector company is a leading provider of technology and software testing solutions. The organisation promotes sustainability through 3 different impact areas of giving back to the society, enabling through education and employment as well as protecting the environment. However, it does not adhere to any sustainability reporting standards or processes. As part of their CSR initiatives, the organisation participates in programmes that are focused on microfinance solutions, education, equal opportunity and green technological solutions. The IT solution project, under study, was carried out for an estimated duration of 3 months with a budget of US \$0.17Mn and under the scope of delivering a Microsoft SharePoint project proposal tracking and evaluation solution to a multinational client in the mining industry. The project was managed using agile project management techniques with stakeholders comprising of a project manager, three shared software engineers (at the solution provider's end) and a technical and quality manager (at the client's end).

4.1.3 Case Study III - Automobile component packaging solution

By manufacturing world leading trucks and diesel engines, the private company positions itself in the automobile industry as part of a Group that offers financing solutions, leasing, insurance and service as well as transportation systems for urban traffic. Its commitment to the environment represents a salient pillar in the company's strategy which is implemented through the development of carbon neutral factories as well as environmentally sustainable transportation solutions. The company runs its activities in accordance with ISO 9001, ISO 14001 and ISO 50001 standards to assure that the resources and processes employed in projects adhere to international quality, environmental and energy consumption requirements. The project scrutinised in this paper uses traditional project management tools and techniques and is scheduled to last for a year, with a budget of US \$1.95Mn and a scope of delivering an improved packaging solution for judicious space utilisation for transportation purposes as well as overall costs and resource consumption reduction. Since the realm of the project is internal, the stakeholders identified include various departments such as production and logistics, product engineering, purchasing, quality and IST; as well as the steering committee, project sponsors, the labour union and the logistic services, which is an external company to the organisation.

4.1.4 Case Study IV - Railway electronics design and delivery

As a referenced electronics systems provider to the railway industry, the private organisation is part of a Group that specialises in the interior and transportation industry. The organisation incorporates sustainability as its core strategy with a vision to harmonise technological innovation and environmental care by working on the core

issues of Green Energy Management. The organisation follows the ISO 9001, LINK-UP and COCS-30.4 standards to maintain the highest level of safety and quality of all resources involved in the projects. The project under consideration was carried out for an estimated duration of 2 years, with a budget of US \$17Mn and provided electronics systems for a new railway line. The project was handled using traditional project management techniques. As the project was executed for an American client, the project admitted strict adherence to the Buy American law. The project team comprised of a project manager, a project coordinator, two engineers (at the solution provider's end) and representatives from the stakeholder groups of two suppliers, a contracting company and the owner of the Group himself.

4.1.5 Case Study V - Furniture manufacturing for office space

The private company is an international manufacturer of office furniture dedicated to combining local craftsmanship with latest technological advances. Sustainability represents a core pillar within the strategy of the organisation and is manifested through charitable furniture donations to various non-profit organisations as well as continuous efforts invested in improving the social context of the company, whilst minimising the negative impact over the environment. The organisation follows ISO 9001 and ISO 14001 international quality and environmental standards and has acquired the latest edition of the Nordic Ecolabelling to guarantee the alignment of its products to rigorously defined environmental requirements, hence promoting sustainable consumerism and production. The project under study was completed within a time frame of 6 months and a budget of US \$4.3Mn intending to deliver both standard and bespoke furniture to a domestic commercial client. The stakeholder groups representative to this project are multiple international suppliers, the Nordic Ecolabelling institution, the client organisation, the shareholders, the employees, the furniture dealer and the architect who led the project on the client's side.

4.1.6 Case Study VI - 100% sustainable coffee production

The privately owned company is a leading player in the FMCG industry. The organisation addresses sustainability as a fundamental pillar of the company's strategy and takes responsibility for the environment, people and economy of their organisation as well as the value chain. The organisation proactively envisions sustainability targets for the year 2020 and has certified itself in *organic certification* (KRAV, USDA Organic, SOIL Association, EU-Organic, BIO Siegel, Demeter); *ethical labelling* (Fairtrade, Fair for Life); *sustainable forestry and farming biodiversity* (Rainforest Alliance); *sustainable supply chains, transparency and quality* (UTZ); *greater responsibility* (4C); *sustainability labelling* (SCS Sustainably Grown, Global GAP, Sustainable Wine South Africa growing, Sustainable Wine South Africa wine production, Sustainable Winegrowing NZ growing, Sustainable Winegrowing NZ wine production); *biodynamic* (Demeter); *climate* (Carbon offset through Plan Vivo) and *reducing the environmental impact of growing* (High Environmental Value, Sustainable Viticulture Champagne). The organisation also follows international environmental and food safety standards such as ISO 14001 as well as ISO 22000, respectively. The 100% sustainable coffee production project was carried out over a duration of approximately one year, with a budget of US \$4Mn and the scope of finding sources of importing 100% sustainable coffee, signing contracts with the producers, updating the packaging material for 100% sustainable coffee and designing the marketing campaign. The project was carried out using traditional project management practices with a project team of nearly 15 members comprising of the production, marketing, sales and coffee

team. The project team along with the clients, end consumers, producers, packaging suppliers and certification providers form the main stakeholder groups of the project.

4.2 EMPIRICAL FINDINGS

The authors believe that the essence of a research lies in studying all the data available and highlighting all relevant findings. This allows for pointing out all intricacies, disparities and winning evidence without getting biased. The authors have reported the findings under themes and further divided them into sub themes in order to point out categories under which evidence has been provided (see Appendix 4). While every section highlights a summary of the findings, a highly concise yet rich text from the data collected builds a storyline for the reader, thus engaging them in the empirical study.

The authors have chosen to not present the transcribed quotes with placeholders such as ‘eh’, ‘oh’, ‘mh’, ‘pause’, etc. in order to incorporate all relevant and valuable information and reduce the density of the texts. The parts that have been left out while quoting texts have been marked with ‘[...]’ allowing the authors to concentrate on important information. Additionally, in order to provide understandable quotes for the reader, the authors have added text to provide full forms and explain pronouns with their corresponding contexts. The added information is highlighted within ‘[]’ symbol. In cases where participants requested the interviewers to find data on the company websites or specific sustainability reports due to time constraints, the authors consulted and reported findings highlighted within ‘[Company website]’ and ‘[Sustainability report]’ representation, respectively.

4.2.1 Balanced or harmonised consideration of social, environmental and economic interests

To assess the harmony of consideration of social, environmental and economic interests sought to be fulfilled through the development of the projects under study, the participants were asked to highlight and discuss the project success evaluation criteria set for the project. Some of these criteria became evident through discussions led on subsequent questions.

People Pillar

Social interests as success evaluation criteria were mentioned under various forms depending on the scope and processes of the analysed projects. Three project managers (RSP1, RSP2 and RSP5) specified measuring and emphasising client satisfaction as part of project evaluation, while a fourth respondent (RSP4) gave an account of meeting the requirements of the client without creating social tensions between stakeholders. One project manager (RSP5) has undertaken the evaluation of client satisfaction through the intermediation of an external consultancy company. One of the projects (RSP3) presented no clients due to its internal nature.

RSP1: “[...] one of the things that we talk about on a regular basis and [...] one of the biggest questions repeated in different ways is client satisfaction.”

RSP2: “We do the client satisfaction of the project but not of the product. We have criteria that we set up which is called CSI, Client Satisfaction Index. We have to decide what aspects are the most important to them for the project.”

RSP4: “You don’t want to pick up a fight because you have to work with them [clients] in the future again. In a way you do try to accommodate all requests.”

RSP5: “[...] we hired a management business in order to help us evaluate where [we] stand now. [...] how happy the clients are [...].”

Measuring employee satisfaction was found to be part of an organisational process, rather than implemented as an evaluation criterion (RSP1). The automotive, railways and furnishing projects analysed (RSP3, RSP4 and RSP5) made additional consideration of employee health and safety, whilst the project involving sourcing of raw material from developing countries (RSP6) highlighted employee rights and working conditions as social project evaluation criterion used.

RSP1: “They send out regular surveys, [...] we [project team] do training, bonding and relationship exercises. And they also have little groups set up where [...] they’ll put us in touch with one another, so we [can] go and have dinner [...]. They strive for employee satisfaction. ”

RSP3: “I set the target to not provide a negative impact on the safety and ergonomics. When it comes to safety, it’s going to be a positive effect because the boxes are going to be lighter than the wooden palette. [From ergonomics perspective] the less movements, the better [...]. People should not feel a discomfort because of this new set up.”

RSP4: “We are not allowed to carry out [health and safety] tests ourselves because we can easily fabricate the data. So we always use a third party and they have their own certifications and their own safety norms. [...] There is an audit every 3 months to make sure that they are following these rules that they are certified against.”

RSP5: “[...] we hired a management business in order to help us [understand] how happy the employees are, what employees’ views are of [the company]. [...] We try to incorporate all the employees [...] to come up with advice on how to make their work easier. [...] Since we do almost all production ourselves, we have good control and overview of the processes. We don’t need to worry about child labouring etc.”

RSP6: “The whole aim of the project was to fulfil environmental and social criteria.” [Company website] The social criteria include control system, human rights, gender issues, ILO (International Labour Organisation) core conventions, health and safety, local commitment, pay and contribution to greater earnings.

Due to the nature of the first project studied, consideration of patients’ safety (RSP1) was found to be an important criterion employed by project managers. Similarly, one project (RSP6) adopted ISO 22000 on food and safety management to protect customers’ health when consuming the company’s coffee.

RSP1: “[...] socials are huge because that’s what we are all here for and ultimately the goal that we are working towards [...]. It’s a number one [priority] to maintain patient safety, making sure that we are doing what we are meant to do, that patients are getting the drug on time, getting the right drug and if we are finding issues that they are having serious adverse events, we are immediately identifying them, notifying everybody else to

make sure that they stop taking them and make sure that other patients don't also react.”

RSP6: “We abide by ISO 22000 [...]”

Planet Pillar

All project managers were able to detail environmental interests taken into account when defining project KPIs. These have been influenced by various national and international regulations (RSP4), certifications gained from non-profit organisations (RSP5 and RSP6) and ISO standards on environment (RSP3, RSP5 and RSP6) and energy (RSP3), respectively. Two project managers (RSP1 and RSP2) have pointed out organisational practices that are concerned with reducing the negative impact of the project over the environment.

RSP1: “One of the things they have done to help environmentally is making us all home-based. [...] At least 50% of my company works from home [...]. [Reducing printing material] That's a huge aspect.”

RSP2: “We do considerations about relating stuff such as traveling or doing video conferencing instead of traveling.”

RSP3: “Then it's a big saving on the environment because we don't have such high CO2 emission as we don't have that much to transport [...] also less packing material [used] versus current setup”. [Sustainability report] The project also fulfilled the ISO 14001 and ISO 50001 international standard criteria on environmental and energy management, respectively.

RSP4: “When it comes to environmental consideration, we have been asked to adhere to RoHS [Restriction of Hazardous Substances] which is a very specific electronics manufacturing compliancing. [...] The overall impact will be better because trains are more efficient than cars.”

RSP5: “[...] the products needed to be Nordic Ecolabelled and that was initiated and successfully labelled”. [Company website] The criteria set for the Nordic Ecolabelling certificate obtained by the company include furniture related materials used, waste minimisation, packaging, fitness for use, instructions, the requirements of the authorities as to safety, working environment and the external environment, environmental and quality assurance and marketing. The company also abides by ISO 14001 international standard, which sets out criteria for the environmental management system.

RSP6: “The whole aim of the project was to fulfil environmental and social criteria”. [Company website] Environmental criteria included land/soil, biodiversity, GMO (Genetically Modified Organisms) ban, waste, water, energy, climate and pesticides. Additionally, the project followed ISO 14001 international standard guidelines on environmental management system.

Two project managers (RSP3 and RSP5) found delivering directly to the client or end user an environmentally conscious practice as it reduced CO2 emission and product handling, subsequently reducing the possibility of damage.

RSP3: “[...] parts are not handled twice or three times but preferably delivered directly or as close as possible to final destination.”

RSP5: “[...] we will try to deliver to the end destination and not go through the warehouse outside.”

Additionally, four project managers mentioned quality criteria as important considerations when analysing project results. Two project managers highlighted that quality indicators are not quantified but either defined as equal or better than current solutions (RSP3), or specified that after sale support should be kept at a minimum (RSP4), respectively. Three projects (RSP3, RSP4 and RSP5) implemented guidelines of ISO 9001 international standard on quality.

RSP1: “[...] we also look at the quality of [the clinical team’s] work. Was the data clean? Was the data entered in a timely manner? [...] Were they sending in blood samples so we can analyse them? [...] And then the overall quality. Have they had a whole lot of quality issues?”

RSP3: “I don’t set certain KPI for quality but I put that it should not be worse than the current quality level of the parts. That means that the new package should not be the cause for damages.”

RSP4: “For the company itself the success criteria are that you deliver all the devices with minimum after sales support [...]. We do not have a number but we define this as the minimum after sales support required.”

RSP 6: “[...] we needed also to find the qualities we were looking for.”

Profit Pillar

Literature suggests that both academics and project management practices focus on the economic pillar of projects and due to the iron triangle, project managers’ attention is driven on the profit ‘P’. All respondents referred to the iron triangle, made up of time, cost and scope criteria as being incorporated in the evaluation criteria of the project, some placing a bigger emphasis on being on time (RSP1), delivering the scope (RSP2 and RSP5), or additional cost saving KPIs set during the feasibility study (RSP3 and RSP6).

RSP1: “First and foremost [the success criteria] were the milestones and the timelines. When are we going to have the first site activated, when they are going to see their first patient, when we plan on having the last patient dose from when we had the last patient off study, and working from there how quickly we can build a clinical study report and have it submitted [...] and of course the budget to make sure that we are staying within. [...] We look at [whether] there are not too many change orders along the way. [...] or if we do things out of scope that’s huge.”

RSP2: “First and foremost, the success criteria is set by the client and the client’s first KPI is that the system is there. [...] The success often is measured in time, budget and functionality.”

RSP3: “[...] you'd deliver the project within the estimated time, budget and scope. [...] we save a lot of money on transportation because instead of two separate loads, we have one. [...] there are some manning potential reductions if we manage to implement it at the customer plants and [...] also there is 1 square meter decrease [of space used] and [a reduction in] utilisation of some equipment.”

RSP 4: “We did receive a tentative PSI [Pre Shipment Inspection] date which means we have the time, budget and scope criteria.”

RSP5: “[...] one part is the financial success [...]. But all these things [time, cost, scope] that you bring up were pushed on.”

RSP 6: “The criteria were the market share and the volume of sales [...]. We looked at the time frame, budget and scope criteria. We wanted a fixed time frame in the turnout from uncertified coffee to 100% certified coffee.”

Three respondents referred to efficiency as an indicator that is recorded, tracked and evaluated upon project closure. Two respondents (RSP3 and RSP5) use LEAN principles to minimise resource usage whilst the third project manager (RSP1) tracks human resource employment through an internal operation system.

RSP1: “We do track our time on a 15 minute interval throughout the day. [...] we have broken it down in various tasks and that's fed into the system. In this way we can see how long it has taken us and I can look at my team to see if there were any inefficiencies.”

RSP3: “Within the company we use LEAN practices. [...] some things [...] I can take care of during my project [...] to eliminate wastes.”

RSP5: “[...] we work LEAN and also try to minimise manual labour both from an ergonomic and economic point of view since labour costs [here] are quite high.”

Barriers and trade-offs

Respondents have pointed out a series of barriers or difficulties they are facing or faced when evaluating social, environmental or economic interest of projects. These are presented below in Table 3.

Table 3. List of barriers to balancing or harmonising social, environmental and economic interests.

Barrier	Quote
Unplanned human resourcing issues	RSP1: “The resourcing issues are not just being able to keep people satisfied but also supply and demand. The demand has gone up dramatically because the client has been happy.”
Lack of reference point to measure sustainable alternatives	RSP2: “They didn't have a good system to manage this from the beginning. So we couldn't measure any improvement in that aspect.”

Scope change resulting in inefficiencies	<i>RSP2: “[...] it’s about them changing their mind [...] it’s more time consuming and more expensive but they don’t care.”</i>
Inability to define scope and implicitly PPP considerations	<i>RSP2: “But the biggest problem is the client does not know what they want.”</i>
Lack of sustainability regulations for prototype development	<i>RSP4: “When a project is not yet started, at the footsteps, and we want to carry out some tests, it’s not very regulated. [...] It would be nice if we had standards for the starting phase of the project, the trial phase. ”</i>
Dependency on alternative transportation fuel developments	<i>RSP5: “[...] we have to have a look at alternative sources of fuelling the truck.”</i>
Financial burden of sustainable alternatives	<i>RSP6: “[...] we were not able to take on the cost increase in our margin so we needed to negotiate with our customers so as to increase our prices.”</i>
Shortage of sustainable sources of raw material	<i>RSP6: “The problem is that there is a shortage of high quality sustainable certified coffee.”</i>
Planning difficulties to establish the switch to sustainable options	<i>RSP6: “[...] You need it to sort of plan till you have the right amount of material so you can switch [to 100% sustainable coffee] more or less in 2 months period.”</i>
Customer confusion over the meaning of sustainable product or process	<i>RSP6: “[Competitors] are making their own programme with not as high sustainable standard or much lower percentage and they call that sustainable. [...] that creates confusion for the consumer on what sustainable means.”</i>
Problems in defining the demand for sustainable products	<i>RSP6: “[...] we had challenges and the challenges were to define the volume of the quality coffee we are looking for and find that at reasonable prices. We still have that problem.”</i>
Lack of control over the supply chain	<i>RSP6: “We have some impact on the transportation part and it’s very hard to control that because the big transportation vessels have not done much when it comes to changing fuel [...]”</i>

Similarly, project managers gave an account of trade-offs that had to be made when catering to certain social, environmental or economic interests. Table 4 presents the corresponding findings.

Table 4. List of trade-offs to balancing or harmonising social environmental and economic interests.

Trade off	Quote
High security vs. access from remote locations and from more energy efficient appliances	<i>RSP2: “The client does not have any support for mobility for their SharePoint solution something we have suggested of course but it’s hard for them because they are high security aware.”</i>
Efficiency vs. reliability	<i>RSP4: “It’s [more efficient to] go for that one [supplier] but we know it will be more reliable if we split [the order] between two [suppliers].”</i>
Efficiency vs. quality	<i>RSP6: “[...] since we have a shortage of suppliers, we cannot have coffee from different origins but we needed to increase the number of origins in order to find the right quality”</i>

4.2.2 Local, regional and global orientation

Since projects employ resources that originate from various geographic locations and have the potential to produce local, regional and/or global externalities, the consideration of the triple P is deemed necessary to be done at various levels. To evaluate the realm of impacts of the projects under study, participants were requested to identify project stakeholders and discuss the purpose of their interaction with them. Furthermore, they were asked to reflect over geographic impact areas their projects entailed.

When enlisting project stakeholders, five projects (RSP1, RPS3, RSP4, RSP5 and RPS6) were classified as global as they involved stakeholders from two or more countries or, geographic areas, while one (RSP2) was classified as regional due to its limitation to a country or geographic area connected through similar cultures.

Local orientation

Local considerations encompassed practices of keeping employees satisfied (RSP1), using video conferencing rather than local travel (RSP2), interconnectedness to a parallel local project (RSP3), health and safety considerations of employees (RSP4 and RSP5) and training of employees (RSP6).

RSP1: “[The company] does things for us home based employees, [...] annually we have a summit for project managers, we do training and bonding and relationship exercises.[...] they [company] put us in touch with one another, if we want to go and have dinner [together].”

RSP2: “There are 2 different offices. We do a lot of collaborations between the offices [...]. [We are] doing video conferencing instead of traveling”

RSP3: “I defined a couple of risks. [...] one of the [other projects] is very important for the local plant.”

RSP4: “[...] the solder fumes are known to be bad for your health, not carcinogenic but can give you headaches. So we make sure there are devices that suck the air.”

RSP5: “We try to incorporate all the employees to make them come up with advice on how to make their work easier.”

RSP6: “We have a sustainability and environmental session that everyone goes through which is renewed every 2 years.”

Regional/ Global orientation

The responses gained from participants highlight that project managers have an inherent global thinking and an understanding over the project’s place within the hub of highly interconnected temporary and permanent organisations. Hence, social, environmental and economic considerations made at regional or global levels, mirrored practices followed at a local level.

RSP1: “The majority of times when the CRAs [Clinical Research Associates] are going to the sites they are local CRAs. So they do know and are able to communicate effectively with the sites they are working with. [...] some of those people going into Canada a lot of times will have to have French background [...] or in certain parts of the States they may look for people that can speak Spanish. [...] So for instance having teleconferences with our team in Japan. They obviously have a different social aspect to them. So I do know that I have to try to calm down my [...] accent and start speaking a bit more slowly [...]. You say good morning to them when it's night for us.”

RSP2: “We are part of a trade where we as experts have to ask the right questions to understand what they want.”

RSP3: In fact I have more or less the same set up for every plant. [...] we have a saying “put on the [company] hat”, meaning that take it as a global project, global saving. ”

RSP4: “When we got the second supplier we had to redo [First Article Inspections and Pre-shipment Inspections] so that the second supplier is also at par with the standards and validated for use. [...] they have to show that they are not employing cheap foreign labour, that they are not indirectly employing child labour in some Asian country.”

RSP5: “Because we work with quite large [international] firms, they have all the [sustainability] documentation that is needed. [...] as long as it's possible we'd like to have a Swedish supplier. [...] Since we are working with the FSC, which is basically a sustainable forest industry.”

RSP6: “All impacts are positive since we are supporting farmers that have taken steps to produce sustainable coffee. [...] You had to broaden the horizons of the places where you get coffee from because very few places grow sustainable coffee.”

Barriers and trade-offs

While project managers’ accounts reflect a spatial consideration of the social, environmental and economic interests of the projects under investigation, a barrier to

the implementation of the local, regional and global orientation has been presented in Table 5.

Table 5. List of barriers to the local, regional and global orientation.

Barrier	Quote
Sustainability consideration inconsistencies at geographically dispersed locations	<i>RSP3: " [...] in the assembly plants we [employees from other factories] are not taking care of the parts as much as you take care of the parts here."</i>

One trade-off has also been identified highlighting the existence of an opposing global and local sustainability consideration, which is presented in Table 6.

Table 6. List of trade-offs to the local, regional and global orientation.

Trade-off	Quote
Global economic sustainability vs. local social sustainability	<i>RSP3: "The target is to provide new set up, new layout, balancing the workload for the operators [...]. But then again, it's for the global savings. There might be some people who could lose their jobs, but it's up to the management of the plant to see the whole picture."</i>

4.2.3 Short-term and long-term orientation

In order to assess how projects incorporate the short and long-term temporal aspects in their projects from a people, planet and profit perspective, project managers were asked about the short and long-term benefits of the project and how they were able to achieve them.

Sustainable improvement events

Authors have pointed towards the need for shift from rapid improvement events to sustainable improvement events that can be carried out in projects in order to reap the benefits of them both in the short and long-term. While there was no question addressed at exemplifying an instance of the same, all six participants showed evidence of these in the answers given throughout the interview, which have been detailed in the analysis section of the chapter.

Strategic alignment

A project's short-term goals when aligned to an organisation's strategy, provides both short and long-term benefits for the organisation executing the project. Questions were asked to understand how much of a strategic role does the project play in delivering the goals of the company. While all projects showed evidence of strategic relevance and showed an economic benefit, two (RSP4 and RSP6) showed evidence of social benefits and one (RSP6) showed evidence of environmental benefit.

RSP1: "Absolutely. Yes [the relationship with the client organisation at a strategic level] is huge. It's one of the things that we talk about on a regular basis [...] client satisfaction, how are they feeling about the project, how are we winning new projects

from them [...]. The demand has gone up dramatically because the client has been happy."

RSP2: "[...] there are strategic considerations to be made during a project. [...] this is a stable client and it has great trust in us. We have done several successful projects."

RSP3: "The whole supply chain will be cheaper if we do certain changes in the set-up [...] in the end it's important not what each factory is earning but the whole company. Because there are times when the economic climate is not favourable."

RSP4: "[...] we have received another purchase order for an extension depending on the quality of our products [...], they [client] have decided to extend it and double the order [...]. The project was instrumental in retaining the technical manpower because it's a niche industry and people in very specific fields are very important for us. If we let go of them our competitor will get them and it will mean more trouble for us [...] this project led to a strategic alignment within the company where they understood what their safe steps should be, what to focus on, what gives them competitive advantage."

RSP5: "[...] you should do good work. It brings out new possible business deals for the company."

RSP6: "We wanted to become the first [company to have 100% sustainable products in the market we play in]."

Short-term benefits

Participants were asked questions that highlighted the immediate benefits that arose from the project in order to assess to what extent they looked beyond the economic benefits. A point to be noted here is that a short-term perspective is often noticed in traditional project management practices and is rooted in the success criteria set for the project. While, all participants solely highlighted financials as short-term benefits of the projects, the success criteria enlisted in the principle of 'balancing or harmonising social, environmental and economic interests' evidenced environmental and social short-term benefits.

RSP1: "For short-term benefits [strengthens] the company financially."

RSP2: "We created systematisation within SharePoint for this particular need they [client] had."

RSP3: "Its benefits are in terms of costs."

RSP4: "The company was on the verge of bankruptcy because of the 2008 financial crisis. It is this project that saved the company. US \$17Mn is a big amount of money for a company, which has less than 50 people. [...] They [client] have decided to extend it and double the order, so we got another US\$17Mn assignment."

RSP5: "It's always nice to make a large deal. In the short-term it's good for the company."

RSP6: "In the short-term [the benefits are] the market share and volume."

Long-term benefits

Literature points out that an investment initiated in a current project may result in additional benefits in the long-term. Questions towards testing this were aimed at establishing the extent to which the project managers were able to point out the long-term benefits of their projects and how far they addressed the triple bottom line. While all participants highlighted social benefits, three participants (RSP4, RSP5 and RSP6) highlighted environmental benefits. Participants who did not mention an environmental benefit pointed out that the projects did not impact the environment, at least not directly.

RSP1: "[...] long-term benefit would be getting this drug out to patients and ultimately working. If you are part of that team who helped make it a drug to the market successfully it's a huge accomplishment."

RSP2: "One was the new technique of course. None of the resources had worked on an angular project before."

RSP3: "[...] cross-functional work and that people know each other better, and that they know their processes much better."

RSP4: "We got a project in China because of this project [...] This was the first time we supplied to a company outside of Europe, so this gave us a chance to become up to date with American standards [...] We got to know more about quality control procedures because American quality control are actually stronger than European ones [...] The long-term benefits also tells that we have more experience in handling large projects."

RSP5: "[...] we have been given the Nordic Ecolabelling of the product and we have been able to use this label for other customers as well. This is quite a good side and long-term effect [in term of safety at the workplace]."

RSP6: "[...] credibility as a highly [socially] sustainable company."

Barriers and trade-offs

While temporal aspects of sustainability have been evidenced, participants also presented certain barriers arising from business practices towards adopting a simultaneous short and long-term orientation of the project benefits (see Table 7).

Table 7. List of barriers to the short-term and long-term orientation.

Barrier	Quote
Unemployment created by global savings over the long-term	<i>RSP3: "The target is to provide new set up, new layout, balancing the workload for the operators [...] But then again, it's for the global savings. There might be some people who could lose their jobs, but it's up to the management of the plant to see the whole picture."</i>
Investment in a sustainable solution becoming obsolete in the long-term	<i>RSP3: "[...] negative impact that I can foresee is that in five years there might be some changes in the design of the cab and then the shape of the parts, the size of the parts, can change."</i>

Interdependencies between projects minimising/delaying benefits realised	<i>RSP3: "[...] the project has some interactions with other projects. [...] So we are interdependent. [...] we can do it separately but then I will have to plan a delay and [...] investigate my project isolated from the other one."</i>
Wrong benefit analysis prior to project	<i>RSP6: "[...] We have taken market share, we sell a higher volume. Our margin has gone down since we started with 100% certified coffee which is not what we planned."</i>

There were also trade-offs pointed out by certain participants which are logged below (see Table 8):

Table 8. List of trade-offs to the short-term and long-term orientation.

Trade off	Quote
Long-term new business vs. short-term resource overload	<i>RSP1: "[...] they've [client] been satisfied enough with us to expand our project base hugely. Almost too many to handle at this point which is part of the resourcing issues as well."</i>
Short-term social and economic benefit vs. short-term environmental benefit	<i>RSP4: "[...] we split the order between two suppliers in the US. If we had not split it, it would have been more efficient because when they produce boards in a batch [...]. It's easier for quality control, less man hours and so on. We decided to change this because the second supplier was being much more economic."</i>

4.2.4 Values and ethics consideration

Participants were asked to distinguish between ethical and unethical practices based on personal values in order to establish an unbiased view. Additionally, they were asked about the values promoted by the organisation or the project. Subsequently, participants were requested to highlight situations where they were ethically challenged and how they managed to overcome it. Finally, project managers were enquired regarding the presence of a formal ethical code of conduct and ethics trainings within the company.

Values

The personal values of an employee can vary from one to another and can also differentiate itself in the broad context of organisational values. To test the principle it was necessary to establish an overlap between personal and organisational values. All participants pointed out the absence of any unethical practices. Additionally, personal values came out to be subsets of organisational values which encapsulated collaboration (RSP1 and RSP2), accountability (RSP1), passion/heart (RSP1 and RSP4), innovation/boldness/brain (RSP1, RSP2 and RSP4), development (RSP1), respect (RSP1), open communication/honesty (RSP1 and RSP2), trust (RSP2), team spirit (RSP2, RSP3 and RSP5), modesty (RSP2 and RSP5), fun (RSP2), safety (RSP3), quality (RSP3 and RSP5), cost-effective (RSP2 and RSP3), deliver value/commitment (RSP2, RSP3 and RSP4), people (RSP2, RSP3, RSP5 and RSP6) and environment (RSP3, RSP5 and RSP6).

RSP1 [Company website]: "Collaboration, Accountability, Passion, Innovation, Development, Respect and Open Communication."

RSP2: "One of my core values is to help the customer know what they want and need in particular situations so if we are doing a solution [...] to deliver value and not only a product [...]. I prefer projects that are less process oriented and more user and behaviour oriented [...]. But in my opinion it's always good to be honest with the client [...]. [Company website] Honesty, Boldness, Trust, Freedom, Team Spirit, Modesty, Fun."

RSP3: "[...] try to be a little bit distant emotion wise from failures that might happen. Don't rush into judging people [...] it's important to try to be really neutral and tolerant [...] I have this chance after I make a report of each stage to share my good and bad impressions. And then I can share my expectations so that is something that an ethical project manager should utilise. Not to blame people, but try to explain people what you expect from them [...] we have categories, which are safety, quality, cost, delivery, people and environment. We try to evaluate solution proposals based on these five categories."

RSP4: "The logo of our company says brain, heart, commitment."

RSP5 [Company website]: "Customer centric, Honesty and humility, Respect for the individual, Eliminate Waste, High and consistent quality."

RSP6: "[...] spotlight on poverty reduction, human rights, the ILO Core Conventions, gender issues, a living wage, biodiversity, the climate and pesticide use."

Ethics

Ethical considerations can help take a conscious action in all project management dealings. Some of the ethical considerations highlighted by participants are integrity (RSP1 and RSP2), trust (RSP1), honesty (RSP1, RSP2 and RSP6), security (RSP2), engagement (RSP3), collaboration (RSP3), cross-functional work (RSP3), diversity (RSP3 and RSP4), confidentiality (RSP4), conscience (RSP5) and compliance (RSP1, RSP4, RSP5 and RSP6).

RSP1: "[...] drugs are truly good drugs, that the research coming out is proven to be true and has good data behind it and so forth [...]. We want to be making sure that we are following all processes to keep us inspection ready and to keep us ethical [...] our employees, officers and directors, as well as our consultants, vendors and others who act on our behalf, to conduct our business ethically and with integrity in all we do. Maintaining compliance and ethical standards is essential to our ability to earn and retain the trust of our customers and stakeholders. To ensure that actions taken on behalf of the company are honest, ethical and lawful [...] Even if you want to be unethical, it's so hard in our industry that I don't think you could go about it."

RSP2: "[...] we ended up giving the client up to a hundred hours as competency raise for us. Those situations are a bit tricky because should you say or keep to yourself and these are also ethical situations."

RSP3: "But in the whole company we have a concept called [company] philosophy. Within the company we talk about engagement, collaboration and cross-functional work and diversity and that means that people of different age, gender, sexual orientation and colour are welcome."

RSP4: "[...] it has become normal for us to retain ethical practices because this is a matter of passenger safety [...]. Every supplier even before their First Article Inspection are audited, they have to disclose their clients and facility and show that they are not employing cheap foreign labour, that they are not indirectly employing child labour in some Asian country. All these things have to be proven in order to be ethical [...]. We do not want any direct communication between our supplier and our client [...] We don't prefer Skype but rather client conferencing network because it's more secure [...] They are pretty fair when it comes to opportunities so they are not racial."

RSP5: "I think it's quite subjective but for me it means acting with good conscious in all the decisions [...] complying with all the regulations."

RSP6: "We don't want to cheat we want to do it 100% correct [...]. You can use the rainforest alliance standards, you can use that certification standard if you only have 30% rainforest beans. But we don't think that's right because the customer doesn't know in that case what it is that they are purchasing."

Ethical code of conduct and training

Four participants (RSP1, RSP2, RSP5 and RSP6) claimed to have a code of conduct and five participants (RSP1, RSP2, RSP3, RSP5 and RSP6) claimed to having had ethics trainings. All six participants were highly regulated by third parties as well. Additionally, certain projects were found to have Non-Disclosure Agreements (RSP4), and anti-corruption codes of conduct (RSP3) that could pass for ethical codes of conduct.

RSP1: "Definitely abiding by the rules of FDA and internal guidelines [...] We have something called The Sunshine Act which is [...] for ensuring investigators are not double dipping, so getting paid by the sponsor or the pharmaceutical company as well as Medicare or Medicaid insurance companies. [...] trainings are ongoing all of the time. There are [...] annual trainings. And there are others that are revised or updated that we train on immediately."

RSP2: "[...] we have an ethical code of conduct. We are supposed to do these online courses."

RSP3: "[...] the anti-corruption code. It doesn't go together with any project. It's included in the training plan for all the employees [...]. It's usually once per year. It's updated and it's e-learning. You get a reminder, centrally through mail system, and you have to pass this training."

RSP4: "Some ethical considerations would be RoHS [Restriction of Hazardous Substances], which is a very specific electronics manufacturing standard. [...] we do have a Non-Disclosure Agreement that we are made to sign by the client and we make all our suppliers sign the same even before they get a RFQ [Request for Quotation] from us. [...] So far I haven't come across any training."

RSP5: "[...] credible documentation makes it easy to comply with regulations, with the Nordic Ecolabelling. [...] on our intranet and also on our webpage we have this portal where we share our code of conduct [...] we want to have a democratic business. If we see that some of our co-workers here are not abiding by the core values of course we try to inform them of what is expected from us. We can say that we are trying to do a bit of training on it as well."

RSP6: "We have a sustainability and environmental session that everyone goes through and is renewed every 2 years. [...] We abide by ISO 8000, ISO 25000 [...]."

Barriers and trade-offs

The subjectivity and vastness of the terms ‘values’ and ‘ethics’ are a barrier to the implementation of this principle (see Table 9).

Table 9. List of barriers to the values and ethics principle.

Barrier	Quote
Subjectivity of the terms ‘values’ and ‘ethics’	RSP1: "[...] I don't think I have ever really seen any unethical behaviour other than just trying to be defensive if we got errors. You know it wasn't necessarily that they are being unethical or fraudulent just trying to cover their own hide."

4.2.5 Transparency and accountability consideration

Transparency and accountability are associated with the triple bottom line as it calls for the correct and complete portrayal of the effect of the activities and decisions of the project and the ownership and implementation of corrective and preventive measures for negative impacts. To understand the application of the principle, the authors asked the participants to recall instances where transparency and accountability were not followed and to also call out the procedures and systems that ensure strict adherence to it.

Transparency

The ways in which project managers ensured transparency are through reporting structures (RSP1), extensive presentations and meetings with multiple stakeholder groups (RSP3 and RSP5), using organisational intranet platforms (eg. SharePoint) to share documents (RSP2 and RSP4) and third party regulated (RSP6).

RSP1: "[...] being very transparent with everything, with financials, with reporting confidentiality and so forth [...]. We do regular project review reports for executives/directors [...]. We are giving weekly updates to the sites, formal updates. And on a day-to-day basis we talk with clients [...]. And that there are certain reports that go up to FDA [...] on a regular basis [...]. I feel that being transparent and the way things work, there is not much room for non-transparency, almost every single task that we do on a day-to-day basis is tracked in some sort of a database."

RSP2: "I can't see hiding any information except for personal information of the resources but then again it's not a concern for them [clients]. We try to handle internal

conflicts, people not doing their best, etc., we try to hide that but we never try to hide work or hours or quality."

RSP3: "I gave the presentation about the feasibility study to twenty different people because everybody wants to know the content of the project [...] be quite transparent of what is the content and what my expectations are from them."

RSP4: "We are promoting transparency. [...] Any changes made are actually put on SharePoint before putting on the baseline. It can be more than one person, one electronics, one mechanical, one software, this goes to a verifier who controls our work in terms of time and quality. Then it goes to an approver and the whole thing is online. So there is complete transparency. Everyone can see all documents."

RSP5: "[...] having a transparent way of working, not needing to hide things. [...] before we sell a material to the customers, we have tried to be clear that this material can be harmful in the long run. There is no data yet but there are some words. Many parties know this but do not tell it to the client. We tried to tell them so they can make an active choice."

RSP6: "They [The third party control] come here and check whether we buy the coffee we say we buy and whether the packaging is correct. So we need to be very transparent."

Accountability

Organisations ensure accountability by maintaining an organisational breakdown structure and putting a communication plan into place. All project managers have established the presence of this. One participant (RSP1) also mentioned the maintenance of a decision log to track the owner and success of the decision. All interviewees presented contextual examples for how they took ownership for their decisions and in case of negative outcomes how they provided corrective and preventive action against future recurrence of the event.

RSP1: "We do keep a decision log [...] so that decisions or decision makers can be tracked and you can see if things were a success [...] if any metric is not within the guidelines of what would be considered green [...] then I have to go in and provide a root cause, provide a corrective action plan."

RSP2: "We could take accountability for some of the delays so the client also took some of the accountability [...] we had to raise our estimates and the customers are fully aware [...]. [The client] has to have one stakeholder that signs off the solution and that is something we decide in the start of the project. She has to be responsible and accountable for the changes and decisions."

RSP3: "I probably overestimated the need for the resources, so I got some additional information about one of the stakeholders, [...] there is a communication plan."

RSP4: "We also set a deadline. By chance if we overstep the deadline then somebody has to have a reason for it. [...] we had to follow a chain of command [...]. Every device the moment we find a problem, say a software glitch we inform our client or [...] we go to our suppliers because it is possible that the supplier has retained a fix."

RSP5: "Also, when you have a reseller or a dealer, they always have to be aware when the problem arises, make a phone call or send an email. Making sure that everybody is aware of the situation, not trying to wait until the last minute. [...] if we deliver furniture and it was found out that it doesn't use sustainable wood then of course we would be responsible for it and of course we should [...] we [acknowledge that]we have made the wrong delivery and we need to make the client happy. We have to make an additional delivery with the correct version."

RSP6: "We are accountable for the decisions we make."

Barriers and trade-offs

The subjectivity of the term 'transparency' can lead to a barrier in its practice highlighted by one of the project managers (see Table 10).

Table 10. List of barriers to the transparency and accountability principle.

Barrier	Quote
Subjectivity of the terms 'transparency'	<i>RSP1: "I don't think I have ever really seen any unethical behaviour other than just trying to be defensive if we got errors. You know it wasn't necessarily that they are being unethical or fraudulent just trying to cover their own hide and that kind of things."</i>

On certain occasions the adherence to transparency and the absence of systematised communication channels can result in additional time-consuming effort spent on the side of the employees (see Table 11).

Table 11. List of trade-offs to practicing transparency and accountability principle.

Trade-off	Quote
Transparency vs. additional effort	<i>RSP3: "[...] the problem for me is that it's additional effort."</i>

4.2.6 Risk reduction

The risk reduction principle tries to assess the extent to which project managers incorporate the people (social) and planet (environmental) considerations in risk assessments. The process can aid managers in aligning the project towards sustainability. To evaluate practices adopted by project managers to reduce risk on the triple P, they were first asked whether they use a risk register. Later they were requested to reflect over major risk categories identified as well as examples for the same.

Risk register

While all participants agreed to having formalised risk assessment procedures, four maintained exhaustive risk registers (RSP1, RSP3, RSP4 and RSP6) and the remaining two had not so comprehensive lists (RSP2 and RSP5). Nevertheless, while all participants documented economic risks, four participants logged social risks (RSP1,

RSP2, RSP3 and RSP4) and four registered environmental risks (RSP3, RSP4, RSP5 and RSP6).

RSP1: "[...] we look at the project itself and the different risks and how to mitigate them to ensure that the project is going to be successful [...]. IQRAM is a risk register. They have pre-identified risks that go along every type of study [...]. For example it asks if it's a first in human trial. [...]. We also keep trackers internally [...] and we keep up with the different issues that popped up over time. [...] we don't look at any environmental as far as my level [...]. Maintaining timelines, maintaining budgets, is a huge risk [...]. I have a whole section of financials."

RSP2: "Yes but it wasn't a very comprehensive list [...]. We had some thoughts about some of the resources in terms of being senior enough to help the technical parts [...]. None of the resources had worked on an angular project before."

RSP3: "Since this project is not a new one, I have utilised the risk list that was made before, but I updated it. [...] Another problem is resources. It's not only about the availability of resources but also about the maturity of the resources [...]. There is a risk that the technical solution might not be that smart."

RSP4: "The Project Manager and Quality Manager have the risk registers [...]. People have to wear a mask and tests are done in closed chambers especially in Italy they are very particular about it. There is a lot of risk or liability [...]. We do not actually train our staff with all the environmental risk factors, we hire specialised people to do that."

RSP5: "[...] we do a certain type of risk assessment when taking on these projects. We do it internally in a project meeting. Are there components that will make this difficult? Are there long lead times? Are there things that could trouble delivery? [...]. Are there any specific environment requirements? That is a question that always arises in these meetings, making sure that we don't miss out on it."

RSP6: "We have a risk register [...]. To find good quality coffee to reasonable prices so the sourcing was a bit risky. [...]. We were too short of new printing material [...] have too much of material that you have to throw away and also have mistakes."

Preventive measures

Discussions over sustainability related problems highlighted endeavours of adopting preventive sustainable measures by eliminating the processes and procedures that previously caused harm to the triple P and substituting them with sustainable alternatives. Participants referred to lessons learnt tracker (RSP1), SQCDPE evaluation (RSP3), durable products (RSP3), thought through contracts (RSP3), First Article Inspection (RSP4), Pre-Shipment Inspection (RSP4), supplier diversity (RSP4) and project baselines (RSP4 and RSP6) as practices adopted.

RSP1: "[...] based of the risks that we are proactively identifying [...] we have a lessons learnt tracker and go over issues that have happened in our trial and use it to help predict future issues throughout other trials. [...] if any metric is not within the guidelines of what would be considered green, [...] then I have to go in and provide a root cause, provide a corrective action plan."

RSP3: "[...] we have categories which are safety, quality, cost, delivery, people and environment. [...]. That's why I took these 5 categories and tried to evaluate my solutions proposals based on these five categories [...]. We can choose certain plastic types. First of all it's returnable packaging. They are used for years. It's not something that is sent one way. But still, the boxes can break and there might be some cracks and they need to be replaced."

RSP4: "We have FAI [First Article Inspection]. It is at this stage that they check whether the devices that people supply during the next phases is in compliance with their first document which is requirement specification document [...]. We have a PSI [Pre Shipment Inspection] for every batch. [...]. One of the risk is our software fails miserably and it could derail the train. So we have an entire battery of tests [...] [Another measure was] to split the order between 2 suppliers in the US. In the beginning we only had one supplier who does large-scale projects [...]. We should not become reliant."

RSP5: "[...] there are a lot of practical issues and we are trying to be proactive, and find out as much as possible before delivering the actual goods."

RSP6: "We calculate all the greenhouse gas emissions in the value chain [to baseline risks that could occur during transportation]."

Response actions

While endeavours are directed to take a proactive attitude towards eliminating the cause of risks in the studied projects, response actions also need to be identified in case a risk occurs from the volatile, uncertain and complex environments that projects thrive in. The project managers showed an inclination towards identifying response actions of keeping change orders/change requests at hand (RSP1 and RSP2), having an emergency communication protocol/procedure (RSP1) and preparing CAR (Corrective Action Report) when needed (RSP4).

RSP1: "[...] if we are finding issues that they [patients] are having serious adverse events, we are immediately identifying them, notifying everybody else to make sure that they stop taking them and make sure that the patients don't also react."

RSP2: "The client pays per hour and we negotiate the rates with the client and if there are any changes to the max estimate we do change requests with the client."

RSP3: "Still, if it happens, then I need to describe what the consequences will be."

RSP4: "In one particular PSI we had to delay [the product] by a week because we didn't have that in stock and we had to bring it in from Europe. [...] we ask for CAR [Corrective Action Report]. Whenever [the client] has a problem we have to report when the problem occurred and how are you preventing it in the future. [...] if there is a complaint from public regarding noise pollution, especially in residential areas, [the company] puts up noise barriers."

Barriers and trade-offs

Participants have pointed out trade-offs that are made in order to do an exhaustive risk assessment and risk documentation (see Table 12).

Table 12. List of trade-offs to the risk reduction principle.

Trade-off	Quote
Speed of risk response action vs. risk impact severity	<i>RSP1: "I see some people just basically saying 'the company is not reacting fast enough and I just can't do it anymore, so I am just going to go to find another company who will allocate me correctly'."</i>
Quality risk assessment vs. delivering value	<i>RSP2: "[...] you have to cut corners and focus on communication with the customers and not maybe so much as you would like quality risk assessment and there is not just enough time for that."</i>

4.2.7 Stakeholder participation

Stakeholders can considerably affect the success of a project and therefore adequate attention should be given to their needs and interests. To evaluate the level to which project managers engaged stakeholders, used their knowledge on specialised areas, communicated and cooperated with them, involved them in decision making as well as balanced their interests, they were asked to reflect over various interests stakeholders presented and ways to balance these when delivering the analysed projects. Furthermore, they were requested to detail instances when they consulted various stakeholder groups prior to taking project related decisions.

Shared Value

All project managers acknowledged the various interests of stakeholders, and either through the inherent purpose of the project or the benefits derived from it, all have showed signs of creating shared value with identified stakeholder groups.

RSP1: "[...] speak at different levels where you start understanding a little more detail into what their interests are, what they are working on and limitations they may have. [...] get down to the details and fight for a cause and work it out."

RSP2: "[...] we are doing what we can to fulfil [the client's] needs"

RSP3: "Every stakeholder is looking for its own benefits from the project. And it's difficult to find the core values, the core benefits that you get and try to push the steering committee to them."

RSP4: "You don't want to pick up a fight because you have to work with them [stakeholders] in the future again. In a way you do try to accommodate all requests. You also try to collaborate at a point where both parties realise that each one of them is important to the other for business."

RSP5: "[...] all [stakeholders'] needs should be realised. [...] we try not to rank [stakeholders], [...] but to comply with all stakeholders' wishes."

RSP6: "When it comes to situations of negotiation you have to remind them of sustainability every time [...]. Customers and suppliers want reasonable prices, consumers want good coffee with reasonable price, suppliers want to be able to supply us at a reasonable price. Then you have the companies and the owners and they need to

make profit. The NGO's, there you have a competitive situation because they want us to choose their certification and they are not happy all the time.”

Stakeholder engagement

During discussions, project managers underlined multiple ways through which they managed to gain stakeholder engagement throughout the project life cycle. A holistic view over all responses highlights the importance of communication, information sharing, and consensus among various stakeholders.”

RSP1: “[...] meetings, having teleconferences to bring everybody together at once and usually each different stakeholder brings a set of slides as to what their goals are, what their current status is and things like that [...]. So really bringing them all together, in one place, one time with everybody involved and discussing some of the details so they understand at a whole bigger level what the different pieces look like.”

RSP2: “If you have a good communication with the client you can explain everything [...]. [The client] has to have one stakeholder that signs off the solution and that is something we decided in the start of the project.”

RSP3: “First of all I try to inform them. It's really to invest time even if I'm already at the point where I know the presentation by heart [...]. Of course the quality of the presentation, if it's a good one then people normally get impressed and then they see that I really invested time in trying to describe it in a user friendly format.[...] and then another way is to thank people, say thank you. [...] Not to blame people, but try to explain to people what to expect and what you expect from them. [...] always stick to an agreed process or routine and try to timely communicate”

RSP4: “[...] go for a meeting and ask ‘is this really a problem?’. [...] we have an agreement with [the customer].”

RSP5: “[...] we have some fixed regulations that we need to comply with, that we need to do, that we have set out to do and communicate to stakeholders. [...] for some parts we need to clarify, you have to ask questions. [...] having an accepted drawing on the product was needed for a customised product in order to minimise miscommunication.”

RSP6: “We have meetings. When it comes to customers it's face to face. [...] to take on what's the cost increase in our margin, we needed to negotiate with our customers. [...] They were very fond of the idea [of moving to 100% sustainable coffee]. They were very supportive.”

Stakeholder consultation and decision-making

While all project managers have given evidence of consulting, proactively communicating and cooperating with various stakeholder groups when bringing project related decisions, three project managers (RSP1, RSP5 and RSP6) mentioned instances when decisions were solely made by the project manager or project team. Their decision of whether to consult with specific stakeholders was dependent on the type of knowledge they possessed as well as on the magnitude of the decision that had to be brought. One project manager (RSP2) highlighted that the project identified one person from the client's side who will have the last word in every decision taken.

RSP1: “For bigger issues or issues that are high priority that usually bring in other stakeholders, we have regular meetings [...] continual discussions for writing the information people need or request. [...] a good example of that is bringing in the clinical team [...] and talking about who are the experts in the field, who are the good doctors that the clinical team knows of and trusts and that from operational perspective, which are the sites that we can open the fastest for the least costs and will bring us the most patients population [...] Or when it comes to making budget updates, I consult internally with business development, with project directors, with the financial people, with all sorts of people and then consult with the client on the other side. [...] Day-to-day activities usually I can make the decision without any kind of input from other stakeholders or other people on my side.”

RSP2: “[The client] has to have one stakeholder that signs off the solution and that is something we decided in the start of the project. We say we want only one product owner but yes they could talk to other stakeholders [...] There are 2 different offices. We do a lot of collaborations between the offices.”

RSP3: “I need to sign an information agreement with the unions and I will ask the head of the logistics department to help me with that. [...] So in fact it's a close cooperation with the investment person who highlights the need for the coming period.”

RSP4: “If a decision is taken as to whether the software is to be updated then the PM with the R&D manager is to be met with. It depends on the impact magnitude of the decision.”

RSP5: “[...] if it's a specification from the architect then I ask the architect. If it's something concerning the payment then I talk to the client or the dealer. If it's an environmental issue then we can talk to the environmental department. So it depends on the situation and the question. [...] we have had situations in which when we internally developed a specific product, we had thought that it's a minor question and then we did it like we thought its right”

RSP6: “When we are going to find the origins of coffee, we bring in more people to find the right coffee. When it comes to implementation and communication we involve NGO's and customers [...]. Basically the end users that are involved and also little bit our customers [in the marketing phase]. [...] When it comes to certification programme we should choose what certifications are there. That was a decision we took by ourselves based on the sourcing situation and development. That is something that we can't talk in our stakeholder groups.”

Regulations and guidelines

While discussing answers to questions, a common theme that five project managers referred to was national and international regulations, industry standards and certifications obtained from non-profit organisations. Thereby, an interpretation of the study is that issuing authorities and organisations represent stakeholders of the analysed projects. Industry standards and sustainability certifications are common to any organisation whereas national and international regulations are country and region specific. Therefore, considerations made on social and environmental interests of projects were influenced by the region where the project takes place.

RSP1: “Definitely abiding by the rules of FDA and internal guidelines.”

RSP3: “[...] they have evaluation systems and they rank the suppliers to A, B, C level that meet ISO standards and different standards for management system and the environment management.”

RSP4: “When you are starting a project your end result should correspond to the [industry and legal] standards. [...] When it comes to environmental consideration, we have been asked to adhere to RoHS. [...] this was one of the first projects in the railway industry that was implemented with a Buy American Act.”

RSP5: “[...] since we are running our own production facility of course we comply with all the Swedish regulations. [...] the regulations are also quite hard in Scandinavia, in Sweden. [...] [Environmental regulation] might depend on the country. [...] within a specific country you can't have seven different types of expectations. We have to treat every project within its own. [...] Because we work with quite large firms [...] they have all the documentation that is needed. [...] actors in the business with credible documentation make it easy to comply with regulations, with the Nordic Ecolabelling.”

RSP6: “You can use the Rainforest Alliance standards.”

Barriers and trade-offs

During responses, certain barriers to adopting a sustainable stakeholder participation perspective became evident. These are included in Table 13.

Table 13. List of barriers to implementing the stakeholder participation principle.

Barrier	Quote
Polar stakeholder interests	<i>RSP1: “We were working with two different companies on a particular project and one company is ready to shut down the project a little early because they've got the results they want, and the other company wants to go on because they are interested in the results.”</i>
Disregarded responsibility towards shared resources	<i>RSP2: “My team resources were not full time so they were not solely my responsibility, so it's hard to look at their interests.”</i>
Time difference between various geographic locations	<i>RSP4: “It's not because I am a workaholic, it's because the American division comes alive after my work. So I only get half a day with them to control everything remotely.”</i>

4.2.8 Consumption of income and not capital

Project related activities should not negatively affect natures', people's and businesses' future ability to sustain themselves. To evaluate if project managers sought to undertake activities that would align to this fundamental consideration, they were asked to explain the physical and mental demand employees and suppliers are subject to, the nature of

the resources they employed in the studied project, as well as the sources of finances the project and company uses.

People Pillar

Work requirements should not exhaust an individual's ability to undertake future physical or mental work. Two project managers (RSP1 and RSP3) admit that the project often resulted in people getting overloaded with work. Three respondents (RSP4, RSP5 and RSP6) referred to local regulatory guidelines when setting the limit to the additional work that employees can undertake while two project managers (RSP2 and RSP3) referred to a maximum workload set by the companies that allows for a time buffer per day. Accidents at the workplace can damage people's health potentially leading to physical impairment. To prevent such accidents project managers highlighted health and safety considerations wherever the project scope entailed physical labour undertaken by employees (RSP3 and RSP5) or suppliers (RSP6). Additionally, three project managers (RSP1, RSP4 and RSR6) mentioned end-users' safety as a crucial measure to ensure.

RSP1: "We have measurements like FTE [full time employees], which are tracked within the system internally. [...] so we can keep tabs on how much people are projected to work versus how much they are actually working and how much they are assigned to work and I can't say that it's always appropriate. [...] I am close to 1.5 FTE. And FTE is 40 hours a week. [...]. 'I'm sorry, I am so tired, and I can't do it anymore'. That's the number one reason I've seen for loss of productivity [...]. It's a huge number one to maintain patient's safety."

RSP2: "We don't put too much work on the team members. We look at the capacity of the team resources when doing sprint planning. So we don't put many story points in, which could interfere with the other projects."

RSP3: "[...] I set the target not to provide a negative impact on the safety and ergonomics. When it comes to safety, it's going to be a positive effect because the boxes are going to be lighter than the wooden palette. [From ergonomics perspective] the less movements, the better [...]. People should not feel a discomfort because of this new set up [...] We also have a maximum workload which is about 85% because the person cannot be occupied 100%, [...] some people get overloaded like 112% [...]"

RSP4: "In Italy we get a salary of eight plus one extra hour [...]. But if you are doing any more than 1 hour they are not going to pay you anyway [...]. Any more than 9 hours, our employees leave and no one forces them to stay back [...]. In fact we did receive a notification that there should be no one in the office after 8 PM. [...] We choose professionals to do the job. You are very careful to choose your vendors to maintain safety and quality."

RSP5: "We actually have specific rules in Sweden [over] how much overtime is allowed. Of course you comply with rules."

RSP6: "In certain cases we have to but in no case can we give more than 8 hours on a continuous basis. [...] The farmers that we had launched a contract with, were already certified. [...] We abide by ISO 22000 [on food and safety management]"

Planet Pillar

Participants referred to multiple categories of environmental practices employed with the scope of incrementally reducing negative externalities over the nature, or engaging in activities that have no harm over the present or future state of it. A commonly mentioned theme was CO₂ emission caused by human or material transportation. Two project managers (RSP2 and RSP3) referred to the use of videoconferences as substitutes to business related travel, whilst a third one (RSP1) stressed the adoption of a 'work from home' policy that aimed to minimise travel needs. Two project managers (RSP3 and RSP4) highlighted the decision of delivering goods directly to the final destination as measures taken to minimise CO₂ emission whereas one project manager (RSP6) pointed out that transportation related greenhouse gas emissions caused by the project are very low, nevertheless existent. These accounts highlighted the existence of practices that substitute unsustainable practices whilst others tried to minimise CO₂ emission, as carbon-neutral transportation options are currently still not available.

RSP1: "One of the things they have done to help environmentally is making us all home-based. [...] At least 50% of my company works from home."

RSP2: "We do considerations about relating stuff such as traveling or doing video conferencing instead of traveling."

RSP3: "Then it's a big saving on the environment because we don't have such a high CO₂ emission as we don't have that much to transport. [...] preferably delivered directly or as close as possible to final destination."

RSP4: "[Video conferencing] is not a choice, this is necessary because [the client] is based in Japan [...] the other side of the world compared to US [...]."

RSP5: "We try to work with as short distances as possible [...] we will try to deliver to the end destination and not go through the warehouse outside."

RSP6: "We calculate all the greenhouse gas emissions in the value chain [...]. But in the whole value chain transportation is very small [...]. The product, on its own, is 100% CO₂ compensated."

Depending on the nature of the project, further environment related themes emerged that varied from printing (RSP1), recycling (RSP3 and RSP5), water treatment (RSP4) and the durability of goods produced (RSP5). Additionally, project managers referred to certifications and standards, which regulate the negative environmental impact derived from the analysed projects. Correlating evidence has been presented in subsection 4.1.1 and 4.1.7.

RSP1: Whilst we used to do everything by paper, [...] almost everything is going electronically. So, we are able to reduce the paper and then also a lot of time our CRAs [Clinical Research Associates] can review information remotely."

RSP3: "I put it within the pre-requisites that it should be environmentally neutral because the type of plastic that is utilised it should be recyclable."

RSP4: “When you use this there is some toxic wastewater that cannot be fed into the sewage system. So we actually went ahead and paid money for wastewater treatment.”

RSP5: “[We are] a higher brand generally speaking and our team has been working with materials that are not standard [...]the big benefit of using our product is that they last much longer than a normal cabinet. [...] I think almost everything is recyclable from our product.”

Profit Pillar

Projects should impose minimum risk over the default of a company and therefore corresponding sources of financing should derive from the income of the project and company rather than its capital. Responses from project managers (RSP2, RSP4 and RSP5) highlighted the need to make company investments prior to generating income from the clients. Due to the internal nature of two projects (RSP3 and RSP6), their corresponding sources of financing were limited to company investments. One of the project managers (RSP4) used external financing as a source to partially fund the project, which was judged to be necessary due to the large liquidity needed. This view was supported by another project manager (RSP3), who argued that external financing possibilities are needed for large projects despite the fact that the project analysed was solely financed internally.

RSP1: “For us it's straight from the client. We usually don't use [capital], unless we are in the red. If we were in the negative, [the group] would be funding us [...], but it's basically having the money coming from the client with a certain amount of profitability.”

RSP2: “The client pays per hour [...]. At the end of each month you bill the client and they have 30 days to pay the bill.”

RSP3: “Of course it's a profit of the company, but I think and I know that for some really big projects [...] like building a new plant [...] resources are borrowed of course from the banks.”

RSP4: “We borrowed from [sister companies] and then later when we were more stable we returned it to them. It was from within the group. [...] It was important to take a loan from external banks when we had to provide money to the suppliers for large batches.”

RSP5: “We have normally 30 days net payment regardless if we have received money from our suppliers. We work with having a good cash flow, having a good financial statement makes us less vulnerable for certain events that might arise. [...] By the time we get paid we have already paid our subcontractors and employees.”

RSP6: “Company investment alone. All the income that had been earned from previous projects was channelled into this project.”

Barriers and trade-offs

Project managers pointed to the existence of certain barriers that prevented or still prevent them from employing practices that won't affect people, nature and businesses future ability to sustain themselves, which are included in Table 14.

Table 14. List of barriers to consuming income and not capital.

Barrier	Quote
Poor planning of human resources	<i>RSP1: “[...] being over allocated and my resources are just burning out. ‘I’m sorry, I am so tired, and I can’t do it anymore’. That’s the number one reason I’ve seen for loss of productivity.”</i>
Disregarded responsibility towards shared resources	<i>RSP2: “My team resources were not full time so they were not solely my responsibility, so it’s hard to look at their interests.”</i>
Lack of sustainability regulations for prototype development	<i>RSP4: “When a project is not yet started, at the footsteps, and we want to carry out some tests, it’s not very regulated. [...] It would be nice if we had standards for the starting phase of the project, the trial phase.”</i>
Dependency on alternative transportation fuel developments	<i>RSP5: “[...] we have to have a look at alternative sources of fuelling the truck.”</i>
Financial burden of sustainable alternatives	<i>RSP6: “[...] we were not able to take on the cost increase in our margin so we needed to negotiate with our customers so as to increase our prices.”</i>
Shortage of sustainable sources of raw material	<i>RSP6: “The problem is there is a shortage of high quality sustainable certified coffee so our purchase manager of coffee needed to go out and search for the coffee.”</i>
Lack of control over the supply chain	<i>RSP6: “We have some impact on the transportation part and it’s very hard to control that because the big transportation vessels have not done much when it comes to changing fuel.”</i>

To adopt practices that won’t harm the future state of natural, human and financial resources involved making a trade-off, which is highlighted in Table 15.

Table 15. List of trade-offs to consuming income and not capital.

Trade-off	Quote
Savings on costs and environment vs. employee engagement	<i>RSP1: “[...] we are missing that whole co-worker environment and that bonding experience.”</i> <i>RSP2: “There are cons to that as well because you don’t get to meet people in person every day and to feel the mood and see who is in the office and stuff like that.”</i>

4.2.9 Redefining sustainability in project management

Sustainability in project management has been defined by many authors by taking into consideration the eight principles of sustainability combined with definitions of project management. The authors asked the project managers how they defined sustainability in the realm of project management in order to gauge their viewpoints and also build an application based definition for the concept. While the social aspect was explicitly highlighted by three participants (RSP1, RSP2 and RSP6), the profit aspect was highlighted by one participant (RSP6) and the environmental aspect by two participants (RSP2 and RSP5). Nevertheless, two project managers highlighted sustainability to be a holistic consideration requiring looking into corners of the business and acting in a better way (RSP3 and RSP5). Lastly, one participant explained sustainability from the perspective of the phases of a project and the project team involved (RSP3).

RSP1: “An appropriate amount of workload.”

RSP2: “In a wider sense of the meaning it could also contain social responsibility as well as environmental responsibility.”

RSP3: “It's securing the fulfilment of certain steps or phases of the project and involvement and engagement of the steering committee and the chairman. If this is done, then I get the right focus and prioritisation from the organisation and involvement or course. [...] I think it's important to follow certain sequence of activities and have milestones and follow up to check whether everything is done on a certain phase. So of course it's very important if the company has its own or maybe outsourced structure and concept on how to do it.”

RSP4: “You have to look into all corners when talking about sustainability.”

RSP5: “So for me being sustainable should be viewed as a holistic process. [...] You should take the lifespan into consideration. You should take the amount of energy that is consumed to procure. Also take the amount of energy that is consumed in order to recycle it. I think that is being sustainable.”

RSP6: “We have a code of conduct and that is that we should live up to [...] and all our products should be produced in safe and sound considerations to both people and profit and it should have a third party control.”

4.3 EMPIRICAL ANALYSIS

This section is dedicated to analysing and discussing the empirical results gained through the research based on the authors' interpretation and in relation to the theoretical framework outlined in Chapter 2. The eight global themes, represented by the eight principles, are scrutinised according to the basic themes that emerged from the empirical findings and in connection with theory. Each subsection assesses the applicability of the sustainability principle in project management by proving or disproving the corresponding hypothesis set in Chapter 2. This step is complemented with an explanation of the barriers and trade-offs identified for the incorporation of the fundamentals during the research process. Based on the findings and the conceptual model that forms the theoretical framework of this study, a refined definition to sustainability in project management is then proposed by the authors.

Following the above structure, the present thesis will answer the question:
How are the principles of sustainability applied in practice?

4.3.1 Balanced or harmonised consideration of social, environmental and economic interests

Literature suggests that business goals cannot be achieved in isolation from the surrounding society and environment, and thereby a balanced consideration of social, environmental and economic objectives is needed to obtain sustainable development in society (Elkinson, 1997, p.1). Since previous empirical findings have directed a greater attention towards the economic pillar (Silvius & Schipper, 2014, p.67) and project management guides still build on the ideology of delivering projects within the constraints of time, cost and scope (PMI, 2013, p.141-254), an expected result of the research was to report a predominance of economic KPIs as project evaluation criteria.

Case study I is a project still in development involving the delivery of project management services of first time trial of a human drug. While the criteria of time, cost and scope specific to traditional project management were among the project KPIs mentioned, the presence of social interests and benefits have been evident. These involved client satisfaction, employee satisfaction as well as consumers' health and safety. Environmental interests sought to be fulfilled through the development of the project were reduced traveling of employees as well as moving away from printing on paper. Ensuring quality services can also be regarded as an environmental consideration as it prevents resources invested and value delivered from going to waste.

Case study II, which had the scope of delivering an IT solution, presented similar results. With an emphasis on scope, the project was evaluated against the iron triangle as well as an index that set to measure KPIs important to the client, hence highlighting considerations made for the social pillar. Environmental interests were limited to reducing travelling of project team members and adopting video conferencing as an alternative.

Case study III aimed to deliver improved packaging solutions and had multiple economic, environmental and social criteria set hence emphasising a balanced or harmonious combination of the triple P. The profit pillar was evidenced through cost savings on transportation, human resources employed, space used for depositing goods as well as adhering to the allocated time and budget for the scope delivered. In addition, measures to improve efficiency through the adoption of lean practices have also been mentioned and associated to the profit pillar. The social interests of the project materialised through improved safety of employees given by lighter boxes as well as enhanced ergonomics given by less movements required. The environmental pillar was evidenced through reduced CO₂ emission gained from reduction in the utilisation of transportation vehicles and direct delivery to final destination, reduced packaging material used and the employment of ISO 9001, ISO 140001 and ISO 50001 international standards on quality, environmental and energy management, respectively.

Case study IV had the scope of delivering electronics systems for new railway lines and was measured against the iron triangle from the profit pillar perspective. The social considerations were realised through accommodating all requests made by the client, and ensuring the health and safety of the production team. The environmental interests

were highlighted through the scope of the project to contribute to the development of railway lines, which are inherently more environmentally friendly than alternative transportation means. Additionally, the project's adherence to environmental regulations such as RoHS (Restriction of Hazardous Substances) and the international standard ISO 9001 on quality management, further strengthen the planet pillar, the latter deemed to be an environmental consideration as it assures durability and subsequently a more environmentally friendly product.

Case study V was about delivering standard and bespoke furniture to a commercial client and its success was measured against the triple P criteria. The profit pillar was focused on the traditional time, cost and scope KPIs as well as the employment of lean processes to improve efficiency. The people pillar included considerations of client and employee satisfaction along with ways to improve employees' working conditions. Finally, obtaining the Nordic Ecolabel as well as adopting ISO 9001 and ISO 14001 catered to the realisation of a multitude of environmental interests. A further measure adopted that strengthened the planet pillar is the decision over delivering directly to the user, a practice that aimed towards reducing CO2 emission.

Case study VI involved shifting the company to 100% coffee production and sale and saw the fulfilment of simultaneous and balanced economic, social and environmental interests. Along with measuring whether the project is within the allocated budget and schedule for the delivery of a predefined scope, additional profit related indicators were market share and volume of sales. Since the purpose of the project was to fulfil social and environmental criteria, the project was evaluated against a multitude of related indicators varying from control system, human rights, gender issues, ILO (International Labour Organisation) core conventions, health and safety, local commitment, pay and contribution to greater earnings to land/soil, biodiversity, GMO (Genetically Modified Organisms) ban, waste, water, energy, climate and pesticides. Furthermore, the project adhered to ISO 14001 and ISO 22000 international standards on environment management and food safety management.

Silvius & Schipper (2010, p.3) argue that social and environmental considerations are regarded solely as additional benefits to projects focused on the iron triangle, thereby the people and planet dimensions gaining less attention. Similarly, Labuschagne et al. (2005, p.378) and Silvius et al. (2013, p.10) highlight the occasional ignorance of the people and planet dimensions. These statements are challenged through the above analysis of the case studies, which highlight the existence of a balanced consideration of social, environmental and economic interests present in all case studies. Since methods of quantifying the level of considerations of the three pillars have not been employed in the study, the authors attached a subjective judgement to deciding if the projects fulfilled a harmonised consideration of social, environmental and economic benefits.

The interrelatedness of the three pillars is evident as they are reciprocally influencing each other (Silvius & Schipper, 2014, p. 69) and the realisation of benefits belonging to one pillar depends on the successful delivery of another one. For example, not having obtained the Nordic Ecolabelling and not having adhered to ISO 9001 and ISO 14001 in case study V, would have resulted in client dissatisfaction, leading to possible rework. This would have caused delays and budget overruns, consequently affecting the realisation of financial benefits derived from the project.

Based on the findings highlighted in Table 16, the initial hypothesis corresponding to this principle has been contradicted, and the study concludes that the projects scrutinised have adopted a balanced or harmonious consideration of social environmental and economic interests.

Table 16. Evidence for a balanced or harmonised consideration of social, environmental and economic interests

	RSP1	RSP2	RSP3	RSP4	RSP5	RSP6
People pillar	x	x	x	x	x	x
Planet pillar	x	x	x	x	x	x
Profit Pillar	x	x	x	x	x	x

Despite the implementation of the principles in all projects, participants also underlined the existence of barriers and trade-offs that they encountered while they attempted to make certain social, environmental and economic interests, which are discussed below.

1) Unplanned human resourcing issues

As a result of client satisfaction or scope change, the company can be requested to take up further work resulting in pressure and a work overload imposed upon current employees. In such situations the company can favour financial incentives and client satisfaction over capacity considerations of employees.

2) Lack of reference point to measure sustainable alternatives

When attempting to switch to sustainable project solutions, the lack of a point of comparison can impede the development of sustainable solutions and practices. This can result in unrealistic project KPIs and a belief that sustainability solutions are not feasible for the project.

3) Scope change resulting in inefficiencies

Scope change often leads to delays in the schedule of a project and budget overrun. This can result in sacrificed quality, pressure exercised over employees and suppliers to deliver in short lead time, as well as cost saving solutions which are not sustainable. Doing rework is not sustainable itself, as the resources invested in the first instance go to waste without the realisation of the product or the delivery of the service.

4) Inability to define scope and implicitly PPP considerations

A lack of clarity over the scope of a project impedes the development of corresponding sustainable solutions. This can lead to inefficient utilisation of material and human resources as well as waste from potential rework.

5) Lack of sustainability regulations for prototype development

The lack of sustainability regulations during a product's research and development stage can result in building it unsustainably or wasting the effort invested given that the product may not clear the regulations applied to the project where this will be used.

6) Dependency on alternative transportation fuel developments

The lack of carbon neutral transportation solutions for long distance delivery poses negative impacts over the environment. Unless alternative fueling solutions are developed, businesses are not capable of fully eliminating their CO2 emission.

7) Financial burden of sustainable alternatives

Sustainable product and service solutions often impose a short-term financial burden over companies as these are frequently more expensive than non-sustainable alternatives inducing business owners to sacrifice the planet pillar in favour of increased profits.

8) Shortage of sustainable sources of raw material

Sustainable sources of raw material have only recently been developed, hence a shortage of supply makes it difficult for companies to gain access to and incorporate these in their value chain.

9) Planning difficulties to establish the switch to sustainable options

When switching to incorporating raw materials originated from sustainable sources, determining the moment when previously purchased material are not used anymore can be challenging. This can lead to postponing the employment of sustainable production options.

10) Customer confusion over the meaning of sustainable product or process

Due to the multitude of standards that companies voluntarily adopt or the various certificates they can gain, users can often get confused over the level of sustainability considerations involved in the production of goods and corresponding processes. This may lead customers to choose a cheaper and moderately sustainable product available in the market over a 100% sustainable alternative thereby resulting in loss of sales for a sustainable company.

11) Problems in defining the demand for sustainable products

Difficulties in establishing the demand for sustainable products can lead to a quick burn out of financial resources and inadequate cash flows, which has the potential to make the company financially vulnerable.

12) Lack of control over the supply chain

Due to practices of outsourcing certain elements of a product's or service's supply chain, the sustainability level of the final product or service is dependent on the practices adopted and resources employed by the outsourcer.

13) High security vs. access from remote locations and from more energy efficient appliances

Due to high security policies, companies can restrict access to certain cloud software's from computers that are situated within the company. This prohibits the utilisation of more energy efficient appliances such as phones, tablets or laptops as well as access to the cloud without travelling to one of the company's site.

14) Efficiency vs. reliability

Due to economies of scale, placing an order with one supplier is more efficient in terms of resources and energy invested in the production and/or delivery of goods and services, nevertheless giving bargaining power to the supplier. As a result, a practice adopted by companies is to divide orders between various suppliers hence sacrificing the efficient employment of resources.

15) Efficiency vs. quality

When sources of sustainable raw material are limited, companies need to contact a multitude of suppliers to obtain the desired overall quality of the product leading to inefficiency in terms of resources and energy utilised.

4.3.2 Local, regional and global orientation

Globalisation has resulted in an increased interdependence between and influence over multiple geographic areas. Consequently, projects have gained a spatial dimension as international stakeholders have started exerting an influence over their successful delivery regardless of project size or magnitude of activity (Silvius, 2012, p.3, Silvius & Schipper, 2014, p.69). *Case studies I, III, IV, V and VI* have been classified as global projects as their corresponding stakeholder groups belong to two or more countries, geographic areas or cultures whereas *Case Study II* was deemed as being a regional

project due to its limitation to one country or geographic area connected through similar culture.

Sustainable development in project management entails a spatial consideration of the environmental, social and economic impact of the project (Hollin, 2001, p.402). In *Case Study I*, the project adhered to local rules and regulations specific to the industry and of the employed sites whilst implementing harmonised organisational policies across all sites to ensure patients’ health and safety, employee satisfaction as well as efficiency in the allocation of project resources. An additional global consideration was given by the selection of Clinical Research Associates with language abilities specific to the region in which the company opened a site. *Case Study II* has shown a local orientation through the employment of videoconferences between local offices and a regional orientation by providing a common SharePoint intranet platform across the regional offices of the client. *Case study III* gave an evidence of a local orientation by considering ways to improve employees’ health and safety at the three production sites and highlighted a global orientation by considering the global savings attained through the successful realisation of the project as well as the global reduction of CO2 emission when transporting in between the three plants. *Case Study IV* showed a local orientation by respecting employees’ rights from the two offices as well as a global orientation by ensuring that all international suppliers were adhering to international standards, the product delivered complies with state and country regulations and at least 60% of the product is sourced from the USA as per the Buy American law. In *Case Study V* maintaining employees’ health and safety was judged to be a local orientation while attempting to primarily source raw materials or components within the country's own borders was deemed a regional orientation. Furthermore, sourcing raw material from credible international suppliers, adopting international environmental standards as well as gaining the Nordic Ecolabel certification represented a global orientation. In *Case study VI* adhering to local regulations on employees’ rights as well as environmental and social considerations on local distribution systems ensured a local orientation. Sourcing from sustainable farms that fulfil both social and environmental criteria, compensating 100% for the CO2 emission of the coffee produced and sold as well as preventing harm on end-users’ health through the adoption of ISO 22000 international standard on food management represented a global orientation.

The above highlights constitute examples of local, regional and global considerations present in the six case studies and establish the fulfilment of the spatial principle of sustainability rather than an exhaustive list of practices and procedures undertaken at the three geographic levels. As documented in Table 17, the six case studies have sought the fulfilment of both local and regional/global PPP considerations, hence disproving the initial hypothesis proposed for this principle.

Table 17. Evidence for local, regional and global orientation.

	RSP1	RSP2	RSP3	RSP4	RSP5	RSP6
Local orientation	x	x	x	x	x	x
Regional/Global orientation	x	x	x	x	x	x

Despite of the successful implementation of the spatial dimension to sustainable project management, participants pointed out the existence of a barrier and a trade-off that businesses should be aware of, which are discussed below.

1) Sustainability consideration inconsistencies at geographically dispersed locations

When companies aim to harmonise sustainability considerations across multiple offices or sites, these can be interpreted in multiple ways and create inconsistent and superficial implementations at certain locations hence preventing the holistic incorporation of this principle.

2) Global economic sustainability vs. local social sustainability

Making improvements to systems and processes can lead to efficiency improvements and global savings realised by a company. Nevertheless, this may imply a trade-off represented by a reduced demand for human capital employed for the purpose of fulfilling the same responsibility leading to company employees getting laid off.

4.3.3 Short-term and long-term orientation

The principle of short and long-term sustainability from a project management perspective requires that the people, planet and profit criteria are taken into consideration with prudence (Badiru, 2012, p.31). With the example of Industrial Engineering projects research has tried to provide ways in which temporal orientations can be made through project management practices. Subsequently, research points out the need for movement from rapid improvement events (RIE) to sustainable improvement events (SIE) in project management processes (Badiru, 2012, p.34). Although there is no mention on how it can be carried out using industrial engineering, all case studies have shown evidence of sustainable improvement events in managing projects.

Case study I, highlights the use of vast reporting systems for all stakeholders of a project pertaining to the social and financial impacts, while *Case study II* highlights the use of new platforms and software coding techniques in order to systematise the intranet and reduce maintenance costs. *Case Study III* promotes improvements in the supply chain to reduce the carbon emissions, reduce employee effort and produce global financial savings while *Case Study IV* has adhered to ethical and sustainable regulations and standards such as RoHS, Buy American Law and uses business practices of Pre Shipment Inspections and First Article Inspections to reduce their environmental, social and economic adverse impact. *Case Study V* has obtained the Ecolabelling certification, which cuts down unsustainable practices and *Case Study VI* changes raw material suppliers and packaging to make it more sustainable. These can be seen as sustainable improvement events (SIE) implemented to manage projects sustainably in their temporal aspects.

Research has highlighted the need for aligning an organisations' long-term strategic management with the short-term needs of project management (Herazo et al., 2010, p. 86). While strategic plans can be executed using project management tools, applying sustainability to projects requires the employment of systems such as Environmental and Social Management Systems that concentrate on both short and long-term effects (Sánchez & Vanclay, 2012, p.1). It's difficult to point out whether the projects used those systems as the project managers follow systems that have been customised to the needs and operations of the company. However, each case study showed evidence of a strategic alignment by creating long-term business relations with the client (*Case*

studies I, II and V), providing financial stability (*Case Studies IV and V*) and making the company's practice more sustainable in the long term (*Case Studies III and VI*).

Projects are also seen to initiate investments, the benefits of which are realised only in the long-term (Silvius & Schipper, 2012, p.38; Messikomer, 2011, p.70). These benefits can often be weighed using the triple bottom line such as in the case of the projects under analysis. While *Case Study I* invests in reporting systems, they are able to capture patients' health and employees' productivity, thereby concurrently reaping benefits of social sustainability, launching a new drug in the market and increasing business. *Case Study II* invests in their employees learning techniques to develop software solutions on SharePoint, thus reducing maintenance effort and costs in the long run as well as providing new challenging opportunities to employees. *Case Study III* spent resources on having inter-factory collaborations and visits, hence creating better social relations between employees and exemplifying better quality practices which would support future projects. *Case study IV* invested in the project on the verge of organisational financial crisis in order to gain experience in handling large projects and gain exposure to the American markets. *Case Study V* invested in obtaining the Ecolabelling certificate in order to gain more clients, thereby long-term financial stability. Finally, *Case Study VI* invested in sourcing coffee from 100% sustainable farms in order to gain a larger customer base and credibility.

Given the above, it can be seen that all the case studies analysed have shown a short and long-term orientation while managing the projects (see Table 18). Thus the hypothesis framed around the principle has been falsified in the context of the study.

Table 18. Evidence for short-term and long-term orientation.

	RSP1	RSP2	RSP3	RSP4	RSP5	RSP6
Sustainable Improvement Events	x	x	x	x	x	x
Strategic alignment	x	x	x	x	x	x
Short-term investment for long-term benefits	x	x	x	x	x	x

Given the above success in implementing a short and long-term orientation the participants also highlighted certain barriers and trade-offs faced while taking the principle into consideration, which have been enlisted and discussed below.

1) Unemployment created by global savings over the long-term

When a project scheduling and scope addresses a global saving, financially it can result in the company having to lay-off certain employees. This can be triggered through process redesign or reengineering. In such cases the company may forego the social considerations while addressing financial sustainability.

2) Investment in a sustainable solution becoming obsolete in the long-term

Just like technology, some sustainable solutions can become obsolete due to changes in the activities of the company or specifications of products. This may lead the company to make further investments in new solutions and re-evaluate the sustainability of the new solution resulting in financial unsustainability. Similarly, companies may anticipate

the arrival of a more advanced sustainable solution thereby delaying the implementation of an existing one.

3) Interdependencies between projects minimising/delaying benefits realised

Certain projects that are taken up by the company in order to establish sustainable practices may have dependencies on other projects in the pipeline. Delayed prioritisation on even a single dependent project can result in the stretching of unsustainable practices over a long period of time.

4) Wrong benefit analysis prior to project

A major threat faced by project managers and teams may be their inability to provide accurate benefits analysis due to the lack of data sources or human resource capabilities. This can result in the implementation of a wrong and highly unsustainable solution and practice.

5) Long-term new business vs. short-term resource overload

While many businesses concentrate on building long-term relations with clients in order to ensure financial sustainability, the physical and mental demand from the employees is pushed into realms of social unsustainability. On the other hand, when assigning human resources to projects in a sustainable manner, any delays in delivering projects may result in the company losing the client for future business.

6) Short-term social and economic benefit vs. short-term environmental benefit

In cases where companies diversify their supplier base for reasons of reducing costs they forego the environmental considerations as the electricity usage and CO2 emission from transportation of finished goods gets multiplied by the number of suppliers. On the other hand the company can create financial unsustainability in a reverse situation.

4.3.4 Values and ethics consideration

The concepts of value and ethics have been recognised as broad concepts (Silvius, 2013, p. 58) including fairness, inclusion, participation, traceability and trust (Eslerod & Huemann, 2013, p.39-41) as well as integrity, credibility and reputation, respectively (Schieg, 2009, p.315). Projects and project managers form the medium through which value and ethical considerations are practiced in organisations. However, these are affected by the project context and the personal values of the project manager (Silvius & Schipper, 2012, p.39). The capitalist environment that businesses thrive in and the economic interest driven definition of success makes malpractices a common place in the project dealings (Mishra et al., 2011, p.338).

The very first checkpoint for the practice of this principle is the presence of a formal ethical code of conduct and trainings. While these codes address the interactions between a project manager and the different stakeholders and organisations, the Article 2.2.1. of the PMI ® Code of Ethics and Professional Conduct makes explicit the environmental and societal facet in the decisions made by the project manager (Silvius & Schipper, 2012, p.39-40). *Case Studies I, II, V and VI* had a formal code of conduct whereas *Case Studies I, II, III, V and VI* gave an account of the presence of ethics trainings that project team members had to attend. All six participants were highly regulated by third parties to act ethically. Additionally, *Case Study IV* presented the use of Non-Disclosure Agreements and *Case Study III* employed anti-corruption codes of conduct that can be perceived as an alternative to ethical codes of conduct.

The personal values of an employee can vary from one to another and can also differentiate itself in the broad context of organisational values. It is usually seen as the way we *view* things rather than *do* things (Silvius, 2013, p. 58). To test the principle it

was necessary to establish an overlap between personal and organisational values. Personal values came out to be subsets of organisational values which encapsulated collaboration (*Case Studies I and II*), accountability (*Case Study I*), passion/heart (*Case Study I and IV*), innovation/boldness/brain (*Case Studies I, II and IV*), development (*Case Study I*), respect (*Case Study I*), open communication/honesty (*Case Studies I and II*), trust (*Case Study II*), team spirit (*Case Studies II, III and V*), modesty (*Case Studies II and V*), fun (*Case Study II*), safety (*Case Study III*), quality (*Case Studies III and V*), cost-effective (*Case Studies II and III*), deliver value/commitment (*Case Studies II, III and IV*), people (*Case Studies II, III, V and VI*) and environment (*Case Studies III, V and VI*).

Finally all projects were seen to make ethical considerations to make conscious actions in all project management dealings. Some of the ethical considerations highlighted by participants were integrity (*Case Studies I and II*), trust (*Case Study I*), honesty (*Case Studies I, II and VI*), security (*Case Study II*), engagement (*Case Study III*), collaboration (*Case Study III*), cross-functional work (*Case Study III*), diversity (*Case Study III and IV*), confidentiality (*Case Study IV*), conscience (*Case Study V*) and compliance (*Case Study I, IV, V and VI*).

While in essence all project case studies made their own ethical considerations (see Table 19), certain projects lacked an Ethical Code of Conduct, formal trainings as well as environmental and social considerations that need to be included as part of the values and ethics principle. Thereby this principle was not seen to be applied by the analysed projects, hence validating the corresponding hypothesis, which states that the principle of values and ethics has not been implemented in practice.

Table 19. Evidence for values and ethics principle.

	RSP1	RSP2	RSP3	RSP4	RSP5	RSP6
Ethical Code of Conduct	x	x			x	x
Ethical Trainings	x	x		x	x	x
People		x	x		x	x
Environment			x		x	x
Collaboration	x	x	x			
Integrity/honesty	x	x			x	x
Passion/heart	x			x		
Innovation/boldness/brain	x	x		x		
Development	x					
Respect	x					
Open communication/honesty	x	x				
Trust	x	x				

Team spirit		x	x		x	
Modesty		x			x	
Fun		x				
Safety/security		x	x			
Quality			x		x	
Cost-effective		x	x			
Deliver value/commitment		x	x	x		
Diversity			x	x		
Confidentiality				x		
Compliance	x			x	x	x

One of the major barriers to the holistic implementation of this principle is the subjectivity or vastness of the ethics and values concepts resulting in their superficial practice.

4.3.5 Transparency and accountability consideration

Transparency encompasses avoiding a black-box methodology and disclosing policies, decisions, activities and the subsequent environmental and societal impact of them. Hemphill (2011, p.307) defines it as a “clear, accurate and complete portrayal, to a reasonable and sufficient degree”, of all the project related information. Transparency in the context of project management implies that project managers disclose all decisions, relevant events and impacts to stakeholders, which can aid in addressing issues raised by multiple different stakeholder groups (Silvius, 2013, p. 58). All project case studies analysed showed evidence of transparency as project managers ensured the employment of reporting structures (*Case Study I*) and extensive presentations and meetings with multiple stakeholder groups (*Case Studies III and V*), the use of organisational intranet platforms (eg. SharePoint) to share documents (*Case Study II and IV*) and third party regulated operations (*Case Study VI*).

Accountability as a sustainability dimension implies that an organisation owns the impacts of its actions, decisions and policies on the environment and society (Silvius & Schipper, 2014, p.69). Additionally, it calls for actions to prevent the recurrence of negative impacts on the environment and society in the future (Hemphill, 2011, p.307). In project management practices the Organisation Breakdown Structure (OBS) assigns tasks to individuals and makes them accountable for it. While the accountable is usually questioned when the activity performs poorly on the cost, time, quality and scope criteria, it is important the accountable person to be held responsible from the triple-bottom-line perspective as well. Thus it calls for an integration of the environmental and social indicators in work progress reports (Silvius & Schipper, 2012, p.39). Organisations ensure accountability by maintaining an organisational breakdown structure and putting into place a communication plan. All project managers have established the presence of this. One participant (RSP1) also mentioned the

maintenance of a decision log to track the owner and success of decisions. All interviewees presented contextual examples for how they took ownership for their decisions and in case of negative outcomes how they developed corrective and preventive actions against future recurrence.

The project manager of *Case Study I* pointed out that they kept a decision log in order to know who made a particular decision and whether decisions were successful. The project manager also looked at KPI's and if a KPI was not judged acceptable a root cause analysis was conducted and corrective actions were provided. The project manager of *Case Study II* pointed out that they took accountability for project delays on some occasions and as a corrective action they gave the client unbilled competence hours of work. *Case Study III* faced a situation where the resource requirements were overestimated. In this case the project manager sought out to correct the requirements posed and took accountability in the miscalculation. The project manager of *Case Study IV* pointed out that any errors spotted in the electronic devices had to be communicated immediately to the client and corrective measures had to be developed and implemented in order to overcome accidents. A similar situation was pointed out by the project manager of *Case Study V* where they took accountability for not understanding the client's requirements and not delivering products as per those. As a corrective measure new batches of furniture were prioritised and shipped out at no additional costs. Finally *Case Study VI* showed a high sense of accountability in all their business dealings proven through their commitment to multiple sustainability certifications.

As a result, all case studies have shown the application of the principle in the projects as has been highlighted in Table 20. Through the above analysis the hypothesis for the principle of transparency and accountability has been falsified.

Table 20. Evidence for transparency and accountability principle.

	RSP1	RSP2	RSP3	RSP4	RSP5	RSP6
Transparency	x	x	x	x	x	x
Accountability	x	x	x	x	x	x

While the principle has been proven to be applied in the scrutinised case studies, participants have pointed out certain barriers and trade-offs they faced, which are explained below.

1) Subjectivity of the terms ‘transparency’

Companies not practicing transparency for the negative impacts on the environment or society yet calling it an ethical consideration of confidentiality, showcase subjectivity and/or misinterpretation of the consideration and can present a barrier to the application of the principle.

2) Transparency vs. additional effort

Transparency requires communicating information regarding activities, decisions and procedures to all stakeholder groups. This can take up a lot of effort from the project team as the information needs to be made relevant to the interests of these groups and addressed in different meetings. Thus often a trade-off is seen between the additional

effort the project team invests in communicating all relevant details to stakeholders and assuring project transparency.

4.3.6 Risk reduction

When dealing with sustainability, project managers encounter future scenarios and evolutionary trends with an unavoidable degree of complexity and uncertainty (Giampetro & Ramos, 2005, p.123). Project managers are often accustomed to considering all risks pertaining to the unfulfilment of the project success criteria. In lieu of the above, the risk reduction principle tries to assess the extent to which project managers incorporate the people (social) and planet (environmental) considerations in risk assessments (Turner, 2010, p.169). The very first step to this process is the presence of a risk register and risk assessment process as part of project management. All six case studies have shown the presence of risk registers either exhaustive or not so comprehensive but involving preventive and corrective actions in case of risk occurrence. Literature suggests that the indeterminacy, complexity, nonlinearity and irreversibility of the society - environment interactions, make it easier to prevent rather than ameliorate adverse impacts leading to the formulation of the precautionary principle (Gareis et al. 2009, p.10).

Additionally, it is important to understand whether the people and planet risks are noted in the register. It was seen that participants logged risks related to the budget of the project (*Case Studies I, II, III and V*), the market share and volume (*Case Study VI*) and also the amount of after sales support (*Case Study IV*). In terms of the social risks *Case Study I* highlighted the presence of a risk register named 'IQRAM' that logged both social risks for human trials and risks related to employee productivity. *Case Study II* and *III* highlighted social risks of the employees not being technically sound to meet the requirements of the project. *Case Study IV* highlighted employee health and safety risks if and when they are exposed to hazardous working environments. *Case Study V* stressed on employee satisfaction. Finally, *Case Study VI* highlighted pay, housing, compensation, anti-discriminatory and other social considerations that they log in order to ensure 100% sustainable coffee production and sales.

Evidence for the environmental risks were: to ensure minimal medical adverse effects on patients as well as treatment and disposal of medical waste to prevent the contamination of the soil or water bodies (*Case Study I*); to ensure that the technological solution reduces paper prints and also enables the client to evaluate projects based on environmental considerations (*Case Study II*); to ensure that the plastic packaging is recyclable and that the CO₂ emissions are reduced during project execution (*Case Study III*); to mandate proper waste disposal of hazardous materials (*Case Study IV*), to ensure that the harmful effects of any furniture material are communicated to the client before going ahead with the order (*Case Study V*); and to ensure that the coffee is produced under sustainable soil conditions, fertilisers and irrigation systems. Finally all the project case studies were managed on these aspects using strict adherence to laws and regulations, standards and certifications and project baselines. The aforementioned evidence proves that all projects were able to show the application of this principle, as documented in Table 21, thereby falsifying the formulated hypothesis.

Table 21. Evidence for risk reduction principle.

	RSP1	RSP2	RSP3	RSP4	RSP5	RSP6
Project Risk Assessment	x	x	x	x	x	x
People (Social sustainability)	x	x	x	x	x	x
Planet (Environmental sustainability)	x	x	x	x	x	x
Profit (Economic sustainability)	x	x	x	x	x	x

While the case studies evidenced the practice of this principle, the project managers also pointed out certain barriers and trade-offs that they faced when trying to incorporate the principle in practice, which are discussed below.

1) Speed of risk response action vs. risk impact severity

Despite the fact that risk registers outline good response actions for risks that occur during the project, the time within which the response actions are implemented might aggravate the risk outcome. An example of this is employees who are constantly being overworked might see slow or no response from the managers thereby leading to their decision to resign.

2) Quality risk assessment vs. delivering value

Project managers need to invest time and resources in order to come up with an exhaustive and thought through risk register. However, this can take away time and effort from the project team in delivering the project or value to the client. Thus there is a potential trade-off made in the quality of risk assessment.

4.3.7 Stakeholder participation

Creating shared value amongst stakeholders is central to gaining stakeholder participation and therefore businesses should go beyond focusing on short-term benefits of shareholders and engage all stakeholder groups who could have an impact over the successful delivery of the project (Porter & Kramer, 2011, p.65-68). Subsection 4.3.3 has evidenced that participants recognised the importance of making short-term investment for long-term benefits. Additionally, through the aim of the project or the processes employed in it, all project managers have demonstrated the creation of shared value. In *Case Study I* this was realised through the scope of the project which is to serve societal interests of bringing to the market a drug that treats severe illness. In *Case Study II* the shared value was to help the client develop a Green IT solution that involves a more efficient data sharing platform allowing for optimisation and deriving resource savings. The inherent shared value in *Case Study III* was the redefined productivity in the value chain through the reduction in CO2 emission, packaging, employee ergonomics and improvement in delivery logistics. In *Case Study IV* the contribution towards the development of more environmental friendly mass transportation means whilst ensuring the health and safety of employees and users was identified as being the shared value created by the project. In *Case Study V* the shared value got materialised through addressing environmental constraints in the value chain and developing furniture that abides by strict environmental regulations. Finally, the shared value in *Case Study VI* was to move to 100% sustainable coffee production through the fulfilment of both environmental and social considerations.

Stakeholder participation is important as project managers can use the specialised knowledge stakeholders possess within their field of expertise or on sustainability (Thomson et al., 2009, p. 991). By means of effective communication and better cooperation (Tam et al., 2007, p.3106), this knowledge can be employed to develop sustainable solutions that cater to their diverse needs. The six case studies presented various ways of gaining stakeholder engagement with the common practice of extensive communication and information sharing realised through presentations, meetings as well as teleconferences. Besides engaging in the process of dialogue, proactive stakeholder engagement also requires consensus building amongst all stakeholders over the entire process from problem definition to monitoring and evaluating the outcomes (Hemmati, 2002, p.2; Goedknecht & Silvius, 2012, p.3). This can prevent misunderstandings and tension created among stakeholders. All case studies indicated towards agreements reached among stakeholders over the process and evaluation of the corresponding projects.

Stakeholders that are key at particular moments of the projects are often given inadequate consideration hence involving them in decision-making presents another way of assuring stakeholder participation (De Brucker, 2013, p. 129). The empirical results evidentiate practices of consulting, proactively communicating and cooperating with stakeholders when bringing decisions of high magnitude or of great impact over the triple bottom line.

As shown in Table 22, the three major themes of shared value, stakeholder engagement as well as stakeholder consultation and decision-making have demonstrated positive results and thereby the hypothesis of this principle was contradicted, the study concluding that the principle of stakeholder participation is applied in project management.

Table 22. Evidence for stakeholder participation principle.

	RSP1	RSP2	RSP3	RSP4	RSP5	RSP6
Shared value	x	x	x	x	x	x
Stakeholder engagement	x	x	x	x	x	x
Stakeholder consultation and decision making	x	x	x	x	x	x

Literature suggests that rules, regulations, standards and processes set up by authorities frequently impose barriers to the implementation of sustainability into project management processes (Marcelino-Sadaba et al., 2015, p.9). On the other hand, studies suggest that governments can often facilitate the design and adoption of sustainable project management practices (Brandoni and Polonara, 2012, p.336-337). Rules, regulations, standards and certifications have aided the adoption of sustainable practices employed by project managers, international, national or local authorities as well as non-profit organisations playing the role of guiding stakeholder groups in implementing sustainability.

Despite the successful implementation of this principle, respondents encountered certain barriers when striving for stakeholder participation, which are discussed below.

1) Polar stakeholder interests

Stakeholders often present opposing interests, which can result in social tensions and possible conflicts. If consensus is solely reached through one party giving up, stakeholder engagement can be affected leading to loss in the value encompassed in the project and implicitly to unsustainability given by the resources going to waste.

2) Disregarded responsibility towards shared resources

When human resources are shared between multiple projects, their interests are often neglected due to the unwillingness of project managers to assume responsibility over satisfying project members' needs.

3) Time difference between various geographic locations

When a project involves stakeholders from various geographic locations, time differences can present a challenge to communication, requiring additional hours spent on working. This can affect employee satisfaction and lead to tiredness and a loss of productivity.

4.3.8 Consumption of income and not capital

On an environmental level, projects should not employ processes or materials that may negatively impact nature's ability to regenerate resources as well as absorb waste from used resources (Silvius & Schipper, 2014, p.70). Participants gave an account of various practices employed with the scope of reducing the project's negative impact over the environment. In *Case Study I* an organisational policy adopted was to reduce the office space and request project team members to work from home. Additionally, printing was gradually being eliminated which both saves paper and allows project team members to access information without travelling to the office. *Case Study II* presented similar accounts through the consideration of replacing travel with online communication solutions. In *Case Study III* one of the aims of the project was to reduce CO2 emission through more efficient logistics as well as to utilise environmentally neutral packaging solutions. *Case Study IV* also highlighted the practice of replacing travelling with video conferencing, but this deemed to be a necessity rather than a choice to the project team. Additionally, project team members used water treatment services to prevent any environmental damage. *Case Study V* emphasised measures of delivering directly to the final user as an endeavour to reduce CO2 emission, as well as to ensure product durability and recyclability of all furniture components. *Case Study VI* gave an account of the minimal negative impact of transportation in the product value chain and entailed achieving a 100% CO2 emission compensation of the coffee produced and sold.

In addition to the aforementioned practices, *Case Studies III, IV* and *V* have adopted ISO 9001 on quality management, which can be regarded as an environmental consideration ensuring durability, *Case Studies III, V* and *VI* adhere to ISO 14001 on environmental management and *Case Study VI* complies with ISO 50001 on energy management. Similarly, all case studies are subject to and strictly follow local and national environmental regulations whereas *Case studies V* and *VI* have also gained environmental sustainability certifications. Since no system can grow forever within a limited environment, the reinforcing loop driving the system needs to be balanced with a loop that restrains it (Meadow & Wright, 2009, p.190). With an understanding of this principle, *Case Studies II, III, V* and *VI* have channelled resources into CSR activities with an environment focus, in an endeavour to offset the negative impact created over the environment. Nevertheless, due to the inability to quantify each case study's

environmental impact and as well as the share of CSR activities undertaken with the scope of offsetting the degradation caused, the authors judged the above considerations sufficient to conclude that all case studies have implemented the environmental pillar of this principle.

On a social level, projects should not require mental or physical work that leads to the exhaustion of an individual's ability to produce knowledge or generate deliverables (Silvius et al., 2012, p.51). Mental tiredness can be a result of long working hours and despite of clearly defined regulations on maximum working hours deemed acceptable per week, *Case Studies I* and *III* highlighted the occurrence of incidents where project team members were burdened with work. Accidents at the workplace can damage people's health, possibly leading to physical impairment. Depending on whether the projects presented a threat to the health and safety of employees, suppliers or the end consumers, the importance of health and safety measures have been highlighted throughout *Cases studies I, III, IV, V* and *VI*. In *Case Study I*, the project manager ensured the health and safety of patients through the implementation of a rigorous control system over the administration of medicine doses as well as the reporting of symptoms identified. In *Case Study III* logistic solutions were designed to prevent any negative impact on the health and safety of employees. In *Case Study IV* health and safety considerations got realised through a careful selection of vendors that provide quality products. In *Case Study V*, the project manager assured that health and safety rules and regulations are complied with throughout the project lifecycle. Finally, in *Case study VI* the health and safety of the supplier and consumers was ensured through the purchase of coffee from sustainable farms and the adoption of ISO 22000 international standard on food management, respectively. CSR activities with a special focus on the society represent an additional consideration identified in *Case Studies I, II, III, V* and *VI*. Nevertheless, as opposed to environmental CSR, social damage can't be compensated through the engagement in social CSR activities. Therefore, the application of the social pillar was judged to be limited to four case studies analysed.

On an economic level, projects should aim to use income received in advance from clients, allocated from the profits of the company or external finances, rather than the company's own capital (Silvius, 2012, p.91). This consideration is made to minimise the risk of default of the organisation delivering the project. *Case study I* used direct payments from the client to finance project related expenses, while *Case Studies III* and *VI* utilised previous profits generated by the company. *Case Studies II* and *V* used company reserves prior to attracting payment from the customer, these being later recuperated with an additional margin. *Case study IV* required additional investments made by sister companies as well as external financial support, which were repaid upon the termination of the project. Based on the evidence presented, none of the projects imposed a financial burden over the company's financial status, as sources of financing were limited to company profits and external investments which were later repaid.

The above planet, people and profit considerations pointed to early signs of a paradigm shift in project management since organisations start to see themselves as part of a highly interconnected social, environmental and economic network (W. Stead & J. Stead, 1994, p.15). Nevertheless, the people pillar of this principle was not fully incorporated in all case studies, as shown in Table 23. Thereby the corresponding hypothesis was validated the study proving that the principle of using income and not capital is not applied in project management.

Table 23. Evidence for consuming income and not capital.

	RSP1	RSP2	RSP3	RSP4	RSP5	RSP6
People		x		x	x	x
Planet	x	x	x	x	x	x
Profit	x	x	x	x	x	x

Since the case studies showed limited practice of the principle, the project managers highlighted certain barriers and trade-offs faced when undertaking people, planet and profit considerations specific to this principle. These are discussed below. Since there is a major overlap between the barriers and trade-offs identified for principle 1 and principle 8, repetitive elements that have already been explained, have not be re-examined.

1) Poor planning of human resources

Inadequate planning of time required to complete a task may lead to employees being over allocated in projects. This may exercise pressure on them, lead to a loss of their productivity and cause work dissatisfaction.

2) Savings on costs and environment vs. employee engagement

A company policy towards reducing office space, company expenses and simultaneous CO2 emission is to implement a work from home policy, which in turn can lead to loss of employee engagement if not dealt with carefully. Since employees lose the team spirit of being part of a group that works together towards common goals, they can become less motivated to produce efficient work.

4.3.9 Redefining sustainability in project management

In an attempt to redefine sustainability in project management the authors have used the model made up of the eight principles, the existing definitions from literature and the answers provided by participants from the empirical study.

The key phrases that can be highlighted from the proposed model are the eight principles themselves namely:

(1) Balancing or harmonising social, environmental and economic interests; (2) local, regional and global orientation (3) both short-term and long-term orientation; (4) values and ethics; (5) transparency and accountability; (6) risk reduction; (7) stakeholder participation; and (8) consuming income, not capital. These principles are focussed on the triple bottom line namely people, planet and profit that form the crux of the term sustainability.

Researchers have made few attempts to define sustainability in project management as summarised in Table 24.

Table 24. Definition of sustainability in project management.

Author(s)	Sustainability in Project Management
Deland (2009, p.1)	“Sustainable Project Management is <i>minimising the resources you and your team use to work a project from project initiation through close.</i> ”

Ning, Zhang, & Li (2009, p.1)	“Sustainable Project Management aims to apply the principle of <i>meeting the needs of the day without compromising the benefits of future generations</i> , to the construction industry by providing ways of buildings that use less virgin material and less energy, cause less pollution and less waste but still provide the benefits that construction projects have brought us throughout history.”
Tam (2010, p.18)	“Sustainable Project Management is the <i>promotion of positive and minimising of negative sustainability impacts</i> (economic; environmental; and social) <i>within the process by which projects are defined, planned, monitored, controlled and delivered such that the agreed benefits are realised</i> and contributing to a sustainable society.”
Silvius & Schipper (2012, p.40)	“Sustainability in projects and project management is the <i>development, delivery and management of project-organised change in policies, processes, resources, assets or organisations</i> , with consideration of the six principles of sustainability, <i>in the project, its result and its effect.</i> ” * These six principles are: (1) balancing or harmonising social, environmental and economic interests; (2) both short-term and long-term orientation; (3) both local and global orientation; (4) values and ethics; (5) transparency and accountability; and (6) consuming income, not capital.

Based on the aforementioned definitions the key phrases that can be highlighted are:

Minimising the resources you and your team use to work a project from project initiation through close; meeting the needs of the day without compromising the benefits of future generations; promotion of positive and minimising of negative sustainability impacts (economic; environmental; and social) within the process by which projects are defined, planned, monitored, controlled and delivered such that the agreed benefits are realised; development, delivery and management of project-organised change in policies, processes, resources, assets or organisations, in the project, its result and its effect.

Finally the key phrases that can be highlighted from the definitions provided by project managers are as follows:

Follow certain sequence of activities and have milestones and follow up to check whether everything is done on a certain phase; being sustainable should be viewed as a holistic process; have a third party control.

Through the combination of the three sources the authors propose an improved definition to sustainable project management, which is:

Managing all phases of a project, it's result and effect in a way to holistically promote positive benefits and minimise negative impacts on resources by (1) balancing or harmonising social, environmental and economic interests; (2) having local, regional

and global orientation (3) ensuring both short-term and long-term orientation; (4) adhering to values and ethics; (5) opting for transparency and accountability; (6) reducing risk; (7) encouraging stakeholder participation; and (8) consuming income and not capital.

CHAPTER 5. CONCLUSIONS AND RECOMMENDATIONS

This chapter summarises the answers to the research questions. In the first section it reinforces the purpose of the study highlighting then the managerial implications that can inform good business practices. Subsequently, the chapter emphasises the theoretical contributions made by the research followed by a presentation of the limitations to the work that have been proactively identified throughout the study. Finally, the chapter ends with recommendations for future research.

5.1 CONCLUDING REMARKS

The purpose of this research was to investigate how the principles of sustainability are applied in project management, in the context of private sector organisations. To fulfil this purpose, the paper first reviewed and critically discussed existing literature to identify the principles of sustainability in project management, and then constructed a model that served as basis for the present study. Through the use of multiple case studies from distinct industries, the authors assessed the applicability of the principles in project management. The case studies used interviews as a data source to generate empirical findings. By examining the data sources, the paper succeeded in identifying barriers to the incorporation of the principles and trade-offs encountered when implementing them. Finally, the study proposed an enhanced definition of sustainable development in project management through a combined analysis of the eight principles, the existing definitions identified in literature and the responses gained from the research participants. By conducting a qualitative study, the authors have gained an extensive understanding of the participants and their project management practices, and succeeded in answering the research question of:

How are the eight principles of sustainability applied in Project Management?

The findings of the present research are that not all principles are fully implemented in project management despite of multiple proactive endeavours of engaging in social and environmental focused business practices. The two principles that have not been applied to the case studies scrutinised were found to be values and ethics as well as consuming income and not capital. The reasons for the inadequate consideration of the former are the lack of a guiding ethical code of conducts and related periodic trainings to maintain awareness of them. The cause of not fulfilling requirements for implementing the latter principle is primarily related to high pressure on employees to engage in work related activities for long hours, which is socially unsustainable.

Additionally, feedback gained from participants highlighted unawareness on what sustainability means in project management, which can be explained both in terms of the subjective nature of the concept as well as a possible gap in communication between the academic world and the business context. If the principles of sustainable development are to be applied in practice, endeavours need to be channelled towards effectively informing the business world with results from research papers.

5.2 MANAGERIAL IMPLICATIONS

The managerial implications for project managers working in companies that fulfil the sampling criteria for the study have been highlighted below in terms of best practices on ways to incorporate the different principles of sustainability in project management.

(1) Balanced or harmonised consideration of social, environmental and economic interests

The people pillar can be incorporated by considering employee satisfaction, health and safety; by respecting stakeholder rights and avoiding discrimination among stakeholder groups; by guaranteeing payment to all suppliers and contributing to greater earnings when importing from developing countries as well as implementing international standards. The profit pillar can be incorporated by respecting timelines, spending within the allocated budget, delivering within the scope of the project and adopting LEAN practices. The planet pillar can be implemented using efficient packaging solutions and reducing CO2 emissions by choosing minimum transportation, maximum virtual connectivity and local sustainable procurement.

(2) Local, regional and global orientation

The principle can be best implemented by abiding by local, regional and global rules, assuring identical sustainability practices through globally dispersed offices and by collaborating with NGO's to gain advice on how to become more sustainable.

(3) Short-term and long-term orientation

Managers can ensure the incorporation of this principle by gauging how the stakeholders feel about the current state of the project, by winning new projects to ensure financial sustainability, by evaluating projects from a company's strategic outlook, by evaluating the benefits that will be gained through the project and by systematising all environmental and social considerations.

(4) Values and ethics consideration

Project managers can imbibe ethical practices by forming a formal ethical code of conduct that each employee should adhere to and by conducting training around them in order to create awareness about them. Some of the value and ethical aspects highlighted through studies are: Collaboration, Integrity/honesty, Passion/heart, Innovation/boldness/brain, Development, Respect, Open communication/honesty, Trust, Team spirit, Modesty, Fun, Safety/security, Quality, Cost-effective, Deliver value/commitment, People, Environment, Diversity, Confidentiality and Compliance.

(5) Transparency and accountability consideration

Project managers can ensure considerations through reporting structures, extensive presentations and meetings with multiple stakeholder groups, using organisational intranet platforms (eg. SharePoint) to share documents, third party regulations, maintaining decision logs and abiding by an organisational breakdown structure.

(6) Risk reduction

The principle can be incorporated in practice by using a lessons learnt tracker, evaluating decisions based on safety, quality, cost, delivery, people and environment criteria, by undertaking First Article Inspections and Pre-Shipment Inspections for manufactured products, by baselining risks, keeping change orders handy, having an

emergency communication protocol/procedure and implementing ISO standards of CAR (Corrective Action Report) and PAR (Preventive Action Report) reports.

(7) Stakeholder participation

The principle can be achieved through communication using different modes of face to face and virtual communication of telephonic and teleconferencing, being culturally aware, gaining stakeholder engagement through creation of shared value that the project aims to deliver and building consensus between stakeholders.

(8) Consumption of income and not capital

The considerations are similar to those of principle one. While principle one refers to the harmonised consideration of the triple bottom line, principle eight refers to maintaining or preserving the power and capability of the resources to regenerate.

Participating project managers have shown a successful consideration and incorporation of sustainability in their project management practices for a majority of the principles. It is only the 'values and ethics' and 'consume income, not capital' that have not been fulfilled by *Case Study IV* and *Case Studies I and III*, respectively. By pointing out the shortfalls in the case studies the project managers are advised to understand the importance and incorporation of the principle through the example of other case studies.

5.3 THEORETICAL CONTRIBUTIONS

The research focussed on understanding how the eight principles of sustainability are implemented in project management. With over 200 publications in the field, the authors identified researchers (Gareis, 2009, p.7-8; Gareis, 2013, p.135; Goedknecht & Silvius, 2012, p.3; Lambuschagne & Brent, 2004, p. 107-108, Messikomer et al., 2011, p.18; Økland, 2015, p.104-105; Silvius et al., 2012, p.49-52, Turner, 2010, p.162-163) who addressed distinctive subsets of the eight principles found in literature. These are: (1) balancing or harmonising social, environmental and economic interests; (2) local, regional and global orientation; (3) both short-term and long-term orientation; (4) values and ethics; (5) transparency and accountability; (6) stakeholder participation; (7) risk reduction and (8) consuming income and not capital. Hence, a theoretical implication of the study is to provide a holistic understanding of the sustainability principles in project management by critically discussing and empirically testing all eight fundamentals academics have pointed to.

While literature suggests that the principles are not yet incorporated in projects and related practices, the study challenged these findings in six out of the eight fundamentals. As a consequence, the research provided evidence to the increased consideration of the social and environmental pillar in project business cases, related decision making and activities. Similarly, it highlighted areas of research where further academic effort is needed to fully understand the cause of negligence of the remaining two fundamentals and aid a quick adoption of them.

Additionally, the project case studies used for the research assessed industries that have received limited attention in prior studies. The new industries scrutinised were Pharmaceutical, IT (Information Technology), Automotive, Transportation, Furniture and FMCG (Fast-moving consumer goods) whereas prior research had seen a concentration of case studies in the building and construction, manufacturing, regional

development and energy industry (Silviu & Schipper, 2014, p.67). Therefore the thesis provided homogenous evidence to the spread of sustainable project management practices across distinct industries, demonstrating that the eight principles are universal, industry-independent and can be applied to all project management activities. However, a project manager's choice of technique for the implementation of the principles can vary, which is coherent with the subjectivist perspective of the researchers.

The research was also able to determine the barriers that impede certain principles to be applied to the management of projects and the resulting trade-offs thereby offering guidance to further topics to be explored by academic researchers. This can be counted as a theoretical contribution as very few prior studies have concentrated on 'why' organisations are not able to manage their projects sustainably and 'where' is it that they face challenges.

Finally, based on an assessment of previous definitions, the eight principles proposed by literature as well as responses gained from participants, the researchers were able to propose a model to and an improved definition of the concept of sustainable project management, which is: "*Managing all phases of a project, it's result and effect in a way to holistically promote positive benefits and minimise negative impacts on resources by (1) balancing or harmonising social, environmental and economic interests; (2) having both local and global orientation (3) ensuring both short-term and long-term orientation; (4) adhering to values and ethics; (5) opting for transparency and accountability; (6) reducing risk; (7) encouraging stakeholder participation; and (8) consuming income and not capital.*"

5.4 LIMITATIONS

The relatively high applicability of the sustainability fundamentals found in the scrutinised case studies may be a result of the sampling criteria assumed given the global, for-profit orientation of the chosen organisations, the geographical location of their headquarters as well as the adoption of sustainability as a core pillar of their corporate strategy. The aforementioned point limits the transferability of the results to projects that fulfil the sampling criteria employed.

A limitation to the study was that few papers that appeared to be relevant based on their abstract or based on citations from key articles were not found or access to them was conditioned to paying a fee, hence not used for the study. Also, it is important to be noted that the articles cited by this paper were spread across multiple journals, with an object of study mostly different from project management (eg. Journal of Cleaner Production, Ecological Economics, Building and Environment, etc.). This presented a challenge to conducting a comprehensive literature review on the chosen topic as well as highlighted the need to address and engage audiences from the project management field in future publications.

The ethical consideration of anonymity made by the participants have resulted in codes used throughout the thesis thereby limiting the ability of future researchers to reflect and re-examine the companies.

5.5 RECOMMENDATIONS FOR FUTURE RESEARCH

Through an extensive literature review and during the course of the study the authors have come across venues for further research that would strengthen current studies and grow the field of ‘sustainability in project management’. These have been enlisted below:

- 1) In this research the authors assessed the implementation of the eight sustainability principles in project management. Checking the mutual exclusivity and collective exhaustivity of those was out of the scope of this study, hence pointing towards a research topic that further studies could embrace.
- 2) Currently, research lacks criteria based on which companies or projects that incorporate sustainability in project management practices can be identified. The authors thus propose an explanatory research on the same.
- 3) When selecting project case studies, the authors assumed as prerequisite that the organisation executing the project should have sustainability as a strategic pillar. While the selection of case studies based on this assumption have proven to be exemplifiers, the authors propose a formal research to evidentiate the causal relationship between ‘sustainability as an organisational strategic pillar’ and ‘sustainability incorporation in project management’.
- 4) Finally, through this study the authors have pointed out multiple barriers and trade-offs that companies faced when implementing sustainability at a project tactical level. Hence, further research can build on assessing and addressing these barriers and trade-offs through the development of prescriptive actions directed to project managers.

The authors believe that further research in this domain will be able to encourage good management practices and will make academic research more relevant to the corporate world.

REFERENCE LIST

- Abidin, N.Z. & Pasquire, C.L. (2005). Delivering sustainability through value management: Concept and performance overview. *Engineering, Construction and Architectural Management*, 12(2), 168-180.
- Achterkamp, M.C. & Vos, J.F.J., (2006). A framework for making sense of sustainable innovation through stakeholder involvement. *International Journal of Environmental Technology and Management*, 6(6), 525-538.
- Adams, J., Khan, H.T.A., Raeside, R., & White, D. (2007). *Research Methods for Graduate Business and Social Science Students*. London: Sage Publications, Ltd.
- Al-Saleh, Y.M. & Taleb, H.M. (2010). The Integration of Sustainability Within Value Management Practices: A Study of Experienced Value Managers in the GCC Countries. *Project Management Journal*, 41(2), 50-59.
- Association for Project Management (APM) (2006). *APM Supports Sustainability Outlooks*
http://www.blackpool.ac.uk/sites/default/files/documents/apm_supports_sustainability_outlooks.pdf [Retrieved November 7, 2015]
- Attride-Stirling, J. (2001). Thematic Networks: an analytic tool for qualitative research. *Qualitative Research*, 1(3), 385-405.
- Badiru, A.B. (2010). The many languages of sustainability. *Industrial Engineer*, 11, 30-35.
- Baker, S., & Eckerberg, K. (2008). In pursuit of sustainable development at the sub-national level: The “new” governance agenda. In: S. Baker & K. Eckerber, eds., *In pursuit of sustainable development: New practices at the sub-national level in Europe*. London: Routledge. pp. 1-26.
- Baxter, P., Susan Jack, & Jack, S. (2008). Qualitative Case Study Methodology: Study Design and Implementation for Novice Researchers. *The Qualitative Report Volume*, 13(4), 544-559.
- Bell, S., & Morse, S. (2008). *Sustainability Indicators: Measuring the Immeasurable? Second Edition Earthscan*. London: Earthscan.
- Bond, A., Morrison-Saunders, A., & Pope, J. (2012). Sustainability assessment: the state of the art. *Impact Assessment and Project Appraisal*, 30(1), 53-62.
- Brandoni, C. & Polonara, F., (2012). The role of municipal energy planning in the regional energy-planning process. *Energy*, 48, 323-338.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77-101.

- Brent, A.C., Manzini, D., & Heuberger, R. (2005). Evaluating projects that are potentially eligible for Clean Development Mechanism (CDM) funding in the South African context: a case study to establish weighting values for sustainable development criteria. *Environment and Development Economics*, 10(5), 631-649.
- Brown, B.J., Hanson, M.E., Liverman, D.M., & Merideth, R.W. (1987). Global sustainability: Toward definition. *Environmental Management*, 11(6), 713-719.
- Bryman, A., & Bell, E. (2011). *Business research methods*. 3rd edition. Oxford: Oxford University Press.
- Bryman, A., & Bell, E. (2015). *Business research methods*. 4th edition. Oxford: Oxford University Press.
- Bryman, A. (2012). *Social research methods*. 4th edition. Oxford: Oxford University Press.
- Caron, F. (2013). *Managing the Continuum: Certainty, Uncertainty, Unpredictability in Large Engineering Projects*. Milan: Springer.
- Creswell, J.W. (2003). *Research design Qualitative quantitative and mixed methods approaches*, 2nd edition. London: Sage Publications, Ltd.
- Crossan, F. (2003). Research Philosophy: Towards an understanding, *Nurse Research*, 11(1), 46-55.
- Crotti, M. (1998). *The Foundations of Social Research*. London: Sage Publications, Ltd.
- De Brucker, K., Macharis, C. & Verbeke, A., (2013). Multi-criteria analysis and the resolution of sustainable development dilemmas: a stakeholder management approach. *European Journal of Operational Research*, 224, 122-131.
- Deland, D. (2009). Sustainability Through Project Management and Net Impact. In: *PMI Global Congress North America*. Philadelphia, USA. Available via <http://www.pmi.org/learning/sustainability-goals-achieving-framework-technique-6776> [Retrieved November 7, 2015]
- Dyllick, T. & Hockerts, K. (2002). Beyond the Business Case for Corporate Sustainability. *Business Strategy and the Environment*, 11(2), 130-141.
- Eden, S.A. (1994). Using sustainable development: The business case. *Global Environmental Change*. 4(2), 160-167.
- Eid, M. (2002). A Sustainable Approach to the Project Management Odyssey. *PMI Research Conference 2002*, 1-16.
- Elkington, J. (1997). *Cannibals with Forks: the Triple Bottom Line of 21st Century Business*. Oxford: Capstone Publishing.

Eskerod, P., & Huemann, M. (2013). Sustainable development and project stakeholder management: what standards say. *International Journal of Managing Projects in Business*, 6(1), 36-50.

Gareis, R., Huemann, M. & Martinuzzi, R-A. (2009). Relating sustainable development and project management. In: *IRNOP IX*, Berlin, Germany. Available via <http://www.pmi.org/learning/relating-sustainable-development-project-management-6497> [Retrieved November 2, 2015]

Gareis, R., (2013). Re-Thinking Project Initiation and Project Management by Considering Principles of Sustainable Development. In: Silvius, A.J.G. & Tharp J., eds. *Sustainability Integration for Effective Project Management*, Hershey: IGI Global. pp. 129-143.

Gasparatos, A., El-Haram, M., & Horner, M. (2009). The argument against a reductionist approach for measuring sustainable development performance and the need for methodological pluralism. *Accounting Forum*, 33(3), 245-256.

Ghuri, P.N. & Grønhaug, K. (2010). *Research Methods in Business Studies*. 4th edition. Harlow: Pearson Education Limited.

Giampietro, M., & Ramos-Martin, J. (2005). Multi-scale integrated analysis of sustainability: a methodological tool to improve the quality of narratives. *International Journal of Global Environmental Issues*, 5(3/4), 119-141.

Gilbert, R, Stevenson, R, Girardet, H., & Stren, R ed. (1996). *Making cities work: The role of local authorities in the urban environment*. London: Earthscan.

Goedknecht, D. & Silvius, A.J.G. (2012). The implementation of sustainability principles in project management. In: *26 IPMA World Congress*. Crete, Greece.

Greener, S. (2008). *Business Research Methods*. Ventus Publishing, ApS.

Easterby-Smith, M., Thorpe, R. & Jackson, P. (2012). *Management Research*. 4th edition. London: Sage Publishing, Ltd.

Hacking, T., & Guthrie, P. (2008). A framework for clarifying the meaning of Triple Bottom-Line, Integrated, and Sustainability Assessment. *Environmental Impact Assessment Review*, 28(2-3), 73-89.

Hanssen, O.J., (1999). Sustainable product systems e experiences based on case projects in sustainable product development. *Journal of Cleaner Production*, 7, 27-41.

Hemmati, M. (2002). *Multi-stakeholder processes for governance and sustainability – beyond deadlock and conflict*. London: Earthscan.

Hemphill, T. (2013). The ISO 26000 guidance on social responsibility international standard: what are the business governance implications? *Corporate Governance*, 13(3), 305-317.

Herazo, B., Lizarralde, G., & Paquin, R. (2012). Sustainable development in the building sector; A Canadian case study on the alignment of strategic and tactical management. *Project Management Journal*, 43(2), 84-100.

Holling, C.S. (2001). Understanding the complexity of economic, ecological and social systems. *Ecosystems*, 4(5), 390-405.

Kates, B.R.W., Parris, T.M., & Leiserowitz, A. (2005). What is sustainable development? Goals, indicators, and practice. *Environment*, 47(3), 8-21.

Kvale, S. (2007). *Doing interviews*. London: Sage Publications, Ltd.

Kvale, S. & Brinkmann, S. (2009). *Interviews: Learning the Craft of Qualitative Research Interviewing*. 2nd edition. London: Sage Publications, Ltd.

Labuschagne, C. & Brent, A.C. (2004). Sustainable project life cycle management: aligning project management methodologies with the principles of sustainable development. *PMSA International Conference*, 104-115.

Labuschagne, C. & Brent, A.C. (2005). Sustainable Project Life Cycle Management: the need to integrate life cycles in the manufacturing sector. *International Journal of Project Management*, 23(2), 159-168.

Labuschagne, C., Brent, A.C. & Van Erck, R.P.G. (2005). Assessing the sustainability performances of industries. *Journal of Cleaner Production*, 13(4), 373-385.

Layder, D. (1993). *New Strategies in Social Research*. Cambridge: Polity.

Lincoln, Y.S. & Guba, E.G. (1985). *Naturalistic Inquiry*. Newbury Park, CA: Sage Publications, Inc.

Marcelino-Sadaba, S., Gonzalez-Jaen, L., & Perez-Ezcurdia, A. (2015). Using project management as a way to sustainability. From a comprehensive review to a framework definition. *Journal of Cleaner Production*, 99, 1-16.

Marcuse, P. (1998). Sustainability is not enough. *Environment and Urbanization*, 10(2), 103-111.

Martens, M.L. & Carvalho, M. M de (2014). A conceptual framework of sustainability in project management oriented to success. In: *POMS 25th Annual Conference, 2014, Atlanta. POMS impact and vision: Reaching New Heights*. Atlanta, USA. Available via <http://www.pomsmeetings.org/confpapers/051/051-0811.pdf> [Retrieved November 1, 2015]

Meadows, D. & Wright, D. (2009). *Thinking in Systems: A Primer*, London: Earthscan.

Messikomer, C., Huemann, M., Dominguez, O., Gareis, R., Navarro-Flores, O., & Morgese, P. (2011). Sustainability and Project Management: The Future is Now. *Project Management Institute*, (10), 1-137. Available via: [http://www.pmi.org/learning/academic-research/~media/PDF/Research/ROWS%20-](http://www.pmi.org/learning/academic-research/~/media/PDF/Research/ROWS%20-)

[%20NA%202011%20Sustainability%20-%20Slides.ashx](#) [Retrieved November 1, 2015]

Mishra, P., Dangayach, G.S., & Mittal, M.L. (2011). An Ethical approach towards sustainable project Success. *Procedia - Social and Behavioral Sciences*, 25, 338-344.

Ness, B., Urbel-Piirsalu, E., Anderberg, S., & Olsson, L. (2007). Categorising tools for sustainability assessment. *Ecological Economics*, 60(3), 498-508.

Ning, C., Zhang, S., & Li, L. (2009). Sustainable Project Management: A Balance Analysis Model of Effect. In: *International Conference on Management and Service Science*. Wuhan, China.

Økland, A. (2015). Gap Analysis for Incorporating Sustainability in Project Management. *Procedia Computer Science*, 64(1877), 103-109.

Tufinio, S.P., Mooi, H., Ravestijn, W., Bakker, H., & Boorsma, M. (2013). Sustainability in Project Management. *International Journal of Engineering*, XI, 91-101.

Pintér, L., Hardi, P., Martinuzzi, A., & Hall, J. (2012). Bellagio STAMP: Principles for sustainability assessment and measurement. *Ecological Indicators*, 17, 20-28.

Planko, J. & Silvius, A.J.G. (2012). Sustainability in Business. In: Silvius, A.J.G., Schipper, R., Planko, J., van den Brink, J., & Köhler, A., ed. *Sustainability in Project Management*, Farnham: Gower Publishing. pp. 7-20.

Porter, M.E. & Kramer, M.R. (2006). Strategy & society: the link between competitive advantage and corporate social responsibility. *Harvard business review*, 84, 78-92.

Porter, M.E. & Kramer, M.R. (2011). Creating shared value. *Harvard business review*, 89(1/2), 62-77.

Project Management Institute (PMI) (2013). *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)*, 5th edition, Pennsylvania, USA: Project Management Institute.

Renn, O., Goble, R., & Kastenzholz, H. (1998). How to Apply the Concept of Sustainability to a Region. *Technological Forecasting and Social Change*, 58(1-2), 63-81.

Robson, C. (2002). *Real World Research*, 2nd edition. Oxford: Blackwell.

Robson, C. (2011). *Real World Research*, 3rd edition. Chichester: John Wiley.

Rubin, A., & Barbie, E. (1997). *Research Methods for Social Work*, 3rd edition. California: Brooks/Cole Publishing Company.

Sánchez, L., & Vanclay, F. (2012). Environmental management systems. *International Association for Impact Assessment*, 2, 1-2.

- Sartori, S., Latrónico, F., & Campos, L.M.S. (2014). Sustainability and sustainable development: a taxonomy in the field of literature. *Environment and Society*, 17(1), 1-22.
- Saunders M. (2012). Choosing research participants. In: Symon, G. & Cassell, C. (eds) *The Practice of Qualitative Organizational Research: Core Methods and Current Challenges*. London: Sage Publications, Ltd. pp. 37-55.
- Saunders, M., Lewis, P & Thornhill, A., (2009). *Research Methods For Business Students*. 5th edition. Harlow: Financial Times Prentice Hall.
- Saunders, M., Lewis, P & Thornhill, A., (2012). *Research Methods For Business Students*. 6th edition. Harlow: Financial Times Prentice Hall.
- Schieg, M. (2009). The Model of Corporate Social Responsibility in Project Management. *Business Theory and Practice*, 10(4), 315–321.
- Sedlacek, S., & Gaube, V. (2010). Regions on their way to sustainability: The role of institutions in fostering sustainable development at the regional level. *Environment, Development and Sustainability*, 12, 117–134.
- Sharachchandra, M. (1991). Sustainable Development: A Critical Review. *World Development*, 19 (6), 607-621.
- Shearlock, C., James, P., & Phillips, J. (2000). Regional sustainable development: are the new regional development agencies armed with the information they require? *Sustainable Development*, 8(2), 79–88.
- Silvius, A.J.G. (2012). Sustainability in Project Management: Vision, Mission, Ambition In: *Proceedings of the PMSummit 2012 PMI Turkey Chapter*, Istanbul.
- Silvius, A.J.G. (2013). Sustainability in Project Management Processes. In: Silvius, A.J.G. & Tharp J., ed. *Sustainability Integration for Effective Project Management*, IGI Global. pp. 58-75.
- Silvius, A.J.G., & Schipper, R. (2010). A maturity model for integrating sustainability in projects and project management. In: *Proceedings of the 24th World Congress of the International Project Management Association (IPMA)*. Istanbul, Turkey.
- Silvius, A.J.G. & Schipper, R. (2012). Sustainability and projects. In: Silvius, A.J.G., Schipper, R., Planko, J., van den Brink, J., & Köhler, A., ed. *Sustainability in Project Management*, Farnham: Gower Publishing. pp. 21-44.
- Silvius, A.J.G., & Schipper, R. (2014). Sustainability in project management: A literature review and impact analysis. *Social Business*, 4(1), 63-96.
- Silvius, A.J.G., Schipper, R. & Nedeski, S. (2013). Sustainability in Project Management: Reality Bites. *PM World Journal*, 2(2), 1-14.

Silvius, A.J.G., Schipper, R. & van den Brink, J., & Köhler, A. (2012). Incorporating Sustainability in Project Management. In: Silvius, A.J.G., Schipper, R., Planko, J., van den Brink, J., & Köhler, A., ed. *Sustainability in Project Management*, Farnham: Gower Publishing. pp. 45-86.

Stead, W.E., & Garner, J. (1994). Can Humankind Change the Economic Myth? Paradigm Shifts Necessary for Ecologically Sustainable Business. *Journal of Organizational Change Management*, 7(4), 15-31.

Tansey, O. (2007). Process Tracing and Elite Interviewing: A Case for Non-probability Sampling. *Political Science and Politics*, 40(4).

Tam, G. (2010). The program management process with sustainability considerations. *Journal of Project, Program & Portfolio Management*, 1(1), 17-27.

Tam, V.W.Y., Shen, L.Y., Yau, R.M.Y. & Tam, C.M. (2007). On using a communication-mapping model for environmental management (CMEM) to improve environmental performance in project development processes. *Building and Environment*, 42, 3093-3107.

Taylor, S.J., & Bogdan, R. (1998). *Introduction to Qualitative Research Methods: A Guidebook and Resource*, 3rd edition. USA: John Wiley & Sons, Inc.

Thomson, C.S., El-Haram, M.A. & Emmanuel, R. (2009). Mapping knowledge during sustainability assessment within a PPP school project. In: Proceedings of the 25th Annual ARCOM Conference, Nottingham, UK, September 7-9.

Thabrew, L., Wiek, A. & Ries, R. (2009). Environmental decision making in multi-stakeholder contexts: applicability of life cycle thinking in development planning and implementation. *Journal of Cleaner Production*, 17, 67-76.

Turner J.R. (2010). Responsibilities for Sustainable Development in Project and Program Management. In: Knoepfel H., ed. *Survival and Sustainability as Challenges for Projects*, IPMA. pp. 161-170.

White, M. (2013). Sustainability: I know it when I see it. *Ecological Economics*, 86, 213-217.

Willard, B. (2005). *NEXT Sustainability Wave: Building Boardroom Buy-In*. Canada: New Society Publishers.

Wilson, J. (2014). *Essentials of Business Research: A Guide to Doing Your Research Project*. 2nd edition. London: Sage Publications, Ltd.

World Commission on Environment and Development (WCED) (1987). Report of the World Commission on Environment and Development: Our Common Future (The Brundtland Report). *Medicine, Conflict and Survival*, 4(1), 1-300.

Yin, R. K. (1994). *Case Study Research: Design and Methods*, Applied Social Research Methods Series, 2nd edition. London: Sage Publications, Ltd.

APPENDICES

Appendix 1 - Consent form.

PROJECT TITLE:

MSc Thesis - Sustainability in Project Management: Eight principles in practice

INTRODUCTION

You are invited to join an academic research study to look at “*How the eight principles of sustainability are incorporated in project management*”.

In this research study, we would like to investigate what sustainability considerations you make when delivering projects in your organisation, what barriers you face when attempting to apply these considerations as well as the trade-offs that you encounter when incorporating sustainability principles in your project management practices.

The incorporation of sustainability in project management can be used as a lever to deliver all projects sustainably. By exploring how the eight principles of sustainability have been applied to project management as well as elaborating on the definition of sustainable project management, the authors aim to attain an accelerated adoption of sustainability in organisations. Furthermore, the authors intend to close the gap between theory and application by pointing out the barriers and trade-offs faced by various industries.

WHAT IS INVOLVED IN THE STUDY?

If you decide to participate you will be asked to answer a set of semi-structure questions related to a project that you recently managed. We think this will take you between 60-90 minutes.

For the purpose of the study we would like to conduct the interview through a Skype video call on a date and time convenient to you. We would like you to think of a project that had a strategic importance for your company. In order to set the context of the case study, we would ask questions regarding your job title and experience, the project under consideration (scope, time, budget, industry and stakeholders) and the organisational context of the project (any reporting standards adhered to).

In the next stage, we would like you to amply describe project related considerations that will touch upon themes such as project evaluation criteria, project impact, project benefits, stakeholders, ethical and value considerations, project risk and resources employed.

For the purpose of the data analysis, we would like to voice record the interview, transcribe it and use it as supporting source for our study. The voice recording will be deleted after the transcription has been made. We will send you a transcript of the interview prior to the data analysis in order to assure that the transcript reflects your initial thoughts on the matter.

Following the data collection, we would like to contact you via email if need be to ask for further clarifications on your answers. These possible follow up emails will not be time consuming and we will be considerate over your response time.

BENEFITS OF TAKING PART IN THE STUDY

Taking part in the study will hold the following benefits for you:

1. It will help you reflect over sustainability considerations you are currently making in projects and serve as an aspiration towards further integration of sustainability fundamentals in your future project management activities.
2. It will report findings from other institutions/ industries that can help you observe what other businesses are doing in terms of their sustainability policies.

Taking part in the study will hold the following benefits for the community:

1. It will inform literature on sustainability principles currently employed in project management activities attempting to close the gap between theory and practice.
2. It will help the academia understand barriers to sustainable project management and fuel discussions on how to address these.
3. It will divert more attention to sustainability in project management encouraging researchers to develop further models, tools and techniques to facilitate its incorporation.
4. It will serve as a guide to other businesses aspiring for the adopting of sustainability thinking in their project management activities.

YOUR RIGHTS AS A RESEARCH PARTICIPANT

Participation in this study is voluntary. You have the right not to participate at all or to leave the study at any time. Deciding not to participate or choosing to leave the study will not result in any penalty or loss of benefits to which you are entitled, and it will not harm your relationship with the researchers.

You have the right to remain anonymous. If you do not wish to disclose your name, or the name of the company you are working for, the study will only describe the general context of your project without including any details that could be associated with you or your company.

CONFIDENTIALITY

Sensitive information will not be disclosed, unless agreed to by you. As part of reporting findings, the paper will use direct quotation marks. The research does not aim to criticise your business activity, but rather to understand what sustainability considerations you made in your projects and what difficulties you faced when implementing them.

Please tick Yes or No next to the following statements.

1. I agree to take part in this study. Yes No
2. I agree for my name to be disclosed in the research report. Yes No
3. I understand that my participation is voluntary and that I am free to withdraw at any time without giving reason. Yes No

4. I agree for the company name to be disclosed in the research report. Yes No
5. I agree to share project sustainability related documents. Yes No
6. I agree to the interview being audio recorded. Yes No
7. I agree to the use of anonymised codes in publications. Yes No
8. I confirm that I have read and understood the above information. Yes No

CONTACTS FOR QUESTIONS OR PROBLEMS

Contact Natalia Semenova (associate professor) at Umeå School of Business and Economics (USBE) at +46 90 786 62 81 or natalia.semenova@usbe.umu.se if you have any questions or concerns about your rights as a research participant.

Consent of Subject (or Legally Authorised Representative)

Signature of Subject or Representative

Date

Appendix 2 - Interview questions.

SECTION I. Contextual questions (5 mins)

1. What is your job title?
2. How many years of experience have you gained in your current role?
3. In what industry does the project take place?
4. What was the purpose/scope, duration and budget of the project?
5. Does the organisation that commissions the project have any form of sustainability reporting?

SECTION II. Questions regarding the project (55-85 mins)

1. What were the success evaluation criteria of the project and was the project successful?
2. Which stakeholders (local/global; non-profit/for-profit) did you interact with and with what purpose?
3. Which geographical area did the project have an impact on and how? If it was a negative impact what measures were taken to correct it (if any)?
4. What are the short/long term benefits of the project (if any) and when were they/will they be realised?
5. How does being an ethical individual differ from being an unethical one?
6. Does the organisation you work for have any value statements and ethical code of conduct/trainings and what are they?
7. Can you think of an instance where you were challenged ethically?
8. Did the organisation's value and ethical code of conduct specifically highlight transparency and accountability?
9. How does the project promote transparency in the activities, decisions and reports of the project?
10. Can you give an instance where you were held accountable for a negative impact on the people, profit or environment? What were the reactive measures that were taken to curb the recurrence of this?
11. What were the interests of the different stakeholder groups and how did you give equal consideration to all interests?
12. Can you give an instance where the project consulted with stakeholder groups and built consensus before taking project related decisions?
13. Did the project have a risk register and what were the main categories of high impact risks that were pointed out?
14. What were the economic, environmental and social risks that the project identified and what were the response actions planned?
15. Did the project see loss in the productivity of any stakeholder group? What do you think were the reasons for the same?
16. Can you point out an instance where the project consumed scarce resources?
17. What sources were used to fund the project?

Appendix 3 - Interview guide.

Theoretical connection	Hypothesis	Interview question
Chapter 2 Subchapter 2.2	The principle of balancing or harmonising social, environmental and economic interests is not applied in project management	1. What were the success evaluation criteria of the project and was the project successful?
Chapter 2 Subchapter 2.3	The principle of having a local, regional and global orientation is not applied in project management	2. Which stakeholders (local/global; non-profit/for-profit) did you interact with and with what purpose? 3. Which geographic area did the project have an impact on and how? If it was a negative impact what measures were taken to correct it (if any)?
Chapter 2 Subchapter 2.4	The principle of having short-term and long-term orientation is not applied in project management	4. What are the short/long term benefits of the project (if any) and when were they/will they be realised?
Chapter 2 Subchapter 2.5	The principle of integrating values and ethics is not applied in project management	5. How does being an ethical individual differ from being an unethical one? 6. Does the organisation you work for have any value statements and ethical code of conduct/trainings and what are they? 7. Can you think of an instance where you were challenged ethically?
Chapter 2 Subchapter 2.6	The principle of integrating transparency and accountability is not applied in project management	8. Did the organisation's value and ethical code of conduct specifically highlight transparency and accountability? 9. How does the project promote transparency in the activities, decisions and reports of the project? 10. Can you give an instance where you were held accountable for a negative impact on the people, profit or environment? What were the reactive measures that were taken to curb the recurrence of this?
Chapter 2 Subchapter	The principle of reducing risk is not applied in	11. What were the interests of the different stakeholder groups and how

2.7	project management	<p>did you give equal consideration to all interests?</p> <p>12. Can you give an instance where the project consulted with stakeholder groups and built consensus before taking project related decisions?</p>
Chapter 2 Subchapter 2.8	The principle of stakeholder participation is not applied in project management	<p>13. Did the project have a risk register and what were the main categories of high impact risks that were pointed out?</p> <p>14. What were the economic, environmental and social risks that the project identified and what were the response actions planned?</p>
Chapter 2 Subchapter 2.9	The principle of using income and not capital is not applied in project management	<p>15. Did the project see loss in the productivity of any stakeholder group? What do you think were the reasons for the same?</p> <p>16. Can you point out an instance where the project consumed scarce resources?</p> <p>17. What sources were used to fund the project?</p>

Appendix 4 - Thematic guide.

Presented below are the global and basic themes on which data has been analysed.

I. Balanced or harmonised consideration of social, environmental and economic interests

- i. People Pillar
- ii. Planet Pillar
- iii. Profit Pillar

II. Local, regional and global orientation

- i. Local orientation
- ii. Regional/ Global orientation

III. Short-term and long-term orientation

- i. Sustainable improvement events
- ii. Strategic alignment
- iii. Short-term benefits
- iv. Long-term benefits

IV. Values and ethics consideration

- i. Values
- ii. Ethics
- iii. Ethical code of conduct and training

V. Transparency and accountability consideration

- i. Transparency
- ii. Accountability

VI. Risk Reduction

- i. Risk register
- ii. Preventive measures
- iii. Response actions

VII. Stakeholder participation

- i. Shared Value
- ii. Stakeholder engagement
- iii. Stakeholder consultation and decision making
- iv. Regulations and guidelines

VIII. Consumption of income and not capital

- i. People Pillar
- ii. Planet Pillar
- iii. Profit Pillar



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