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THE SUSTAINABLE Project Management CANVAS

Ron Schipper
Independent researcher
ron.schipper@aetsveld.nl

Gilbert Silvius
LOI University of Applied Sciences, Leiderdorp, Netherlands
Professor
mail@gilbertsilvius.nl

ABSTRACT

Sustainability is one of the most important challenges of our time and companies are integrating ideas of sustainability in their business operations. This integration requires change and projects as instrument of change are crucial to sustainable development. Integrating sustainability aspects into project management methodologies is a fast emerging field of interest. These methodologies suggest the development of a Sustainability Management Plan (SMP) as a document to reflect the sustainability perspective and necessary course of action for a project. But these methodologies hardly give any and support in deriving such a SMP. In order to provide a practical tool this paper presents a Sustainable Project Management Canvas that is suitable for practically helping a project manager and his project team to develop such a SMP.

1. Introduction

Sustainability is one of the most important challenges of our time. Our current linear business model turns raw finite materials into one time used consumer products which will then be left as (hazardous) waste. How can we cope if this business model is challenged when another 2 billion people will live at this planet and another billion people will move from the fields into mega cities becoming new mass consumers by the year 2050? Next to being a must, sustainable development is no longer only a philanthropic suggestion or compliance issue, but is also seen as a business opportunity to create value. Companies are integrating ideas of sustainability in their marketing, corporate communications, annual reports and in their actions.

Projects as instrument of change are crucial to sustainable development. Realizing a shift from a linear economy to a circular economy requires fundamental change in thinking, operation, cooperation and partnering between various lines of business and organizations. And change is most often realized through projects. This is why the concept of sustainability has more recently also been linked to project management. The literature reviews by **[32]** and **[19]** show an increasing number of publications on this relationship.

Sustainable project management integrates sustainability in one of the business processes of an organization, the one of temporary organizations delivering change. As a consequence sustainable project management will help realizing the (sustainability) strategy of the organization. Sustainable project management is based on a principle approach to sustainability according to various authors (**[8], [16]**). They define sustainability by specifying various sustainability principles giving more concrete meaning to the concept of sustainability and sustainable development. Examples of these principles are "balancing the short term and long term", "local and global", "transparency and accountability" and "eliminating waste", "reducing risks" **[32].** These principles are then to be operationalized at three levels: the project deliverable and its effects, the project delivery (e.g. the project resources and project activities) executed to deliver the project result, and the project management processes and project management products (like the business case, project plan, risk management strategy and stakeholder management approach) **[32]**.

From literature we can identify the core elements of sustainable project management **[37]**:

a) Having a people/planet/profit perspective in all aspects of the project **[30]**
b) Having a life-cycle perspective on the project, its delivered asset and the products produced with this asset **[16]**
c) Proactively engaging stakeholders **[7]**
d) Taking responsibility for sustainability by the project manager. **[30]**

The description of the core elements gives a high level overview of its essence, but practical application in a real project still remain unfolded. In order to establish good project management practice we observe that these core elements are more and more integrated into concrete project management methodologies like PRISM **[11],** Sustainable PRINCE2® in **[12]** and **[32].** These methodological adaptions from project management industry standards like PMBOK **[28]**, PRINCE2® **[23]** and ISO21500 help the project manager in taking the appropriate steps and obtaining the right information (covered in management products). Various authors take different approaches to the integration of sustainability. We observe a distinction between 'integrative' approaches and 'additional' approaches. **[29]** take an integrative approach. They intertwine sustainability in all existing management products, processes and activities. PRISM **[11]** takes an 'additional' approach, by adding a specific document called the Sustainability Management Plan to existing process. The goal of this SMP is to reflect the specific actions to be taken to reflect the sustainability perspectives and ambitions of the organization and the project at hand. Despite the approach taken, it is necessary and in essence all methodologies suggest the development of some form of a (separate or integrated) Sustainability Management Plan.

The identified methodologies hardly describe or provide tools to the project team to perform an analysis and development of an SMP. **[29]** describe a high level 4 step approach and PRISM gives no additional guidance except for the application of their P5 Analysis framework which mainly consist of an sustainability indicator framework. It is this observation where we think current sustainable project management execution has its shortcomings. The core goal of projects is to change the organization by analyzing, working together and creating and implementing deliverables. But from a sustainability perspective it's is not directly clear what tools are practically available to support the project manager and its team and stakeholders to shape projects from a sustainability perspective by the development of a SMP.

To summarize we can conclude that sustainable project management is an emerging field of study. It's conceptual understanding is quickly rising and is now being operationalized in various project management methodologies and its documentation. Despite this, practitioners are still struggling with concrete tools to support them when they are facing the challenge of a real live project. Therefore our research questions are:

1. Which current available tools is are suitable for practically supporting a project team in the development of a Sustainability Management Plan?
2. What are the requirements for a tool supporting the development of a Sustainability Management Plan?
3. Can we develop the perfect tool for practically supporting a project team in integrating sustainability into the project and its project management?

This paper is structured as follows. First we describe our research methodology. Our research is based on a literature review of all publications regarding tools for sustainable project management which help a project team with the development of a Sustainability Management Plan. We then analyze the identified tools according to a number of specified criteria . Next we describe the development of a new tool, the Sustainable Project Management Canvas. We finish this paper with our conclusions.

2. Methodology

This study is based on a literature review and analysis of publications that describe tools for the development of a Sustainabilit Management Plan. The literature review is followed by a conceptual design approach to develop a new tool that supports the development of a Sustainability Management Plan for a specific project.

For this, we fist analyzed the publications on tools for sustainability in project management, as documented by two recently performed literature studies: **[32]** and **[19].** We additionally searched for academic journals on the topic, using the Google Scholar that were published in 2014, as they were not included in the earlier mentioned overviews.

Our search was limited to tools for developing a Sustainability Management Plan. A tool doing should support this integration of sustainability at the level of project management, project delivery and at the project deliverable level. Therefore we left out publications on tools for performing a sustainability assessment. Assessment tools are techniques that can be used to make it easier to compare different project/policy alternatives **[10],** and also make decision-making easier, because they assess the sustainability impact of a certain project. These approaches won't help a project team designing and developing a Sustainability Management Plan. Therefore tools primarily focused on assessing sustainability like **[15]** or tools mentioned in **[22]** were left out.

We limited our analysis to academic journals, papers in conference proceedings, books and book chapters (peer reviewed). In total, the study analyzed 265 publications. We performed the analysis of the publications in two iterations. In the first iteration the publications were scanned (title only) for their use of the word 'tool'. Of these publications, only 11 included this word. None of these publications were taken into considerations because they were categorized as supporting a sustainability assessment or methodology approach only. In the second iteration we performed a qualitative approach to the results of the literature review. Two publications were selected. Before analysing these tools as described in the identified publications, first the relevant criteria for a suitable tools are derived.

Based on the criteria for a suitable tool, a new tool was designed.

3. Literature review on tools for sustainable project management

The goal of a Sustainabililty Management Plan is to define the actions to be taken to reflect the sustainability perspectives and ambitions of the organization and the project at hand. The GPM Handboek **[11]** defines a SMP as follows as shown in **table 1**.

In order to reflect the sustainability perspective of the organization and the project it is necessary to first analyse the corporate sustainability strategy (if available) and the project at hand. This would reveal those sustainability aspects which needs to be taken into consideration during the project. These aspects can both be positive (a project can make a positive contribution to a sustainability aspect) or negative while the project has a negative impact on a sustainability aspect just because of executing the project. In both situations it has to be determined if and how a course of action must to be defined for the project. For the analysis and defining the course of action a Sustainability Management Plan should be developed during the initiation phase of the project (**[11]** and **[29]**). A SMP from **[11],[3]** is outlined in **table 1**.

Table 1 shows that the SMP defines what aspect needs to be taken into consideration, but gives no support to determine and defining the necessary course of action to reflect these aspect in the project.

There's been a substantial and ongoing growth in numbers of sustainable tools and instruments available on the market **[17]**. In **[29]** it was discovered that only very few tools are specifically designed for the intersection of sustainability, projects and project management. From the performed qualitative literature review we identified the following tools.

Sustainable GWW (**www.duurzaamgww.nl**) is a Dutch best practice for considering and implementing sustainability aspects of infrastructure projects from the early planning phase of the project, with a focus on the whole life-cycle of the infrastructure object. It consists of 6 step approach to identify, realize and account for opportunities of sustainability in these

Component	Description
Summery	A brief outline of how sustainability touches the project and what the key measures are in the project and how they will be measured and maintained.
The Project Sustainability Objectives Section	Outline the methods that will be employed and how they tie to organizational goals and standards. Here the key objectives can be realized and then the total scope of work clearly understood.
Key Measures and Performance Indicators	Qualitative and Quantitative Measures) just as outlined in the impact analysis
Key Performance Indicators Environmental:	– Energy – Waste – Transport – Water Usage – Materials and Resources
KPI Financial	– Return on Investment – Business Agility
KPI Personal	– Labour Practices and Decent Work – Human Rights – Society and Customers – Ethical Behaviour
KPI Products	– Lifespan of Product – Servicing of Product
KPI Processes	– Maturity of process – Efficiency and fairness of process
Environmental Impact Assessment results.	A summary of the planned environmental impact and steps that will be taken to decrease the effects or increase the opportunities identified
Scope Exclusions	Any known areas that the plan will not include, if any.
Sustainability Risk Management	Methods explained as to the approaches to identification, analysis and response to sustainability risks within the project being used.
Reviews and Reporting	Steps to take in a project audit regarding sustainability and how sustainability metrics will be reported throughout the project

TABLE 1. *Overview over GPM Sustainability Management Plan (GPM manual, 2012)*

infrastructure projects. It is accompanied with 4 tools and a knowledgebase of various helpful documents. One very useful tool is the context scan (in dutch 'omgevingswijzer') with consists of sustainability topics and associated questions regarding the (positive or negative) effect of the topic on the project. Applying this tool, together with all stakeholders, creates a spider web of the sustainability aspects of a projects and aligns the goal and mind setting of them. The other tools are the AmbitionWeb, which graphically reflect the ambition of the project and DuboCalc to calculate various alternative solutions of ecological impact. The benefit of the tool is that it is free available and fairly easy to use, although it needs expertise to facilitate the stakeholders sessions and discussion about the sustainability aspects. It does not take into account that sustainability thinking

Another specific sustainable project management tool is Sustainable Project Management Maturity Model (SPM3) from **[31]**, **[34]**. This maturity model is suitable for both "assessing and developing the organizational capability of integrating the concepts of sustainability in projects and project management". It breaks down the domain of sustainability from the triple bottom line perspective into a set of sustainability indicators. The maturity levels are described from a level of influence perspective in **[31]**: the level of resources, business processes, business model and the product. The authors elaborate this in **[34]** to the maturity levels of being: compliant, reactive, proactive and purpose. In their approach each sustainability indicator is assessed with respect to the project management process and the project deliverables. For each indicator both the current situation and a desired state are being discussed with project representatives.

These two publications answer the first part our first research question 'Which current available tools are suitable for practically supporting a project team in the development of a Sustainability Management Plan?'

We now would like to analyze these identified tools. Therefore we first derive a set of criteria to assess whether these tools support a project team and its stakeholders with the development of a Sustainability Management Plan. The criteria are based on our understanding of sustainable project management and experience as practitioners in using tools. We define these as follows based on two aspects: usability and knowledge. **Table 2** describes the criteria and also answers our second research question "What are the requirements for a tool supporting the development of a Sustainability Management Plan".

	Aspect	Criteria	Origin
1	Usability	A tool should be visual, compact, self-supporting and making sustainability practical to the team	Based on for example the success of sustainable GWW
2	Usability	A tool should connect to the experiences of its target audience (project managers).	Practitioner experience
3	Usability	A tool should be able to facilitate a process for the identification of opportunities for sustainability in the project among various stakeholders	This requirements finds its origin in third core element of sustainable project management (stakeholder engagement)
4	Usability	A tool should be generic in design, but it should be able to tailor it to its specific context if necessary	Sustainability is context specific [20]
5	Knowledge	A tool should reflect sustainable development concepts in order to guide the conceptual thinking of the project team.	This criteria is based on the first core element of sustainable project management (TBL in all project aspects)
6	Knowledge	A tool should distinguish between project management processes, project delivery processes and the project products (deliverable)	This criteria is based on the first core element of sustainable project management (TBL in all project aspects).
7	Knowledge	A tool should contain all placeholders for the Sustainability Management Plan	This criteria is based on our research question.

TABLE 2. *Criteria for tools supporting the development of a SMP*

In **table 3**, the two identified tools are confronted with these criteria. From this we can conclude that no tool matches all criteria to the full extend.

Now we can answering our first research questions. We identified two tools for practically supporting a project team in the development of a Sustainability Management Plan. But both tools do no met the criteria to full extend. Therefore the third research question is still relevant: "Can we develop the perfect tool for practically supporting a project team in integrating sustainability into the project and its project management? We will answer this question in the next section.

4. Results

The tool and its name, the Sustainable Project Management Canvas (SPMC), is inspired by a popular business modeling tool, the Business Model Canvas **[25]**. The Business Model Canvas (BMC) is popular among business consultants and (senior) management because of its visualization, compactness and easy to use attractiveness. The BMC focuses on 9 core elements relevant to any business model: key partners, key activities, key resources, value propositions, customer relationships, channels, customer segments, cost structure and revenue streams and key questions associated to each placeholder. These core elements are defined and titled with meaning full names to the practitioner. We could say 'the tool speaks the language of the practitioner'.

	Criterium	Sustainable GWW	Sustainable Project Management Maturity Model (SPM3)
1.	A tool should be visual, compact, self-supporting and making sustainability practical to the team	Yes	Yes
2.	A tool should connect to the experiences of its target audience (project managers).	Yes	Partly
3.	A tool should be able to facilitate a process for the identification of opportunities for sustainability in the project among various stakeholders	Yes, the supporting tools facilitate this by the formulation of questions and suggestions with respect to infrastructure specific topics. Also knowledge documents describing possible opportunities are part of the tool.	Yes, this is done through the provision of a list of indicators applied to both the project process and the project deliverables.
4.	A tool should be generic in design, but it should be able to tailor it to its specific context if necessary	Yes	Yes, this can be done by indicating the relevance of an indicator
5.	A tool should reflect sustainable development concepts in order to guide the conceptual thinking of the project team.	Partly	Partly, because it does not explicitly reflect all important sustainability concepts.
6.	A tool should distinguish between project management processes, project delivery processes and the project products (deliverable)	Partly because the tool does not really addresses the project management processes.	Partly, because it makes this distinction at a high level, but the tool does not explicitly support the more detailed level.
7.	A tool should contain all placeholders for the Sustainability Management Plan	Partly, the tool does not include scope	Yes

TABLE 3. *Current tools match against requirements for suitable tools*

The fundament of the SPMC must therefore be built on the body of knowledge of the target audience: the project manager and his team. One part of the SPMC must consist of placeholders with recognizable projects and project management elements such as project goal, scope and deliverables. We observed earlier that current sustainable project management methodologies (e.g. PRISM, Sustainable PRINCE2®) hardly support the development of a SMP with tools and (Silvius et al., 2012) observed that current global recognized industry standards on project management (PRINCE2®, ISO21500, PMI) fail to address sustainability. Also the professional competence baselines like ICB and PMBOK hardly acknowledge the specific knowledge required to have a sustainability perspective **[33]**. Because these institutional documents do not encompass sustainability, it is fair to presume that the majority of professional project managers have little knowledge on sustainability and sustainable development. Without this knowledge it will be very difficult for the project manager and his team to develop an accurate SMP.

For this reason it is necessary to extend the SPMC fundament with knowledgeable guidance on sustainability and sustainable development. We can distinguish sustainable development concepts like the Brundlandt definition, the Triple Bottom Line (TBL) and Life Cycle Management. These concepts gives the practitioner an important mind-set in thinking and reasoning, but these concepts are lacking in making sustainability and sustainable development more concrete and practical. This is necessary in order to apply these concepts to a project. The TBL concept for example states that there should be "a balance between economic, environmental and social perspectives". But what encompasses environmental sustainability? Scare resources, ecological services of our nature, spatial planning, hazardous waste or noise? Indicator sets or frameworks are usually developed to make concepts more practical **[31]**. Within the indicator list of for example **[34]** we can identify two types of indicators. One indicator type describes the objects to which a general concept sustainable development applies. For example Sustainable Environment, derived from the TBL concept is defined by indicators like 'material' and 'resources'. A second type of indicators already reflect the practical application of a general sustainable development concepts, e.g. "reusability" and 'flexibility'. It is not entirely clear (yet) whether these are design errors or an inevitable effect. It's our observation that one would need both knowledge aspects to obtain al full picture of all possibilities. Therefore we extend the fundament of the SPMC with two knowledge components: the sustainable development concepts and a list of sustainability indicators. The sustainable development concepts help the team in thinking conceptually in the right direction, where the indicator set breaks sustainability down into easy to catch chunks and serves as a function like the Context Scan of the earlier discussed Sustainable GWW tool. This will give the team using the canvas a very clear guidance at the sustainability topics that might need to be taken into account in the project. While not every indicator is relevant to the specific context of the organization or project, the indicator list can be tailored to a specific branch or project domain by selecting appropriate branch related indicators.

One of the other aspects of the Business Model Canvas is that each placeholder is accompanied with key questions. This implies that also the SPMC needs to formulate key questions to each placeholder, reflecting the questions from a sustainable development perspective in mind. These questions are derived from the sustainable development concepts, sustainability indicator list or a combination.

To summarize the Sustainable Project Management Canvas consists of three parts:

- Project Management Canvas with key questions from a sustainable development perspective
- Sustainability Indicator list
- Sustainable Development Concepts

Below each part and its origin and derivation is described into more detail.

Part A: Sustainable Development Concepts

The aim of the Sustainable Development Concept is to set the project manager and his team using the Sustainable Project Management Canvas into the right thinking modus. A publication showing the results of a literature review on the main concepts on sustainability is currently lacking in academic research. Nevertheless we are convinced that the following should definitely be part of them: The definition of sustainable development by the Brundtland Commission, the Triple Bottom Line concept from John Elkington, life cycle management, the circular economy concept, the notion of shared value from Porter and the maturity levels based on Willard. These will be described below.

The UN 'World Commission on Development and Environment', named the *Brundtland Commission*, defines sustainable development, in their report "Our Common Future", as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" **[36]**. By stating that "In its broadest sense, sustainable development strategy aims at promoting harmony among human beings and between humanity and nature", the report implies that sustainability requires also a social and an environmental perspective, next to the economical perspective, on development and performance.

The visions that none of the development goals of economic growth, social wellbeing and a wise use of natural resources, can be reached without considering and effecting the other two, got widely accepted. In his book "*Cannibals with Forks: the Triple Bottom Line of 21st Century Business*", John Elkington identifies, this as the 'triple bottom line' or 'Triple-P (People, Planet, Profit)' concept:

Sustainability is about the balance or harmony between economic sustainability, social sustainability and environmental sustainability **[6]**.

The Brundtland definition links the time dimensions of short term and long term. This notion is also the basis of the concept of life cycle analysis (and management) and the Cradle to Cradle concept **[21].** Life Cycle Analysis observes the impact of a product from obtaining the raw material, through its production, use and finally disposal. The impact is expressed in for example a CO2 Footprint metric. From that information one can then make smarter design decision, which is the key statement from **[21]:** "we don't have a waste problem, we have a design problem"

The Cradle to Cradle concept transforms the linear based economy into an business model where products are designed such that their waste after (re)use is input to other business streams. This creates a circular economy. The circular economy "refers to an industrial economy that is restorative by intention; aims to rely on renewable energy; minimizes, tracks, and eliminates the use of toxic chemicals; and eradicates waste through careful design." **[18]**. There are five circular business models that **[1]** has been identified:

- **Circular Supplies**: Provide renewable energy, bio based- or fully recyclable input material to replace single-lifecycle inputs
- **Resource Recovery**: Recover useful resources/energy out of disposed products or by-products
- **Product Life Extension**: Extend working lifecycle of products and components by repairing, upgrading and reselling
- S**haring Platforms**: Enable increased utilization rate of products by making possible shared use/access/ownership
- **Product as a Service**: Offer product access and retain ownership to internalize benefits of circular resource productivity

Life Cycle Management, Cradle to Cradle and the Circular Economy tend to focus on physical materials and products. **[27]** observes that in recent years business has been viewed as a major cause of social, environmental, and economic problems. He states that companies must take the lead in bringing business and society back together by applying the concept of shared value. This involves creating economic value in a way that also creates value for society by addressing its needs and challenges **[27]**. A good example of this alternative perspective is the fair trade movement in purchasing. Fair trade is mostly about redistribution, by offering higher prices to farmers, rather than expanding the overall amount of value created. A *shared value* perspective would focuses on improving knowledge and skills (like growing techniques) and strengthening the local suppliers in order to increase farmers' efficiency, yields, product quality and sustainability. This leads to a bigger pie of revenue and profits that benefits both farmers and the companies that buy from them.

[35] describes five 'sustainability stages' a company can be in. The stages move from reactive to proactive and describe to what extent a company is committed to sustainability principles. The first stage is when companies fail even to comply with prevailing regulations. They are opportunistic and not engaged with the concept of sustainability . When a company complies with all environmental and social regulations it moves up to stage 2, 'compliance'. In stage 3 'beyond compliance' a company starts to not only react on regulations, but it starts introducing sustainability activities. Yet, these activities are not concerted but are carried out in different departments. Companies who understand the importance of sustainability and the value-added they can gain from sustainable activities e.g. energy-efficient production or eco-friendly products and integrate sustainability into their corporate strategy are in stage 4 'integrated strategy'. The highest stage 5 'purpose and passion' is attained when companies are not just driven by profits but also by a sense of responsibility to improve society and environment and contribute to a better world. **[34]** have translated these into a 4 level maturity or ambition level: compliant, reactive (reduce the negative impact of a sustainability aspect), proactive (make a positive contribution to a sustainability aspect) and purpose meaning that making a contribution to (a certain aspect of) sustainability is one of the drivers behind the project and sustainability considerations are included in the justification of the project.

These above described concepts differ in nature but form a coherent set. The sustainable development definition gives a philosophical view on the future. It has been made more practical by the Triple Bottom Line definition of John Elkington. Where the circular economy is a concrete concept mainly oriented at the world of physical materials and environmental aspects, shared value has a more social orientation. Finally the sustainability stages or maturity levels give direction to the ambition of the organization or project. Bringing them all together provides into one tool gives the user enough angles and visionary conceptual thinking to be up most creative in thinking about solutions.

Part B: Sustainability Indicators

Another aspect of the tool is to show the understanding of the field of interest: sustainability. Several organizations have developed frameworks of 'sustainable development indicators' (SDIs), both as a way of measuring and evaluating (proposed) actions, as a way of communicating this information **[2]** and to make it more applicable. In fact in the literature on these models we find many different approaches and case studies **[24]**. Only a limited number of these SDI frameworks are considered a de-facto international standard. The most influential are the UN Global Compact framework, the ISO 26000 guideline on social responsibility, the GRI Sustainability Reporting Guidelines and the Dow Jones Sustainability Indexes.

Next to these industry standards, academic publications also provide suggestions for sustainability indicators **[34]**. For example, Baumgartner and Ebner (2010) identify 21 'aspects' of sustainability. The 2010 IPMA Expert Seminar 'Survival and Sustainability as Challenges for Projects' featured several papers and discussions on the integration of sustainability in projects and project management. The report of the seminar included a 'checklist' of sustainability aspects of projects, that was derived from the GRI G3 guidelines **[14]**. Also several case studies from the practice of real-life projects provide an identification of indicators of sustainability specific to the context of these cases. For example, the organizations responsible for the development of the new Vienna hospital north, published a 'charter on sustainability', that presents 31 sustainability criteria that cover both the planning and construction phases of the hospital, as well as the 'manage and maintain' phase, when the hospital will be in operation and the building of the hospital itself.

Specialists question whether or not a common list is even possible, given the wide variety of conditions and the differences in values in different contexts **[13]**. We therefore conclude that a tool on sustainability in projects and/or project management should be configurable to the characteristics and context of the project at hand.

The Sustainability Indicators from **[34]** contains indicators from all the above mentioned sources (academic, case studies, industry standards) and is supposed to be generic and a very complete list. A short overview of the Sustainability Indicator list is presented in **table 4**.

The Sustainable Project Management Canvas therefore uses this indicator list to identify the relevant sustainability aspects of the project which need to addressed or to which a contribution can be made to.

Part C: The Project Management Placeholders and key questions

The fundament of the SPMC consists of the placeholders representing the project and project management processes. As described earlier, one of the main requirement for these placeholders is that they need to address the experiences of the target group. They have to be formulated in 'the language of the project manager". Another important requirement is that placeholders (and its key questions) have a clear relationship with Sustainability and the Sustainability Management Plan.

[32] identify and describe 15 areas of impact of sustainability on the practices of project management. These impact areas are an important first start

	Indicator	*Description*
Economic Sustainability	Return on Investment	Return on investment (ROI) refers to the creation and distribution of economic value as a basic indication of how the project creates wealth for all stakeholders.
	Business Agility	The competence to be flexible or agile is an important economic value in modern society. Business agility refers to the extend in which flexibility is possible in the project delivery, the deliverable and the business effects.
	Competitive potential	Competitive potential arises when an organization acquires or develops (through projects) an attribute or combination of attributes that allows it to outperform its competitors.
	(Business) Continuity	Business continuity is about ensuring that an organization's critical business functions will continue to operate and about change or adapting business functions and the business model of the organization, in case of changing circumstances or conditions.
	Motivation and incentives	Motivation is the reasons for human actions, desires, and needs
	Risk reduction	Risk is the potential of losing something of (potential) value.
Environmental Sustainability	Transport	Transport is about the movement of physical objects from one place to another and important it imposes environmental impacts
	Energy	Energy is related to greenhouse gas (GHG) emissions and to scarcity of their origins (e.g oil).
	Water	Approximately one billion people still lack access to safe water and over 2.5 billion lack access to adequate sanitation. Withdrawals from a water system can affect the environment. Therefore the effect of the project on water sources and the source of the water used (rain water, potable water) are important aspects to consider.
	Eco system	An ecosystem is a community of living and provides a variety of goods and services upon which people depend.
	Waste and Packaging	The disposal of products and packaging materials at the end of a use phase is a steadily growing environmental challenge. Establishing effective recycling and reuse systems to close project and product cycles contributes significantly to increased material and resource efficiency.
	Materials and resources	Materials and resources can impose environmental burdens they become toxic during the project, projects use scare materials, or the project requires extra energy during the project to turn it into a project deliverable.
	Emissions	During the production of materials, emissions such as greenhouse gasses (GHGs) are produced as side effect. GHG emissions are a major contributor to climate change.
	Spatial planning	Regional/spatial planning gives geographical expression to the economic, social, cultural and ecological policies of society.
	Nuisance	Nuisance describes an activity or condition that is harmful or annoying to others during or after project activity
Social Sustainability	Labor practices and decent work	Fair labour practices and decent work is the availability of employment in conditions of freedom, equity, human security and dignity.
	Human rights	Human rights covers the extent to which processes have been implemented, incidents of human rights violations, and changes in stakeholders' ability to enjoy and exercise their human rights.
	Ethical behaviour	Ethical behavior, consisting of anti-competitive behaviour, anti-trust, and monopoly practices must ensure a level playing field for customers (and supplier)
	Society, customer and product responsibility	Society, customer and product responsibility concerns with impacts caused by project activities, project results and their effects on customers, society, local communities and other stakeholders.
	Participation	Participation is about the involvement of stakeholders, suppliers and customers with respect to the sustainability aspects of project's and their results.
	Human capital development	Human capital refers to the collective value of the organization's intellectual capital. This capital is the organization's constantly renewable source of creativity and innovativeness (and imparts it the ability to change) to meet strategic targets in a changing work environment.
	Corporate governance	Governance broadly refers to the mechanisms, processes and relations by which corporations and projects are controlled and directed.

TABLE 4, *Indicators of sustainability (based on Silvius and Schipper (2015))*

point for our analysis because they describe the intersection of sustainability and project management. We fist analyze the coverage of these impact areas towards the Sustainability Management Plan and the Project Management Products from PRINCE2®. PRINCE2® was chosen as the reference project management methodology because it often used by the project management community. The comparison is described in **table 5**.

From **table 5** we can conclude that there is no 1 on 1 relationship between the impact areas, the referred Sustainability Management Plan and PRINCE2®. As shown, not all recognizable regular project elements like the project goal or scope are covered by an impact area. We can also observe that not all impact areas are part of the Sustainability Management Plan. If the

	Impact Area From (Silvius, Schipper, 2014)	GPM SMP	PRINCE2® Management products
1.	Context	Best fit 'Summary'	PID – Project Definition - Background
2.	Identification of stakeholders	Not addressed	Communication plan
3.	Projects specifications/requirements/deliverable/quality criteria	KPI Products	Project Plan – Product descriptions
4.	Business case/cost/benefits	KPI Financial	PID - Business Case
5.	Dimensions of project success	Not addressed	Not addressed
6.	Selection and organization of project team	Not addressed	PID – Project Management Team structure Project Plan – Allocated team members
7.	Project sequencing and schedule	KPI Processes	PID - Project approach Project Plan – Appendix Gannt Chart
8.	Materials used	KPI Ecological	Not explicitly addressed
9.	Procurement	Not addressed	Not explicitly addressed
10.	Risk identification and management	Risk Management	Risk Management Strategy and Risk Register
11.	Stakeholder involvement	Not addressed	Communication plan
12.	Project Communication	Not addressed	Communication plan
13.	Project reporting	Reviews and project reports	High Light Report, End of Phase Report, End of Project Report
14.	Project handover	Not addressed	Process ' Closing a Project'
15.	Organizational learning	Not addressed	Lessons Learned Project Plan – Lessons Learned Process ' Closing a project'

TABLE 5, *Relationship between impact area' s, SMP, PRINCE2® and SPMC Placeholder*

recognizable project management elements are not included in the canvas, we can expect that the project managers will not recognize the tool as feasible for developing a SMP.

How can we construct a recognizable and valuable project management canvas? For this we follow a 4 step approach

1. Selection of the initial project management placeholders from PRINCE2® to have a recognizable fundament for the canvas
2. Identify the already covered impact area's and discuss the feasibility of not yet covered impact areas. This results in a final list of placeholders
3. Define appropriate placeholder names
4. Formulate placeholder questions.

Step 1: Select initial project management placeholders

The Project Initiation Document is the main deliverable of the project manager during the initiation phase of a project. Therefore from all available PRINCE2® management products we have taken the Project Initiation Document (PID) and the Project Plan for the identification of appropriate placeholders. Each project management document is described via a table of contents. We analyzed the table of content in order to derive the initial placeholders. All elements from the table of content which do not refer to the content wise shaping and development of a project. With content we mean: references to the project result, the way the result is produced (delivery) and information about understanding the project. So, items referring to controlling the project (like issue management, quality management, configuration management and also reporting) or communication were left out. These aspects are of course important to successfully executing a project but have no direct relationship to the content of a project. **Table 6** describes our initial selection of items from these documents.

Merging these two lists results in an initial list of placeholders from the project management perspective: Project Background, Project Goal, Scope, Assumptions and Prerequisites, Users and other stakeholders, Project Approach, Business Case, Time, Lessons learned, Allocated resources, and Product Descriptions.

Step 2 Identify the already covered impact area's and discuss the not yet covered impact area's

This initial placeholder list already covers for 7 impact area's as we can identify from **table 5**. These are: Context, Identification of stakeholders, Project sequencing and schedule, Business case/cost/benefits, Organizational

From the PID we selected:	From the project Plan we selected
Project background	Plan description
Project goal	Prerequisites
Scope	Plan assumptions
Assumptions	Leaning points / previous lessons learned
Users and other stakeholders	Time and budget
Project approach	Allocated resources
Business Case	Product descriptions
Not selected	Not selected
Interfaces, while these are only relevant for the aligning of the project with other projects.	External dependencies, while these are only relevant for the aligning of the project with other projects.
Project Management Team while this is about the control of the project.	Progress and Control, while this is about control of the project
Management strategies while these discuss the control of the project.	Tolerances, while this is about control of the project
Control instruments while these discuss the control of the project.	

TABLE 6. *Initial selection of placeholders for the SPMC*

learning, Selection and organization of project team, Projects specifications/ requirements/deliverable/quality criteria.

As we have already covered the initial placeholders from the project perspective we now have to decide what additional placeholders have to be created in order to reflect relevant sustainability aspects. The coverage of 7 impact area's implies that from 8 other impact area's we have to decide whether they should be included in the canvas. This is discussed in **table 7**.

Step 3: Define appropriate placeholder desciptions names

From the above we can now summarize the integral fundament of the project management canvas and define appropriate placeholder names. This naming is to some extend an arbitrary choice, mainly based on relevance and

	Impact area?	Include?
1.	Stakeholder involvement	Stakeholder engagement is important in in sustainable development . Several authors (for example [26]; [8]) emphasize the importance of stakeholder participation in projects. According to the ISO 26000 guideline, proactive stakeholder engagement is one of the basic principles of sustainability (International Standards Organization, 2010). Also [7] link sustainable development, projects and the role of stakeholders, and conclude that there is a need "to incorporating stakeholders and their interests in more project management activities" [7]:45. Sustainable project management would imply to involve stakeholders proactively in project activities. Stakeholders are split into two containers: stakeholder segments and stakeholder involvement. The stakeholder involvement describes how each of these stakeholder segments will participate in the project.
2.	Dimensions of project success	Integrating sustainability into the project implies that the definition and perception of project success take into account the 'triple bottom line' of economic, social and environmental benefits, both in the short term as in the long term. This implies that the success of the project is assessed based on the life cycle of the project and its outcome [26]; [5]. But from the description of sustainable project management we can derive that also other success criteria of project management will be positively addressed. Examples are stakeholder satisfaction and preparing the organization for the future. The current standards for project management reflect a narrower perception of project success. PRINCE2® mentions six project performance variables. These variables do not mention sustainability aspects explicitly, but they may be included in performance variables quality and benefits. Therefore the container ´Success´, describing the attributes of project success is added to the canvas.
3.	Materials used	Material used is obviously important aspect of sustainability in projects and is also part of the SMP (via the KPI Environmental) and therefore cannot be neglected in the canvas.
4.	Procurement	The processes of procurement give an important opportunity to integrate sustainability into a project, for example by appreciating the sustainability performance of a supplier in its own delivery process or product. But in more general terms opportunities for sustainability rise from the partnerships with and between suppliers, competitors, NGO's and other stakeholders. These partnerships not always directly related to a specific project but project can certainly contribute to these partnerships. For the goal of the project management canvas we would combine these partnerships with the result of the procurement process, the selection of a vendor for the specific project.
5.	Risk identification and management	Risks are an important element for project managers. [32] identified risk reduction as one of the main principles for sustainability and conclude that the integration of sustainability requires the assessment (and management) of risk to evolve. Therefore we can conclude that risks need to be part of the canvas.
6.	Project Communication	Not selected because project communication does not refer to the shaping and development of the project content as described earlier
7.	Project Reporting	Not selected because project communication does not refer to the shaping and development of the project content as described earlier
8.	Project Handover	Project handover describes how the project actually provides value to the organization and its environment by implementing its deliverables into that organization. Therefore these were added to the initial list.

TABLE 7. *discussion of not yet covered impact area's*

Project Management fundament to canvas	Covered Impact Area	Placeholder name
Project Background	Context	Background & Context
Project goal,		Goal
Scope		Scope
Assumptions and Prerequisites		Assumptions and Prerequisites
Users and other stakeholders	Identification of stakeholders	Stakeholder Segments
Project Approach		Approach
Business Case	Business case	Costs
		Benefits
Time	Project sequencing and schedule	Activities
		Milestones
Lessons learned	Organizational learning	Implementation
Allocated resources	Selection and organization of project team	Resources
Product Descriptions	Projects specifications/requirements/ deliverable/quality criteria	Deliverable
	Not by project management elements covered impact area's	
	Dimensions of project success	Success
	Materials used	Resources
	Procurement	Participants and suppliers
	Risk identification and management	Risks
	Stakeholder involvement	Stakeholder involvement
	Project handover	Implementation

TABLE 8. *naming the placeholders.*

recognition to the project management community. In two cases we decided to combine multiple items into one placeholder. This concerns ' materials used' and 'selection and organization of project team' while these both refer to a single aspect: resources. Also ' organizational learning' and ' project handover' are combined to a general placeholder 'implementation" while these are so closely related to that aspect. in two cases we decided to split an item into two placeholders. This concerns the business case (split into well-known elements of costs and benefits) and 'Project sequencing and schedule' (split in well-known elements activities and milestones). The full list is presented in **table 8**.

If we combine **table 5** (relationship between impact areas and SMP) and **table 8** (summary of all placeholders of the SPMC) we can identify only one element the SMP is not part of the SPMC, which is project reporting. But the SPMC contains 7 more placeholders then the SMP. Next to that, the SMP refers to a limited number of indicators, where the SPMC refers to about 24 indicators and 80 variables. So we can conclude that the SPMC covers for the SMP.

Step 4: Formulate placeholder questions

Each placeholder is provided with one or more supporting questions. These questions are formulated from a sustainability and sustainable development perspective. Therefore we take the sustainability concepts and indicators to a certain extend into consideration. For example in the placeholder "Goal" we formulate the question "How can the project make a positive contribution to sustainable development of the organization". This question is based on the ambition levels earlier described where a distinction is made between being compliant, reduce negative effects or make a positive contribution. We aim to make these questions reflect the biggest ambition

	Placeholder	Description	Placeholder Questions
1.	Background /Context	Describes the organizational and societal context from a sustainable perspective.	What are sustainability issues of the organization? What are the sustainability goal, strategy and themes of the organization? How can the project make a positive contribute to them? What is the potential (positive/negative) impact of the project on society?
2.	Goals	The desired result that the envisions, plans and commits to achieve	What could be the economic, environmental and social goals of the project? How can the project make a positive contribution to sustainable development of the organization. How can a shared value for both the organization and society be formulated?
3.	Scope	The work that needs to be accomplished to deliver a product, service, or result with the specified features and functions	How could the scope easily be set to address and reflect societal (environmental or social) impacts of the organization?
4.	Success		How is the success of the project defined? • Managing the TBL perspective of project delivery? • Satisfaction for all identifiable stakeholders? • The deliverable is a solution to the problem from all TBL perspectives? • The project can meet the business case (more) easily? • The project prepares the organization (of its community) for the future?
5.	Assumption & Prerequisite	Assertions about some characteristic of the future that underlies the current operations or plans of the project	What assumptions can be identified from an economic, ecological and social perspective positioned on the interacting life cycles?
6.	Participants / Suppliers	Describes suppliers and partners (industry or NGO).	How can you involve suppliers regarding the environmental and social aspects of their resources, production process and their deliverable? How can you use or strengthen the (sustainability) partnerships of your organization in this project
7.	Project Approach	The approach the project will take to deliver its results	How can your delivery approach reduce negative impact of this delivery process or/and make a positive contribution?
8.	Activities	The main activities that needs to be done	How can you integrate social aspects of sustainability into key activities (fair laborship, health and safety,…) How can you integrate the sustainability indicators of the organization into your daily project operations How can you engage in Human Capital development of your team before and during the project (training, coaching, best fit in project task assignments)?
9.	Resources	The main resources (being physical or human) used for the projects	What are the economic, environmental and social aspects of the resources to be used in the project? How can you, by the selection of resources reduce a negative impact or make a positive contribution?
10.	Deliverables	The tangible results the project will deliver	What are the economic, environmental and social aspects and impacts of the deliverable and its use and disposal? How can the deliverable be designed such that a negative impact is reduced or a positive contribution is made? Can the deliverable create a shared value for both the organization and society? How is the exploitation and decommissioning phase taken into account? How does the deliverable prepare the organization for the future?
11.	Milestones	Milestones are used to mark major progress points that must be reached to achieve success along a project timeline.	Can you indicate when (positive or negative) impacts to society will take place in future
12.	Risk	An uncertain event or condition that, if it occurs, has a positive or negative effect on a project's objectives	What are the economic, environmental and social risks for every stakeholder related to the project including the use and disposal of the project deliverables
13.	Cost	The sum of cost associated with the spend resources necessary to produce the project's deliverables.	What are the economical, (qualitative) environmental and (qualitative) social (TBL) costs of the project? What are the economic, environmental and social life cycle costs of the project's deliverable (the asset)? What are the TBL life cycle costs of the products produced by this asset?
14.	Benefits		What are the economical, ecological and social benefits of the projects for the organization? What are the economical, ecological and social benefits of the projects for the society (e.g. environmental services restoration of preservation, strengthening of social community,….)
15.	Stakeholder segments	A stakeholder is any person or organization, who can be positively or negatively impacted by, or cause an impact on the actions of the project. Stakeholder segments is the logical grouping of these (individual) stakeholders along some criteria.	Who will represent future generations? Who are environmantal or societal stakeholders. Who will represent them?
16.	Stakeholder involvement	Stakeholder relationships is the way the project interacts with their stakeholders and addresses their expectations and agreed objectives.	How can the project stimulate a proactive dialogue with its stakeholders? What would you need to do in order to manage the project " for" the stakeholders ? How can you ensure that communication is always transparent to all stakeholders?
17.	Implementation	Implemention describes how the results of the project are integrated in the daily routines of the organization.	How can the project implementation help the organization to prepare for the future? How can the project contribute to the learning ability and actual learning of the organization? How can the project contribute to the Human Capital Development of its team members (training, organizational roles for project team member after the project)?

TABLE 9. *The containers and the questions from the sustainable project management canvas*

possible because this will trigger the creativity of the persons involved. All placeholders and their definition and questions are described in **table 9.**

Visualization

An important aspect of the success of the Business Model canvas is it easy to understand and visual use of the canvas. One can easily print it on (A0 format), put it at the wall and use it as a structure to guide a team discuss in but also to document the preliminary results of that discussion.

The core of the picture, presented in **Figure 1**, is about the sustainable project management placeholders, and is surrounded by the sustainability

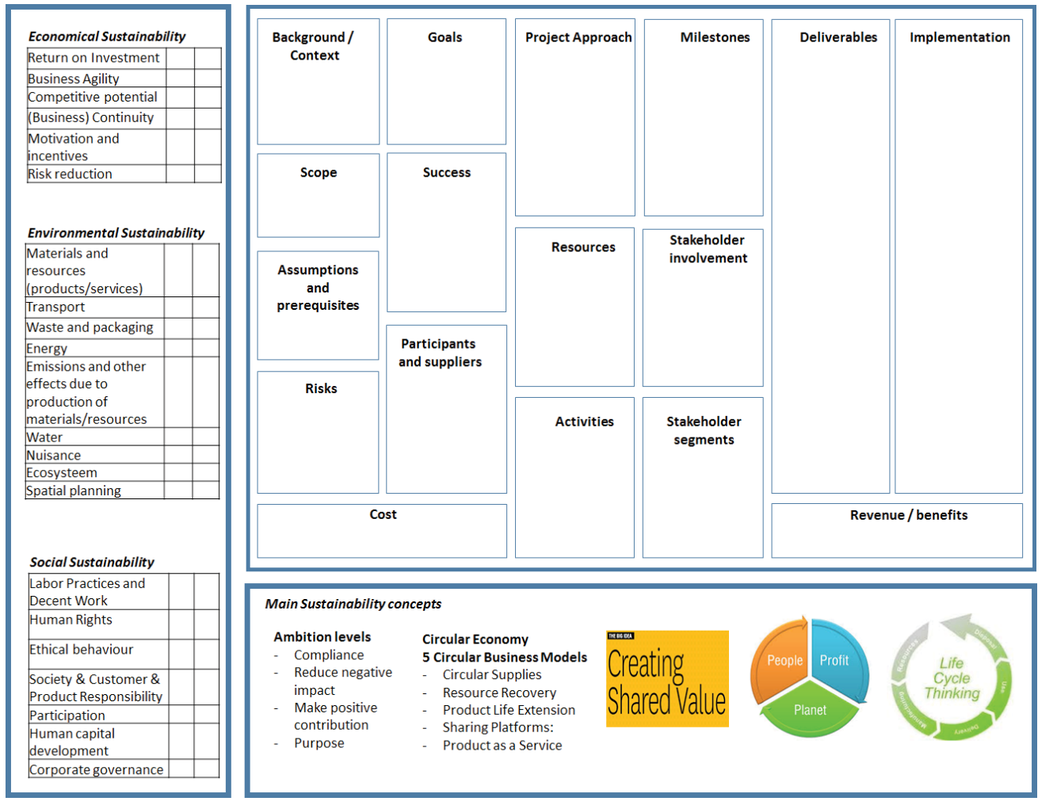

FIGURE 01. *The Sustainable Project Management Canvas*

concepts and the sustainability indicators. For readability reasons, the placeholder questions (as formulated in **table 9**) were left out.

5. Conclusion

It was discussed that although sustainable project management is an emerging field of interest, not many cases and tools are available for guiding the realization of a Sustainability Management Plan which is an important part of evolving sustainable project management methodologies. In order to develop a suitable tool, first a set of requirements for such a tool was derived. After that a tool for analyzing the sustainability aspects of a project was developed: the Sustainable Project Management Canvas . The tool is built upon three parts: the most important sustainable development concepts, a sustainability indicators set and a project management canvas with key questions from a sustainable development perspective. We concluded that the SPMC covers for all elements and more of the Sustainability Management Plan. There is one exception, the SPMC does not cover for Project Reporting.

In **table 8** we confront the original tool criteria with the SPMC tool. From this table we can conclude that this tool should be suitable for it purpose: facilitating the development of an Sustainability Management Plan.

	Criteria	SPMC
1.	visual, compact, self-supporting and making sustainability practical	This is done by adding the extensive sustainability indicator list to the canvas
2.	connect to the experiences of its target audience	
3.	facilitate a process for the identification of opportunities for sustainability	This is reflected by combining the sustainable thinking (through the use of the sustainability concepts), with the sustainability indicators (which make sustainability very concrete) and its application into one or multiple containers of the canvas. This is reflected by stating the questions in each container from this perspective and through the addition of sustainability indicators from these perspectives
4.	generic in design, but it should be able to tailor it to its specific context	
5.	reflect sustainable development concepts	This is reflected by adding the most important concepts of sustainable development to the Canvas which guide the users in the appropriate way of thinking
6.	distinguish between project management processes, project delivery processes and the project products (deliverable)	This is reflected by the selection of the containers. Some containers are about the project processes (like Approach, key activities, milestones), other refer to the project deliverable and its effects (deliverable, implementation, effect, benefits)
7.	a tool should contain all placeholders from the Sustainability Management Plan	The SPMC covers for all and more the placeholders of the SPMC, also with more indicators covered through the Sustainability Indicator list.

TABLE 10. *Matching the SPMC with the criteria for a SMP-tool*

authors

Ron Schipper is an experienced project and program manager, principal consultant at Van Aetsveld and an independent researcher. 'Different projects for a better life' captures his drive, finding possibilities for sustainability in every project is his daily business. Today he is one of the well-known recognized experts in the field of sustainability in project management with over a dozen papers and several books published and various practical contributions towards organizations adopting this topic. He was awarded the 2014 Sustainability Award of the international Green Project Management organization. Ron is also an external examiner in the Master of Informatics and Master of Project Management in HU University of Applied Science in the Netherlands.

Dr Gilbert Silvius is professor of project and programme management at LOI University of Applied Sciences in the Netherlands and senior research associate at the University of Johannesburg in South Africa. He initiated and developed the first MSc in Project Management program in the Netherlands and is considered a leading expert in the field of project management. Gilbert has published over a 100 academic papers and several books. He holds a PhD degree in information sciences from Utrecht University and masters' degrees in economics and business administration. As a practitioner, Gilbert has over 20 years' experience in organizational change and IT projects and is a member of the international enable2change network of project management experts.

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