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Sustainability in Project Management
Case study project GrownDownTown

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ABSTRACT

Sustainability is a hot topic nowadays. Many companies are using this term, but the big question is how many of these companies actually implement sustainability in their business operations and thus are entitled to use this term. Sustainability has many different principles and concepts, which all can be implemented in these operations. To combine all these different principles and concepts and create a complete view of sustainability, a framework was created to see how sustainability is integrated in a project. The project ‘GrownDownTown’ is created by ‘De Groenten Uit Amsterdam’ and Philips is responsible for the LED lighting. The project was tested to the framework and the Maturity Model, to see how the concepts are integrated and the level of consideration of sustainability in terms of resources, business processes, business model and products/services. The outcomes clarify that project ‘GrownDownTown’ mainly has a focus on the environmental concept of sustainability. Philips outsources the knowledge that is needed for the agriculture, to the company ‘De Groenten Uit Amsterdam’. Like how Philips collaborate with ‘Douwe Egberts’. Through these collaborations Philips makes it possible to develop the high quality without the knowledge inside the own organisation.

INTRODUCTION

Sustainability became a hot top in the middle of the nineties (Hart, 1995). The burning challenge of business in the 21st century is to integrate sustainable development principles into core business operations such (Cooper, Hayward, & Neuberger, 2010) as projects. Sustainability is not just for the environment. Although environmental concern is what immediately comes to mind whenever the word “sustainability” is mentioned, there are many languages of sustainability, depending on whatever perspective is under
Consideration (Badiru, 2010). Thus sustainability has not only something to do with the environment, but also with the economical and social issues (Triple Bottom Line).

Many companies say that they consider or already use sustainability principles in projects or in project management processes (Keeys, 2012), the reality is that sustainability development principles are not largely considered in projects (Labuschagne et. al., 2005 & Gareis et. al., 2010). In project management, the focus is on specific sustainability aspects (environmental, social, construction, techniques, etc.) (Robert, et al., 2002) (Ebner & Baumgartner, 2010).

Businesses want to be sustainable (for their selves or for the outside world) so they develop what they call ‘corporate sustainability strategies’. However it is not clear if and how these strategies contribute to the integration of sustainability issues in projects (Keeys, 2012). There is very little guidance available on what is meant by sustainable project management or the responsibilities of the project management professional (Silvius, Brink, & Smit, 2009). So when there is little guidance available for how to integrate sustainability in projects, how can companies actually do it? The main question of this paper is:

“How do (or how can) organisations integrate the concepts of sustainability into the way they execute and manage projects?”

To give an answer to the main question, the paper first presents a literature review about the topics sustainability in projects, corporate sustainability, integration of sustainability in projects and the related topics. After the literature review, the paper presents a single case study. The literature review produces a framework, which is applied to the case. The chapter ‘Research methods’ clarifies how the framework will be applied to the single case study. The case study contains a project of the international company Philips and is called ‘GrownDownTown’.

LITERATURE REVIEW

The literature review provides the information about the topics sustainability, the concepts of sustainability, corporate sustainability, project management and the Maturity Model. These topics are studied to create a solid foundation for the analysis of the case study. On the basis of the literature review the framework of the case study is created. The Maturity Model is applied to assess the level of consideration of sustainability.
Sustainability

Commitment to sustainability is in vogue these days, be it in the corporate world or personal pursuits (Badiru, 2010). But what exactly is sustainability? The most accepted definition of sustainability comes from The 1987 Brundtland Commission, i.e., “meet present needs without compromising the ability of future generations to meet their needs’. Sustainability is nothing more than prudent resource utilization in the form of energy, money etc. (Badiru, 2010). When the term sustainability is mentioned, most people think about the environment. These thoughts are in line with the climate change models that emerged in the middle of the nineties. These models described the climate change as a result of pollution. When we look at the future, pollution will still be a hot topic but there are a few topics that will attract more attention (Houghton et. al., 1996). For example: the relationship between the amount of people in the world and the amount of food. Penning de Vries et al. (1995) described the natural resources and limits of food production in 2040 for different regions in the Netherlands. So when there are limitations with regard to food production, it is important to produce the food in a sustainable way. Sustainability contains more than just the environmental issues (Taylor, 2006).

Concepts of sustainability

1. Environmental, Social & Economic Sustainability

Sustainability has not only something to do with the environment, but also with the economical and social issues, this is called the triple bottom line method. According to Taylor (2006), the method contains the following different types of sustainability:

- Environmental Sustainability: to optimize the use of natural resources in order to increase resource productivity and minimize emissions and wastage.

- Social Sustainability: To take into account all the interests of all the stakeholders in any development activity, not just that of the client or sponsor, in such a way that all their energies are harnessed towards the common goal.

- Economic Sustainability: to move away from classical economic theory, which treats the Earth’s resources as free, to a Sustainable or ‘Eco-economics’ which takes account of the environmental and social cost of human actions. This is often associated with the notion of whole life costing (the systematic consideration of all relevant cash flows associated with the acquisition and ownership of an asset).

This model is the same as the People, Planet, Profit model of John Elkington, see below:
2. Short-, mid-, and long-term

Gareis et al. (2010) describe the following principles of sustainability in addition to the model of John Elkington:

The definition of sustainability reads: “meet present needs without compromising the ability of future generations to meet their needs’. Present needs are short time oriented and the ability of future generations to meet their needs is long time oriented. The sustainability of ecosystems over time as well as the consideration of the needs of future generations is in direct contradiction with the today’s ever shortening time horizon of decision-makers (Gareis, Huemann, & Weninger, 2010). Long-term orientation requires improvements in our capacity to address complex, evolving systems which main attribute is uncertainty, shifting to a paradigm of perceiving and adapting to change, with the key elements of social learning, innovation and design (Bagheri & Hjorth, 2007). It is important that there is a balance between the short-, mid-, and long-term scales.

3. Local, regional, global

The environmental, economical and social processes of sustainability take place at various spatial scales at the same time (Local, regional, global) (Holling, 2001). Gareis et al. (2010) differentiate the local, regional as well as global orientation and point to the necessity of balancing between these various spatial scales.

4. Values

From the very beginning Sustainability has been understood as a normative concept (Martens, 2006) that reflects values and ethical considerations of the society. There has been made a distinction in:

- Economical values
Environmental values
- Social values

All the three different values affect present and future generations.

5. Consuming income, not capital

Dyllick and Hockerts (2002), identify another additional concept of sustainability:

Sustainability is about consuming the income and not the capital. This aspect of sustainability is viewed from the economic perspective. When the impact is not visible in the short-term, it might be causing degradation of resources in the long term. Thus, in practice companies make decisions to make fast profit what depletes sources. Sustainability implies that the natural capital remains intact. This means that the source functions of the environment should not be degraded. Therefore, the extraction of renewable resources should not exceed the rate at which they are renewed, and the absorptive capacity of the environment to assimilate waste, should not be exceeded” (Gilbert et. al., 1996).

6. Transparency & Accountability

ISO 26000 is the designation of the future International Standard giving guidance on social responsibility (SR). It is intended for use by organizations of all types, in both public and private sectors, in developed and developing countries. It will assist them in their efforts to operate in the socially responsible manner that society increasingly demands (International Organization for Standardization, 2008). The following principles of transparency and accountability on Social Responsibility are given by the ISO:

- Accountability: An organization is answerable to those affected by its decisions and activities, as well as to society in general, for the overall impact on society and its decisions and activities.

- Transparency: An organization should disclose, in a clear, accurate manner and to a reasonable and sufficient degree, the policies, decisions, and activities for which it is responsible, including known and likely impacts.

Corporate sustainability

For business, it is the integration of sustainability in their mission, long term strategy, processes and execution to include strong balance among social, ethical, environmental and economic ideals, goals, and results (Deland, 2009). A different description is: meeting the needs of a firm’s direct and indirect stakeholders without compromising its
ability to meet the needs of future stakeholders as well (Dyllick & Hockerts, 2002). This definition almost corresponds with the definition of sustainability that comes from The 1987 Brundtland Commission. Corporations have a different interpretation of the term “corporate sustainability”.

The choice of terms is important to understand how sustainability development issues are integrated in core business activities (main question). To give a definition to corporate sustainability, Keeys (2012) uses the following process definition: (1) holistic approach, (2) long-term oriented, (3) large spatial and institutional scale, (4) risk reducing, (5) values and ethical considerations, and (6) participation and capacity building (Gareis, Huemann, & Weninger, 2010).

Project management

A project does not function in isolation; it operates within the organizational structure, culture, strategy, and decision-making processes of its parent organization and its stakeholder environment (Engwall, 2003). According to the PRINCE2 method, a project is (Hedeman, Vis van Heemst, & Frederikz, 2010):

“A temporary organization that is created for the purpose of delivering one or more business products according to a agreed business case.”

According to PRINCE2 the characteristics of a project are: change, temporary, cross-functional, unique and uncertainty and project management is about the implementation of changes.

Maturity Model

The Maturity Model is for the incorporation of sustainability in projects and project management processes. This model assesses the level of consideration of sustainability in terms of resources, business processes, business model and products/services (Silvius & Schipper, 2010):

- **Resources:** Using resources that provide the same functionality, but are less harmful for the environment

- **Business processes:** A more sustainable business process takes away the cause of non-sustainable effects instead of just limiting or compensating them

- **Business model:** The way of how the products or services are delivered

- **Products/services:** Products and services can be innovated to contribute to a more sustainable society
It is a practical way to translate the complex concepts into organizational capabilities and to raise awareness for potential development. They provide guidance for action plans and allow organizations to monitor their progress (Dinsmore, 1998).

**RESEARCH METHODS**

In this part of the paper is described how the research is approached and which methods are used. First of all, a literature review was done on the following subjects: sustainability, concepts and principles of sustainability, corporate sustainability, project management, sustainability in project management and the Maturity Model. This is all been done by desk research resulting in the framework for the case study, used for this research. A case study was necessary, because the research question is a ‘how’ question and the research investigates a contemporary phenomenon within a real life context (Yin, 1994). The field research began with the approaching of different companies, which do projects. This has resulted in contact with Roel Janssen of the company Philips, after which the interview with the project manager Philip van Traa of ‘De Groenten Uit Amsterdam’ was organized. During this method of data collection all the required information about sustainability in project ‘GrownDownTown’ was retrieved. This information is processed in the framework and in the Maturity Model. Finally, the Case Study has been done by a holistic approach because there was only one project for the analysis.

**CASE STUDY**

**Introduction**

In 1891 the company Philips was found in Eindhoven in the Netherlands. In the beginning the company only produced light bulbs, today Philips is one of the largest electronic concerns in the world and, in addition to the lighting, Philips pays a lot of attention to the quality of life through consumer electronics and equipment for healthcare (Philips, 2011). Within the organisation the department LED Horticulture is active with the lighting for the agricultural sector. The project ‘GrownDownTown’ is created to produce vegetables in the densely populated city Amsterdam. Philips supplies the LED lighting for this project.

**Philips Horticulture**

The department Horticulture of Philips develops LED lights for the agricultural sector and conducts research to better and more efficient ways of lighting. LED lighting provides less use of energy and the lights are adjusted to the different crops for optimal lighting, consistent quality and efficient heat control of the crops.
GrownDownTown

The project ‘GrownDownTown’ is executed to produce crops in the high-populated city Amsterdam. In the northern part of the city, behind the building ‘Overhoeks’, a plot of land is equipped with glasshouses for the growing of the crops using the LED lights of Philips Horticulture. Vertical farming is used to generate a high production. A restaurant will be located on the plot, where meals will be prepared with the crops from the glasshouses. Individuals and companies can rent spaces in the glasshouses to produce their own crops and the crops can be sold to the locals.

Because the LED lights create optimal conditions for the production of the crops the production will be three times higher than in a normal glasshouse. The vertical farming can generate a higher production. The production needs 90% less water, less energy by the LED lights and less logistics, because the product will be used or bought by a local resident. There will be no surpluses, because the production will be demand driven. Through the LED lights the production will not be dependent on weather conditions, this means that there will be security for the harvest and also the timing of the harvest.

De Groenten Uit Amsterdam

The department Horticulture of Philips is approached for the information about sustainability in their projects. Because Philips does not have the knowledge about farming in their own organisation parts of the project are outsourced to other parties who do have such knowledge. One of these parties is ‘De Groenten Uit Amsterdam’ which is the project manager for the project. After contact with Roel Janssen from Philips Lighting – LED Horticulture an interview was held with project manager Philip van Traa from De Groenten Uit Amsterdam on Monday 26 November 2012. He first told about the project and then explained how sustainability is integrated in the way they execute and manage the project.

In the figure at right shows how the project is organised.
RESULTS CASE STUDY

This part of the paper presents the results of the Case Study in a framework, which is based on the literature review:

<table>
<thead>
<tr>
<th>Concepts of sustainability</th>
<th>Translation into project GrownDownTown</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Social</td>
<td>- New jobs are created by GrownDownTown</td>
</tr>
<tr>
<td></td>
<td>- Vegetable gardens for local residents for a low price</td>
</tr>
<tr>
<td></td>
<td>- Meeting place for local residents</td>
</tr>
<tr>
<td></td>
<td>- A new marketplace to buy vegetables, fruits and herbs</td>
</tr>
<tr>
<td></td>
<td>- A new restaurant, also for business meetings</td>
</tr>
<tr>
<td></td>
<td>- Education through involved schools</td>
</tr>
<tr>
<td></td>
<td>- Transfer of knowledge about foods which are produced</td>
</tr>
<tr>
<td></td>
<td>- Producers are nearer to their customers</td>
</tr>
<tr>
<td></td>
<td>- Crime decreases</td>
</tr>
<tr>
<td>Environment</td>
<td>- Logistics and transport are not necessary</td>
</tr>
<tr>
<td></td>
<td>- No transport: no fuel consumption and emissions</td>
</tr>
<tr>
<td></td>
<td>- Wasteland gets a function</td>
</tr>
<tr>
<td></td>
<td>- LED lights of Philips provide less use of energy</td>
</tr>
<tr>
<td></td>
<td>- Vertical farming generates a higher production</td>
</tr>
<tr>
<td></td>
<td>- The production of the crops needs 90% less water</td>
</tr>
<tr>
<td></td>
<td>- Production is demand driven so there won't be surpluses</td>
</tr>
<tr>
<td></td>
<td>The consumed energy is generated by solar panels and windmills</td>
</tr>
</tbody>
</table>
### Economical
- The model GrownDownTown is profitable
- Local residents can sell their farmed products

### 2. Short term
- First version GrownDownTown in Amsterdam
- Now investing in a good standard
- Local residents can produce and buy products or eat at the restaurant

### Long term
- Global implementation of a successful concept
- Food shortages are counteracted

### 3. Local
- GrownDownTown Amsterdam
- Products can be produced by local residents
- Local residents can buy fresh products at the marketplace
- Improvement of the surroundings, crime decreases
- New jobs are created by GrownDownTown
- Meeting place for local residents
- A new restaurant is created
- A new marketplace to buy vegetables, fruits and herbs
- Education through involved schools
- Wasteland gets a function

### Global
- Global implementation of a successful concept in densely populated cities

When this project will be implemented in another city the local effects will occur
4. Values

<table>
<thead>
<tr>
<th>Social values</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Anchor point/meeting place in area of implementation</td>
</tr>
<tr>
<td>- Local residents can rent vegetable garden for a low price</td>
</tr>
<tr>
<td>- Less crime</td>
</tr>
<tr>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Economical values</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Through the project new jobs are created</td>
</tr>
<tr>
<td>- Improves the capital of the surroundings</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Environmental values</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Wasteland gets a function</td>
</tr>
<tr>
<td>- Less use of energy, water and no surpluses</td>
</tr>
<tr>
<td>- High productivity through perfect circumstances for production</td>
</tr>
</tbody>
</table>

5. Consuming income, not capital

| - Food shortages are counteracted |
| - Each process is approached in the most sustainable manner |
| - Less use of energy, water and no surpluses |
6. **Transparency**

- Because customers are close to the producers, they can view the production processes.
- Each stakeholder of the project knows what the other stakeholders are responsible for and what their activities are.

**Accountability**

- Every party in the project knows their own responsibilities.

In addition to the framework, to test the level of consideration of sustainability in the project, the Maturity Model is applied to the Case Study. The Maturity Model describes two different situations, the actual situation and the desired situation. Philip van Traa, the Project Manager of ‘GrownDownTown’, manages the project in his opinion in the most sustainable way possible, which resulted that the desired situation and the actual situation are equal. The figures present the calculated level of consideration of sustainability. According to Silvius & Nedeski (2011) from low to high maturity, the levels of consideration are:

- Sustainability aspects are not considered in the project;
- Sustainability aspects are considered at the level of the resources of the project;
- Sustainability aspects are considered at the level of the business processes of the project;
- Sustainability aspects are considered at the level of the business model of the project;
- Sustainability aspects are considered at the level of the products or services the project delivers.
Below, the results of the Maturity Model are shown in the charts:

### Profit

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-existing</td>
<td>25%</td>
</tr>
<tr>
<td>Resources</td>
<td>50%</td>
</tr>
<tr>
<td>Processes</td>
<td>25%</td>
</tr>
<tr>
<td>Business Model</td>
<td>50%</td>
</tr>
<tr>
<td>Products/services</td>
<td>50%</td>
</tr>
</tbody>
</table>

The highest presences of sustainability of the Profit perspective are: Resources (50%), Business Model (50%) and Products/services (50%). The consideration of sustainability in Processes has the lowest level (25%). Overall, the consideration of sustainability in the Profit perspective is on an average level.

### Planet

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-existing</td>
<td>0%</td>
</tr>
<tr>
<td>Resources</td>
<td>57%</td>
</tr>
<tr>
<td>Processes</td>
<td>86%</td>
</tr>
<tr>
<td>Business Model</td>
<td>86%</td>
</tr>
<tr>
<td>Products/services</td>
<td>86%</td>
</tr>
</tbody>
</table>

The Planet perspective has in the Processes (86%), Business Model (86%) and Products/services (86%) the highest level of consideration of sustainability. The consideration of sustainability in Resources is 29% lower. Overall the level of consideration of sustainability is very high in the Planet perspective.

### People

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-existing</td>
<td>75%</td>
</tr>
<tr>
<td>Resources</td>
<td>13%</td>
</tr>
<tr>
<td>Processes</td>
<td>50%</td>
</tr>
<tr>
<td>Business Model</td>
<td>13%</td>
</tr>
<tr>
<td>Products/services</td>
<td>25%</td>
</tr>
</tbody>
</table>

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This figure shows that the 'Non existing' category in the People perspective is the highest (75%) of all the different perspectives, Profit (25%) and Planet (0%). From this we can conclude that in the perspective People the consideration of sustainability is on the lowest level.

ANALYSIS

The framework, which is based on the literature review, shows the concepts of sustainability in relation to the project ‘Grown Down Town’. The goal of the project is to produce vegetables in the city of Amsterdam in the most sustainable way. The Framework shows that the project not only has a good influence on the environmental values but also on the economical and social values. The problem of the framework is that it only shows how the principles of sustainability are integrated in the project.

It is also important to know what the level of consideration of sustainability in the project is because than you can actually decide if the project is sustainable enough. An analysis of the results of the maturity model shows:

- The consideration of sustainability in the Profit perspective is on an average level.
- The level of consideration of sustainability is very high in the Planet perspective.
- The perspective People shows the lowest level of consideration of sustainability.

Gareis et al. (2010) point out the necessity of balancing economical, social and environmental orientation. The results of the maturity model show that there is no balance between the profit, planet and people perspective because all the three perspectives are at a different level of consideration. The actual situation and the desired situation are equal, this is remarkable because as a project manager you should always strive to a higher level of sustainability within a project.

As already said earlier, the framework shows how the principles of sustainability are integrated within the project and the maturity model shows the level of consideration. What is the relationship between the framework and the maturity model? To start with the planet perspective, the maturity model shows a high level of consideration. This is reflected in the framework because the concept environment (it is the same as the perspective planet) contains a lot of aspects of sustainability, which are translated to the project. From the people and profit perspective it is harder to see a relationship with the social and economical concepts of sustainability, which have been shown in the framework.
CONCLUSION

Within the organisation of Philips the department LED Horticulture is active with the lighting for the agricultural sector. The project ‘GrownDownTown’ is created to produce vegetables in the densely populated city Amsterdam. The project is a consortium of parties with the client Philips. The project can contribute to the sustainable development of Philips. The results of the case study give answer to the following main question:

“How do (or how can) Philips integrate the concepts of sustainability into the way they execute and manage projects?”

First of all it was necessary to find out if Philips had actual an idea of what sustainability is. The project was tested to a framework and a Maturity Model. The outcomes clarify that the project ‘GrownDownTown’ mainly has a focus on the environmental concept of sustainability. This is in line which what is already said in the introduction: the environmental concern is what immediately comes to mind whenever the word “sustainability” is mentioned, there are many languages of sustainability, depending on whatever perspective is under consideration (Badiru, 2010).

For an international company as Philips, it is hard to change the way of managing and executing projects because it needs a different mind-set of the employees. In addition, it is the question of a corporate sustainability strategy leads to an integration of sustainability principles into projects (Keays, 2012). The department LED Horticulture has chosen to execute the project with the project manager ‘De Groenten Uit Amsterdam’. This manager, Philip van Traa, has experience with sustainability in projects. He has the freedom to manage the project in his way that results in a more sustainable project than when the department of Philips LED Horticulture had chosen a manager.

The project ‘GrownDownTown’ is for the most part of Philips, however the company don’t want to link their name to the project individual. The reason for that is that Philips does not see the company as a producer of vegetables. It is like the cooperation between Philips and Douwe Egberts. In this case Philips produces/supplies LED’s instead of coffee machines.

‘De Groenten Uit Amsterdam’ and Philips have the ambition to copy the project ‘GrownDownTown’ to other cities in the world. When Philips creates a balance between the concepts of sustainability within the project, it will be a large success.
RESOURCES


About the authors

Roeland Derichs

Bob Valk

After Bob Valk and Roeland Derichs graduated for the Bachelor of Built Environment at the University of Applied Sciences in Amsterdam in 2012, they both started the European Master of Real Estate of the University of Greenwich in London. For the course Sustainability during this Master, Bob Valk and Roeland Derichs wrote the paper about Sustainability in Project Management within the project ‘GrownDownTown’. With this paper they won the first prize of the student paper awards on Masters level at the international Happy Projects conference in Vienna in April 2013. At this conference they also presented their paper.

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