

SUSTAINABILITY REPORT FOR THE BACHELOR THESIS

IMPORTANT NOTE: THE EVALUATION OF THE SUSTAINABILITY REPORT WILL NOT DEPEND ON THE DEGREE OF SUSTAINABILITY OF THE PROJECT, BUT ON YOUR CAPACITY TO ANALYZE ITS SUSTAINABILITY.

1. Introduction

The sustainability report is a common requirement, nowadays mandatory, for IT companies and their projects. Prestigious organizations such as the *Global Reporting Initiative (GRI)*, the *UN Sustainable development Knowledge Platform*, or *Electronics Watch*, measure the sustainability of the products and services of these companies. Thus, for example, the GRI organization defines standards for reporting the impact of a project on climate change, human rights, transparency or quality of life, among other aspects.

The GRI Standards are a good tool to publicly report the economic, environmental and social impacts of an organization. The sustainability reports of different companies can be found in¹. Find an IT company related to your project. You will find that virtually all major companies publish their sustainability reports annually.

All BS Theses presented at the FIB must include a chapter entitled "Sustainability Report" in their final report. The present document provides a set of guidelines to help students to elaborate this report. A part of the report must also be presented in GEP course.

2. The sustainability matrix

The sustainability report will be based on the application of the sustainability matrix presented in Figure 1. The analysis of the sustainability of a project is divided into three parts, identified by the columns of the matrix:

- **Project development (PD)**, which includes the planning, making and implementation of the project.
- **Exploitation** of the project, which starts once it has been implemented and ends with its dismantling.
- The **risks** inherent to the project itself throughout its construction, exploitation and dismantling.

	PD	Exploitation	Risks
Environmental	Consumption of the design	Ecological footprint	Environmental
Economic	Invoice	Viability plan	Economic
Social	Personal impact	Social impact	Social

Figure 1. Sustainability matrix for the BS thesis

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<http://database.globalreporting.org/search/>

Each of the columns must be analyzed from three points of view: **environmental, economic and social**, the three dimensions of sustainability.

When we talk about risks –not unforeseen events– we are referring to those variables that we can identify but cannot control. Unforeseen events, however, cannot be anticipated in most cases, and therefore will not be taken into account in the sustainability report. It is considered a risk, for example, if a mobile application for online sales is designed and the competitors decide to take our idea with a similar initiative. On the other hand, it would be an unforeseen event if a state law, without any prior notice, prohibited sales through the Internet starting next week. In case that the media had already been talking about its possible approval, it would no longer be an unforeseen event but a risk.

The meaning of each cell in the matrix is :

- Environmental/PD cell: represents the impact on the environment throughout the completion of the BS thesis (energy consumption and waste generation). It can be measured, for example, in kWh and tons of CO₂ emissions involved in carrying out the thesis.
- Environmental/Exploitation cell: represents the ecological footprint that the project will have throughout its life. It can be measured with the same parameters as the previous cell.
- Environmental/Risks Cell: represents the set of eventualities that could cause the environmental impact of the project to be more negative than expected.
- Economic/DP Cell: represents the consumption of resources (material and human) made during the development of the entire project and the cost of these resources. It would be the equivalent of the invoice that would be charged to a potential client of the project and requires carrying out a detailed temporary planning of the BS thesis.
- Economic/Exploitation cell: represents the project's viability plan. In the case of a BS thesis, this plan will be presented in a very simplified form.
- Economic/Risk Cell: represents the set of contingencies that could cause the project to take longer than expected to reach viability, or even never become profitable.
- Social Cell/DP: represents the impact that carrying out the project has had on the people who have worked on it. Given that it is difficult to quantify this impact, try to indicate how the project has changed you and your closest environment.
- Social Cell/Exploitation: represents the impact the project will have on the different groups that could be affected, either directly or indirectly. It is difficult to quantify; indicate your reflections on the possible effects of your project.
- Social Cell/Risks: represents all the eventualities that could lead to the project having a more negative social impact on one of the related groups than forecast in the project report.

Normally, the scope of a BS thesis will be narrower than that of an engineering project, as shown in figure 2. In any case, the maximum scope of an engineering project (and that of a BS thesis) goes as far as its implementation. However, the report must include a set of reflections related to its exploitation and the associated risks. The challenge of trying to foresee what may happen helps the student to get the acquisition of a strategic vision.

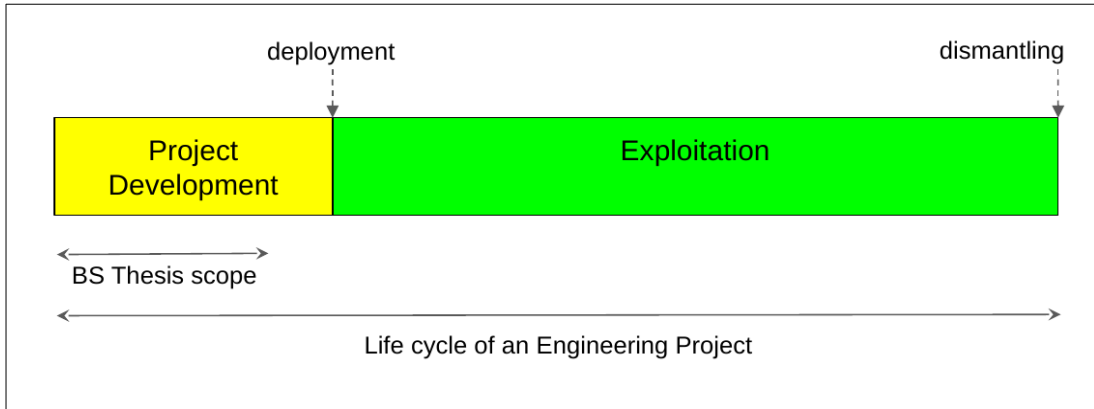


Figure 2. BS thesis scope

3. Questions that students should ask themselves

To prepare the sustainability report, we suggest that you ask yourself a set of questions that you should answer in the corresponding chapter of the report. Figure 3 shows these questions. Row "I" of each dimension of sustainability corresponds to the questions that you must ask yourself in the GEP course (Initial Milestone of the thesis), while row "F" contains the questions that you must ask yourself while you are carrying out the project, whose answers should be included in the "sustainability report" (Final Milestone of the thesis).

Not all the questions make sense for all types of projects, You should consider which of the questions make sense for your BS thesis and which ones don't. You should also consider (and discuss in the sustainability analysis) which questions other than those included in this document would be relevant to your project.

In-depth reflection on the sustainability of your BS thesis will probably reveal both positive and negative consequences. However, in no case, negative consequences on the sustainability of your project will lead to a negative assessment of either your sustainability analysis or your BS thesis.

		Project Development	Exploitation	Risks
Environmental	I	Have you estimated the environmental impact of the project? Have you considered how to minimize the impact, for example, by reusing resources?	How is the problem you want to address currently being solved (state of the art)? In what way will your solution improve environmentally on the current solutions?	
	F	Have you quantified the environmental impact of the project? What steps have you taken to reduce the impact? Have you quantified this reduction? If you did the project again, could it be done with fewer resources?	What resources do you estimate will be used during the exploitation phase of the project? What will be the environmental impact of these resources? Will the project reduce the use of other resources? ¿Overall, will the use of the project improve or worsen the ecological footprint?	What Scenarios could lead to an increase in the footprint?
Economic	I	Have you estimated the cost of the project (human and material resources)?	How is the problem you want to address currently solved (state of the art)? What could economically improve your solution compared to current solutions?	
	F	Have you quantified the cost (human and material resources) of the project? What decisions have you taken to reduce the cost? Have you quantified the savings? Is the estimated cost similar to the final cost? Have you justified the differences (lessons learned)?	What is the estimated cost of the project over its exploitation phase? Could this cost be reduced to make the project more feasible? Have you taken into account the cost of adjustments / updates / repairs over the lifetime of the project?	What scenarios could jeopardize the viability of the project?
Social	I	What do you think the realization of this project will bring to you personally?	How is the problem you want to address currently solved (state of the art)? What could socially (quality of life) improve your solution compared to previous solutions? Is there a real need for the project?	
	F	Does this project involve significant reflections on the personal, professional or ethical standards of the people working on it?	Who benefits from the use of the project? Is there any group that may be adversely affected by the project? To what extent? To what extent does the project solve the problem initially raised?	Could any scenarios arise to make the project detrimental to any particular segment of the population? Could the project create any kind of dependency that leaves users in a weak position?

Figure 3. Questions in the sustainability matrix (I: initial milestone, F: final milestone)

3.1. Environmental impact study

In this section you should estimate the environmental resources that your project will use. A relatively simple way is to calculate the consumption of your project in kWh. You can also estimate the waste generated in Tm of CO₂ equivalent.

In the Initial Milestone (GEP) you must estimate the environmental resources that will be consumed in the design of your project, while in the Final Milestone (Sustainability Report) you must consider the environmental resources – ecological footprint – that your project will consume during its exploitation.

You should also explain how others solve the problem you want to address (state of the art). In other words, explain what solutions that are currently available and, from an environmental point of view, the problem/need you aim to tackle. You should also estimate how your solution will be environmentally better than existing ones.

In the Final Milestone you must estimate the "environmental risks". That is, answer questions such as: Could situations occur that would increase the ecological footprint of the project? Explain potential situations that you cannot address due to lack of time, resources or ability that could lead to an increase of the ecological footprint.

3.2. Economic impact study

This section presents the questions you should ask yourself regarding the economic viability of your project. We do not propose you to prepare an exhaustive analysis of viability, returns on investment, funding or other issues that should be considered in a Master's thesis.

In the Initial Milestone you should estimate the cost of the project/Invoice (and include a detailed planning). Specifically, during the Initial Milestone you must answer the questions corresponding to the two rows of the matrix labeled "project invoice" and "viability plan". In the Final Milestone (Sustainability Report) you should present, in addition to the calculation of the project design invoice, the analysis of the deviations with respect to the initial approach, if they have occurred.

In the Final Milestone you should also reflect about the "economic risks". In other words, reflect on whether some situations that affect the viability of the project may happen. Explain possible scenarios that you have not taken into account due to lack of time, resources or ability, which could jeopardize the economic viability of your project.

3.3. Social impact study

Questions referring to the social impact should be focused on considering the implications that the realization of your project may have on society. To answer the questions of the Initial Milestone and the Final Milestone proposed in the matrix, you should identify the groups affected by the problem/need that you intend to address. The groups related to a project could be: owners/managers, workers, suppliers, consumers (direct users) or others (indirect or passive users).

For example, in car sharing apps, the owner/manager maintains the app, the direct users are the driver and passengers, and other affected people could be taxi drivers, that is adversely affected by the reduction in their turnover.

The social implications of a BS thesis are very diverse depending on the type of project, and generally, they are difficult to forecast and quantify. You can observe this enormous diversity in the real indicators of social sustainability in the GRI standards².

² <https://www.globalreporting.org/standards/gri-standards-download-center/>

As a guidance, below are some considerations that are generally relevant to the type of BS theses carried out at the FIB. These could help you to answer the questions proposed in the sustainability matrix.

- Who did the work that your product will do now? Are there jobs at risk? Were they decent jobs? Was it routine work? Will work quality be gained?
- Have you taken into account the usability of your product for people with special needs (elderly people, visual impairment, disabilities...)?
- Have you assessed the project's implications in terms of privacy of user data, image rights, etc.? Can your product put someone in a vulnerable situation?
- To what extent do you estimate that your project will increase or decrease social inequality?
- Does the project have direct application in public administration? Could it provide any service to the citizens? Have you considered the implications of using free or proprietary software? Is the final product conceived as a proprietary product, or a product for shared use?

When considering the social risks, explain possible situations (that you cannot address due to lack of time, resources or ability) that could adversely affect the people related with your project (users, investors, workers, suppliers, etc.).

4. Conclusions

According to data published in the KPMG Survey of Corporate Responsibility Reporting, in 2020, 93% of the world's leading companies compiled the corresponding sustainability reports corresponding the ecological, economic and social areas.

This document presents a method for carrying out the sustainability report of a BS thesis. However, given the diverse nature of the BS theses at the FIB, if the student prefers to organize their sustainability report in a different way than the one proposed here, they can do so as long as it results in a good analysis.

The committee will assess your project using a rubric³. As a student, you must ensure that the organization of the "sustainability report" chapter of your thesis meets the criteria specified in this rubric.

³ The rubric is available to the public and can be found on the FIB website.
<http://www.fib.upc.edu/es/estudiar-enginyeria-informatica/treball-final-grau/indicadors.html>