

SUSTAINABILITY ANALYSIS FOR EWOC/EIWC PROJECTS

PLEASE NOTE: THE ASSESSMENT OF THE SUSTAINABILITY ANALYSIS WILL BE BASED ON YOUR CAPACITY TO ANALYSE THE PROJECT'S SUSTAINABILITY, RATHER THAN ON THE PROJECT'S ACTUAL LEVEL OF SUSTAINABILITY.

1. Introduction

A sustainability report is a common requirement—almost an obligation—for IT companies and their projects today. Prestigious organizations such as the [Global Reporting Initiative](#) (GRI), the [UN Sustainable Development Knowledge Platform](#) and [Electronics Watch](#) measure the impact on sustainability of IT companies' products and services. The GRI, for example, defines standards for compiling reports on a project's impact on climate change, human rights, transparency and quality of life, among other aspects.

The Spanish law published on BOE: [*Ley 11/2018, de 28 de diciembre, por la que se modifica el Código de Comercio, el texto refundido de la Ley de Sociedades de Capital aprobado por el Real Decreto Legislativo 1/2010, de 2 de julio, y la Ley 22/2015, de 20 de julio, de Auditoría de Cuentas, en materia de información no financiera y diversidad*](#), that corresponds to the transposition of [European directive 2014/95/EU of the European Parliament as regards disclosure of non-financial and diversity information](#), specifies that corporations must report on sustainability relating to environmental and social matters.

All the projects of EWOC/EIWC courses at ETSETB should include in the final report a chapter entitled "Sustainability Analysis". In this document, some guidelines are given to help you to prepare a sustainability analysis.

2. The Sustainability Matrix

The sustainability analysis will be based on the application of the Sustainability Matrix shown in Table 1 to your project. The organization in a matrix form is just a way to order the different concepts in this guide. You don't need to write your report using a matrix, but you have to follow the guidelines.

The analysis of a project's sustainability is divided into three parts, identified by the matrix columns:

- The **Project Development**, that begins with the acceptance of the project by the students and ends when the project report is presented.
- The **Exploitation** of the project, which starts once the project has been implemented and ends when it is dismantled (it should be an estimation of the hypothetical exploitation of the product or service presented).
- The **Risks and limitations** inherent to the project during its construction, useful life and dismantling.

	Project Development	Exploitation	Risks/ limitations
Environmental	Consumption of the design	Carbon footprint	Environmental risks and limitations
Economic	Invoice	Viability plan	Economic risks and limitations
Social	Personal impact	Social impact	Social risks and limitations

Table 1. Sustainability Matrix for the EWOC/EIWC projects

Each column must be analysed from three perspectives: **environmental**, **economic** and **social**, the three dimensions of sustainability.

Risks refer to variables that we can identify but not control, even though they could influence the success or failure of a project. In contrast, unexpected events generally cannot be anticipated, as they are outside the expected life cycle, and therefore will not be considered in the sustainability analysis. An example of a risk: a mobile application is designed for online sale, but a rival decides to copy our idea with a similar initiative. An example of an unexpected event: with no advance warning, a state law will ban internet sales from next week. Unexpected events cannot be anticipated. If the media had already been discussing the possible approval of such a law, it would be a risk rather than an unexpected event.

As limitations, we must take into account all those that have made the sustainability analysis not more developed. The main limitations, which in no way can lower the grade of the report, is that the time and resources that can be devoted to doing the EWOC/EIWC project are limited.

The meaning of each cell in the matrix is:

- Environmental/Project Development cell: represents the impact on the environment during the preparation of the project (energy consumption and waste generation). The

carbon footprint can be measured, for example, in kg of CO₂ emissions¹ caused by carrying out the EWOC/EIWC project. *PLEASE do not mix up power (is a rate measured in Watts) with energy (measured in Joules, W-s or kWh).*

- Environmental/Exploitation cell: represents the carbon footprint that the project will have throughout its useful life. It can be measured using the same parameters as the above cell.
- Environmental/Risks cell: represents all the eventualities that could make the environmental impact of the project more negative than expected in the project report.
- Economic/Project Development cell: represents the consumption of resources (material and human) during the entire project and the cost of these resources. It would be the equivalent of the invoice that would be sent to a potential client and requires detailed EWOC/EIWC project time planning.
- Economic/Exploitation cell: represents the project's viability plan. In the case of a EWOC/EIWC project, this plan will be set out in a highly simplified form.
- Economic/Risks cell: represents all the eventualities that could lead to the project taking longer than planned to become viable or maybe never becoming profitable.
- Social/Project Development cell: 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 reflect on how the project has changed you (the complete team) and your closest environment.
- Social/Exploitation cell: represents the impact that setting up the project will have on the various groups related directly or indirectly with the project. It is difficult to quantify, so you should reflect on the potential effects of your project.
- Social/Risks cell: 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.

3. Questions

To prepare the sustainability analysis, we suggest you ask by yourself a series of questions. The answers will form the sustainability analysis in the corresponding chapter of the project report (final stage of the EWOC/EIWC project). Table 3 shows these questions.

Not all the questions are relevant to all types of EWOC/EIWC projects. You should consider which of the questions apply specifically to your EWOC/EIWC project and which are not applicable. You should also consider (and discuss in the sustainability analysis) which questions other than those included in this document would be relevant to your EWOC/EIWC project.

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

¹ <https://www.electricitymap.org/zone/ES?solar=false&remote=true&wind=false>

	Project Development	Exploitation	Risks
Environmental	F.EN.D.1. Quantify the environmental impact of the project development What steps have you taken to reduce the impact? Have you quantified this reduction? Does your design follow the cradle-to-cradle philosophy?	F.EN.X.1. What resources do you estimate will be used during the lifetime of the project? What will be the environmental impact of these resources?	F.EN.R.1. Could any scenarios that might increase the footprint of the project arise?
		F.EN.X.2. Will the project reduce the use of other resources? Overall, will the use of the project improve or worsen the ecological footprint?	F.EN.R.2. If you did the project again, could it be done with fewer resources? Can it be designed again with reused material?
	F.EN.D.2. What is the origin of the raw materials and / or materials used? Do your suppliers publish environmental reports?	F.EN.X.3. When the life of the project comes to an end, what waste is generated? How the environmental impact of dismantling can be reduced?	F.EN.R.3. What have been the main limitations of the environmental analysis of your proposal?
	F.EN.D.3. Do your suppliers follow the RoHS directive? Do your suppliers follow the RBA Code of Conduct?	F.EN.X.4. Could the project be carried out with less environmental impact?	
Economic	F.EC.D.1. Quantify the cost (human and material resources) of the project. What decisions have you taken to reduce the cost? Have you quantified the savings?	F.EC.X.1. What is the estimated cost of the project over its lifetime? Could this cost be reduced to make the project more feasible?	F.EC.R.1. Could any scenarios arise that may jeopardize the viability of the project?
	F.EC.D.2. Is the estimated cost similar to the final cost? Justify the differences (lessons learned).	F.EC.X.2. Have you taken into account the cost of adjustments / updates / repairs over the life of the project?	F.EC.R.2. What have been the main limitations of the economic analysis of your proposal?
		F.EC.X.3. Would the dismantling of the project incur any additional costs?	
		F.EC.X.4. Could any other project benefit from the results of this one?	

Social	F.SO.D.1. Does this project involve significant reflections on the personal, professional or ethical standards of the people working in the project? Has inclusive and non-sexist language been used?	F.SO.X.1. Who benefits from the use of the project? Is there any group that may be adversely affected by the project? If so, to what extent?	F.SO.R.1. Could any scenarios arise to make the project detrimental to any particular segment of the population?
		F.SO.X.2. To what extent does the project solve the problem initially raised?	
	F.SO.D.2. What is the current situation of the sector related to the project?	F.SO.X.3. Are other ways of implementing the project that lead to different social impacts?	F.SO.R.2. Could the project create any kind of dependency that might leave users in a weak position?
	F.SO.D.3. Do the distributors, manufacturers, suppliers, and retailers meet public ethical or conduct codes?	F.SO.X.4 Does the project avoid biases, stereotypes and gender roles? F.SO.X.5. Have you considered the usability of your product for people with diverse needs (age, gender, sex, functional diversity, cultural diversity, etc.)? Are there barriers to using it?	F.SO.R.3. What have been the main limitations of the social analysis of your proposal?

Table 3. Questions to answer in the EWOC/EIWC sustainability analysis of your EWOC/EIWC report.

Questions for the ethic report:

- Identify situations which could involve ethical issues in the design, production, and use of your solution.
- Is there any aspect which could cause harm by intentionally, recklessly, or negligently use of your solution?
- If so, describe the main lines of the communication needed with the affected parties.
- If so, can you foresee corrective measures other than communication?
- Does your project involve the processing of personal data? How have you considered accomplishing the GDPR? Checking that tool would help to answer this question: <https://ec.europa.eu/assets/rtd/ethics-data-protection-decision-tree/index.html>

3.1. Environmental impact study

In this section, you should estimate the resources that the realization of your project has used, as well as, the resources that the project/product/service you propose would use. Some elements to take into account are:

- mobility
- electricity (renewable and not renewable) used by different devices (laptops, smartphones, acclimatization, illumination, etc.)
- embodied energy (amortization)
- fungibles, water, paper and other consumption if relevant
- waste generated (cables, IC, etc.)
- access to networks and cloud
- etc

About the calculation of amortization of embodied energy, imagine that you use a computer which the manufacturer claims to have an embodied energy of 180 kg CO₂e. If the estimated useful life of the computer is 5 years and for the project you use the computer 10 h/week during 4 weeks, 160 g CO₂e must be associated to the project (calculations: $180 \text{ kg CO}_2\text{e} / 5 \text{ years} = 36 \text{ kg CO}_2\text{e/year} \approx 100 \text{ g CO}_2\text{e/day} = 4 \text{ g CO}_2\text{e/hour}$).

3.2. Economic impact study

In this section, we introduce the questions you should ask on the economic viability of your project. If required, you can make a reference to other chapters of the EWOC/EIWC final report.

In the initial stage, you should estimate the cost of the project/invoice (and include detailed planning). In the final stage, you must submit an analysis of deviations from the initial proposal, if applicable, in addition to the economic calculation of the invoice for the project design. Specifically, you should answer questions corresponding to the cells of the matrix labelled “Economic” and “Exploitation”.

In the final stage, you should also reflect on economic risks. In other words, consider whether situations could occur that would be detrimental to the viability of the project. Explain potential situations (that you have not considered due to a lack of time, resources, or ability) that could have a negative impact on the economic viability of your project.

3.3. Social impact study

In this section, we present questions that you could ask on the social impact of your project. You should consider the social implications for the project’s target group and for other groups. For example, the creation of a recycling system is a social improvement, but it also initially complicates the daily lives of users as they must change their habits.

Questions referring to **personal impact** (Project Development column) should address how undertaking the project has affected you and your closest environment: How has it changed your life, if it has, or how has it changed your vision of life? Has it made you aware of situations you did not know about before? In the initial stage you will probably have to make forecasts (questions in Table 3a), while in the final stage you must reflect on the questions in Table 3b.

Questions referring to the **social impact** (Exploitation column) should be focused on considering the implications that undertaking your project could have for society. To answer questions in the initial stage and the final stage proposed in the matrix, you should identify the group affected by the problem/need that you will address. Groups related to the project

could be owners/ managers, employees, suppliers, consumers (direct users) or others (indirect or passive users).

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

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

By way of guidance, the below are some considerations that are typically relevant to the type of projects carried out at the ETSETB. These could help you to answer the questions proposed in the sustainability matrix.

- Who did the work that your project will now do? Are jobs at stake? Was it a decent job? Was it routine work? Will quality of working life be gained?
- Have you considered the usability of your product for people with special needs (elderly people, people with visual impairment, disabilities, etc.)? Are there barriers to use?
- Have you assessed the implications of your project in terms of privacy of user data, image rights, etc.? Could your project put anybody in a vulnerable situation?
- To what extent do you consider that your project will increase or decrease social inequality?
- Can the project be used directly by the public administration? Could it provide any service for citizens? Have you considered the implications of using free or proprietary software? Is the final result conceived as a product with copyright or a product for shared use?

When you consider social risks, explain likely, but insignificant, potential situations (that you cannot tackle due to a lack of time, resources, or ability) that could be detrimental to the people associated with your project (users, investors, employees, suppliers, etc.).

4. Conclusions

A good professional must know the environmental, social and economic impacts of his/her specialty and know how to face the ethical problems that arise from it.

Society, industry, and market demand more attention in matters of sustainability. In fact, there is an increase in the attention of investors and stakeholders on sustainability issues and the upcoming legislative proposals for reports will be more demanding in their measurement.

According to data from the KPMG Corporate Responsibility Reporting Survey, in 2021 96% of the world's 250 largest companies made sustainability reports. In a few years, it is expected that this ratio of complementation will also occur in smaller companies

In the EWOC/EIWC project, students can demonstrate that they have acquired the necessary skills to practice in the specialty they have studied. And among these skills must be those of measuring and reflecting on the impacts of their work and the possible technical and ethical consequences that arise.

This paper presents a method for carrying out a sustainability analysis for an EWOC/EIWC project. However, given the diversity of EWOC/EIWC projects at ETSETB, if a group of students wants to organize their sustainability analysis in a way that is different of what is exposed here, they can do so as long as a complete and justified analysis is made.

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