

Social Impact Assessment (SIA) for Capstone Design

The procedure in this document will help you to plan and execute a Social Impact Assessment to give you a clearer picture of the effect your design might have on the world around it. The outline should familiarize you with the process of performing a Social Impact Assessment (SIA) of a design. Once you complete the steps in this outline, **you may use it to create the section on the Social Impact of your design for your final report for Capstone Design, using the guidance template at the end of this document.**

The procedure consists of three steps: (1) Defining the Goal and Scope, (2) Performing an Inventory Analysis, and (3) Interpreting the Results.

An example is provided for a Social Impact Assessment of a laptop computer [1]. A glossary of terms used in this document may be found at the end of the procedure section of this document.

1. Define the goal and scope

Defining the goal and scope of the study is the first step in the SIA as it provides context and its definition affects the subsequent steps of the analysis. The *goal* of the SIA describes the objective of the study, or basically the reasons for performing it. The *scope* describes the design system being studied, the product lifecycle stages considered in the analysis and the definition of the functional unit. The goal and scope are captured in tabular form. Refer to Table 1 for an example of the output of the goal and scope step.

A. Define the objective of the study

- What do you hope to learn from your social impact assessment about your design/product?
 - Why is the analysis being performed?
- What stage in your design process are you in when this assessment is being performed?

B. Define the scope

- The scope defines: the function of the design being studied, the functional unit, the product lifecycle stages considered and its associated activities.
- Describe your design
 - What design problem or opportunity are you addressing?
 - What is the intended purpose or function of the design? (Should begin with action verb)
- If you're assessing more than one design alternative, describe each design alternative.

C. Define your functional unit

- The functional unit is a quantifiable element related to the product being studied, such as the product itself, a subcomponent of the product, etc.

D. Select the lifecycle stages considered in this assessment of your design

- Determine which stages of the design/product lifecycle(**shown in bold**) will you consider:
 - **Production**
 - Raw material extraction
 - Material Processing
 - **Manufacturing**
 - Material forming or molding
 - Product assembly
 - **Product use**
 - Customer use of product
 - Associated product maintenance
 - **End of Life**
 - Landfill disposal
 - Recycling/Reuse
 - Incineration

Summarize the results from the Goal and Scope step as shown in Table 1.

Table 1: Example Goal and Scope Section Summary

Objective of Study	Design Function	Functional Unit	Lifecycle Stages Considered	Associated Activities
Assess social impacts of laptop computer	Provide desktop computer functionalities in a lightweight and portable package	1 laptop computer	Production	Raw material extraction
			Processing	Assembly of components

2. Inventory Analysis

The inventory analysis determines the relevant stakeholder groups, social impact categories and the social impact indicators of the SIA analysis. The data is organized hierarchically by stakeholder group, social impact categories and social as shown in Figure 1. The output of the Inventory Analysis step is captured in tabular form. Refer to Table 4 for an example of the output of the inventory analysis step.

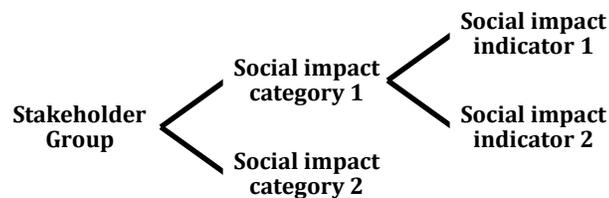


Figure 1: Hierarchy of analysis data based on the stakeholder groups

E. Select applicable stakeholder groups

- What are the stakeholder groups in your design context/problem?
 - A stakeholder group is defined as a group of individuals that share a set of characteristics on how they are affected by the product lifecycle activities
- Select among the 5 stakeholder groups shown in the first column of Table 2
 - The selection should be based on the goal and scope of your analysis and on the product lifecycle stages that you are considering for your social impact assessment.
- Are there additional groups that should be considered in your social impact assessment that aren't represented by the groups suggested in Table 2? If so, document them.

Table 2: Stakeholder groups with definitions and examples.

Stakeholder Group	Definition	Examples
Consumers	Individuals that interact with the product when using it	<ul style="list-style-type: none"> ● Sugar consumers [2] ● Bamboo bicycle users [3] ● Laptop users [1] ● Vehicle users [1]
Local community	Individuals living near facilities where product lifecycle activities are conducted	<ul style="list-style-type: none"> ● People living around sugar farms (not workers) [2] ● People living around bamboo bicycle

		frame production companies [3] ● People living near Copper mines [1]
Society	Refers to norms, rules, and laws regulating socioeconomic development. This group also refers to a collection of individuals at a bigger scale than the local community stakeholder group. [5]	● Government representatives [2] ● Sustainability related policies [4] ● Mining company codes of conduct [1]
Value-chain actors	Individuals involved in activities to create the product, without having direct contact with it.	● Sugar farm owners [2] ● Bamboo farm owners [3] ● Extracted material distributors [1]
Workers	Individuals that directly act on the activities for producing the product	● Sugarcane farms employees [2] ● Bicycle frame companies workers [3] ● Copper mine extraction workers [1] ● Tire manufacturing employees [1]

F. Select applicable social impact categories

- Social impact categories are defined as logical groupings of social impact results related to the social issues of interest for each stakeholder group [5].
- Select among the social impact categories shown in Table 3, based on the goal and scope of the study and on the stakeholder groups selected in Step 2-A.
- Refer to the 2011 UNEP Methodological Sheets [4] (download from the ME Capstone website) to see a full list of impact categories for each stakeholder group, as Table 3 only contains a few examples.

Table 3: Example social impact categories for consumer and local community stakeholder group.

Stakeholder Group	Social Impact Category	Definition
Consumer	Health and Safety	Customers expect the product that doesn't pose a risk to their health and safety when used.
	Feedback Mechanisms	Paths through which consumers can communicate their product satisfaction to a company.
	End-of-Life Responsibility	The extent that companies inform the consumer about the possible end-of-life options of the product.
Local community	Delocalization and Migration	The extent of organization's contribution to involuntary delocalization of populations due to lifecycle product processes.
	Local Employment	The effects of an organization in the local employment. This includes income and training opportunities to community members.
	Access to Material Resources	The extent to which organizations work to protect, provide, or improve community access to material resources and infrastructure.

G. Select applicable impact indicators

- Social impact indicators provide a measure of the social aspect being evaluated [5].

- Select corresponding indicators for each selected social impact category using the 2011 UNEP Methodological Sheets [4]. Summarize them as shown in Table 4 (**note that this appears as Table 2 in the guidance template**), for each lifecycle stage, stakeholder group, and social impact category you have selected.

Table 4: Example Inventory Analysis Section Summary

Product Lifecycle Stage	Stakeholder Group	Social Impact Category	Impact Indicators
Production	Workers	Child Labor	% of children working in country/sector
			Accident rate by country/sector
	Health and Safety	Extraction of material resources and level of industrial water use	
	Local Community	Access to material resources	Number of hours worked per employee
Processing	Workers	Hours of Work	% of children working in country/sector

3. Interpreting the Results

- Based on the analysis performed in Steps 1 and 2, write a reflection addressing the following questions:
 - How do you predict your design will impact human well-being, positively and negatively?
 - What steps can you take to minimize the negative social impacts of your design?
 - In completing Steps 1 and 2, what was your reasoning for the selection of the:
 - lifecycle stages?
 - stakeholder groups?
 - social impact categories and indicators?
- Your reflection should not be framed in a question-and-answer format.

Example Reflection for Social Impact Assessment of Laptop Computer

How do you predict your design will impact human well-being, positively and negatively?

Numerous potential positive social impacts are expected from the lifecycle activities. Laptop components are usually produced in countries with lower employee wages, so employment and job creation is an expected benefit. As with any computer, laptops are enabling technologies that allow users increasing capabilities, especially for professional purposes. Laptops are global products that promote trade and global economic prosperity due to the multinational actors involved from the design process to the creation of the tangible product.

Potential negative impacts are expected for the worker stakeholder group. Laptop component production and processing is usually performed in less developed countries due to their lower labor costs. Lower labor costs are usually associated with poor labor regulations that fail to protect employees relative to countries with more strict labor code practice and oversight. Laptop components require the extraction of rare earth metals that involve dangerous and polluting mining processes. In addition, these processes may also involve a significant use of natural resources, which is critical in countries with low employee wages.

What steps can you take to minimize the negative social impacts of your design?

Because there is significant concern for unregulated labor practices, it will be wise to select companies that are established in countries with labor regulations that protect workers and avoid any type of child labor. It will be advised to consider companies that promote and enforce the use of safety gear and practices among its employees and that provides regular safety training to their employees. Another important aspect to consider is to implement designs that have a reduced use of natural resources or even more importantly, to select companies and countries that have sustainable practices and agreements in place to protect the environment.

In completing Steps 1 and 2, what was your reasoning for the selection of the:

- **lifecycle stages?**

The production and manufacturing lifecycle stages were selected because it was assumed that these two have the greatest potential for social impacts relative to the rest of the stages.

- **stakeholder groups?**

Based on the selected lifecycle stages, the workers and the local community are the stakeholder groups expected to have the greatest social impact.

- **social impact categories and indicators?**

The social impact indicators selected in the analysis for the worker stakeholder group are based on the history of poor labor laws and working conditions in the country where most of the production and processing activities occur (China).

Appendix A Glossary of Terms

Table A1: Definition of terms

Term	Definition
Consumer Stakeholder Group	Individuals that interact with the product during the use phase of the product lifecycle. [5]
Functional Unit	A functional unit is a measure of the performance of the functional outputs of the product. [6]
Local Community Stakeholder group	Individuals living near facilities where product lifecycle activities are conducted. [5]
Primary Data	Data that is specific for a company or product lifecycle activity collected directly from the source via interviews, questionnaires or surveys [7]
Performance Reference Points	Reference values that give an indication of the current state of a metric from a social context [8]. Performance Reference points may be internationally set thresholds, goals or objectives according to conventions and best practices [5].
Qualitative Indicator	Qualitative indicators are normative, meaning that they provide their descriptions using words. Qualitative indicators are important when measuring stakeholder perception about subjective issues. One example is the perception of employees regarding the strength of a management system to protect consumer privacy
Quantitative Indicator	Quantitative indicators provide their description using numbers, like for example the number of accidents reported during a manufacturing process
Secondary Data	Data that is not collected directly from the source or product lifecycle activity being studied [7].
Social Impact Indicators	Social impact indicators are evidence, subjective or objective, qualitative, quantitative or semi-quantitative, being collected in order to facilitate concise, comprehensive and balanced judgments about the condition of specific social aspects with respect to a set of values and goals. Indicators are specific definitions of the data sought. [5,9]
Social Life Cycle Assessment (S-LCA)	S-LCA is a social impact assessment method that aims to assess the social and socio-economic aspects of products and their positive and negative impacts along their life cycle, encompassing

	extraction and processing of raw materials, manufacturing, distribution, use, re-use, maintenance, recycling, and final disposal. [5,10]
Society Stakeholder Group	Refers to norms, rules and laws regulating socioeconomic development. This group also refers to a collection of individuals at a bigger scale than the local community stakeholder group. [5]
Stakeholder	Any individual that has an interest in any activities or decisions of an organization. [5,11]
Stakeholder Categories/Groups	A cluster of stakeholders that are expected to have shared interest due to their similar relationship to the investigated product [5]; groups upon which the product has an impact along its lifecycle. [7]
Semi-Quantitative Indicator	Semi-quantitative indicators provide descriptions based on yes or no answers (binary) or using a scoring system such as a Likert scale. One example is the presence of a stress management program in a company
System Boundaries	A set of criteria specifying which unit processes are part of a product system considered in the social impact analysis. [5]
Value chain	The full range of activities that firms and workers to bring a product, from its conception to its end of life, including design, production, marketing, distribution and support.
Value-chain actor	Individuals involved in activities to create the product without having direct contact with the product. Every person that adds value to a product; an identifiable company, or well-organized community of small-scale entrepreneurs. [5,12]
Worker Stakeholder group	Individuals that directly acts on the activities for producing the product. [5]

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Social Impact Assessment (SIA) Results Template

This template provides a means to organize the results obtained by following the Social Impact Assessment (SIA) procedure. The template consists of three sections corresponding to the SIA procedure: (1) define the Goal and Scope, (2) perform an Inventory Analysis, and (3) interpret the Results. With proper prose and formatting, this template may be integrated into your ME Capstone reports.

1. Goal and Scope

Complete **Table 1** based on the SIA procedure.

Table 1: Goal and Scope Section Summary

Objective of Assessment	Design Function	Functional Unit	Lifecycle Stages Considered	Associated Activities

2. Inventory Analysis

Complete **Table 2** based on the SIA procedure. Use the provided *2011 United Nations Environmental Program Methodological Sheets* (download from the ME Capstone site) to find applicable social impact categories and indicators.

Table 2: Inventory Analysis Section Summary

Product Lifecycle Stage	Stakeholder Group	Social Impact Category	Impact Indicators

3. Interpreting the Results

Write a reflection addressing the following questions (pay attention to the instructions in the SIA Outline document):

- How do you predict your design will impact human well-being, positively and negatively?
- What steps can you take to minimize the negative social impacts of your design?
- In completing Steps 1 and 2, what was your reasoning for the selection of the:
 - lifecycle stages?
 - stakeholder groups?
 - social impact categories and indicators?