

Project Planning: Introduction to the Four Smart Design Lenses

Circular Economy, Smart Design, and the United Nations Sustainable Development Goals

In a traditional linear economy, products are made, used, then discarded. However, in a circular economy, products are designed with sustainability in mind. Products are designed to be useful for as long as possible and then can be recycled into components, materials, or other products.

As an engineer, it is vital for you to envision yourself as a professional who strives to improve the world in which you live and to imagine how your efforts impact others. For the major assignments in this course, you will be asked to imagine how your work is informed by, and informs, global sustainability. In order to do this, you will work with a team (and, in some assignments, individually) to address the United Nations (UN) Sustainable Development Goals (SDGs). These SDGs were developed to encourage the global community to strive for sustainability by 2030. All seventeen (17) SDGs address significant problems in our world.

The goal is to support your learning and to help you recognize the potential for positive social impact through your work. Modelled after “systems thinking,” this approach will guide you to imagine your work in the larger context of the UN SDGs and to drive your abilities to think critically.

The following resources will be helpful in contextualizing the project:

- **UN SDGs:** www.un.org/sustainabledevelopment/sustainable-development-goals/
- **National Zero Waste Council:** www.nzwc.ca/focus/circular-economy/Pages/default.aspx

As you focus your attention on **a specific consumer product that is related to this semester’s assigned topic**, you will need to consider how the product will fit into the concept of a circular economy and how you can work with your team to adapt/improve the product through Smart Design.

Smart Design is a model used to support sustainability and is one way to address the goal of creating a circular economy. There are several resources and organizations devoted to Smart Design as a practice, so you will be able to find many examples of how the model works. For this project, it is most important that you and your team address the product’s adaptation/improvement through four specific lenses:

- Business
- Human
- Technology
- Nature

These four lenses will give you the opportunity to conduct research and to explore the product, location, and SDG through specific contexts, and the exploration will help you to analyze the efficacy of your product adaptation/improvement. Each lens requires you to question, explore, and commit to developing solutions that will generate positive impact.

As you decide on a product and the SDGs with which you’ll work, consider how they can be addressed and assessed through the four lenses. Some of the questions that you can ask yourself are listed below.

Please note that these lists of questions are not exhaustive – they are provided here to help launch your inquiry.

Business

- What are the key metrics for determining the success/failure of this design?
- What is the business model?
- Who will fund this design and how will that funding be sustained?
- What is the anticipated revenue/profit based on similar products in the market?
- What implications will this design have on local, regional, national, and global business? (e.g., How will governments and policies impact [or be impacted by] this design?)
- What is the value proposition of the product?
- Is there room for this product in the market? How might you prove that there is?
- How might your team source the materials for this product? Who will manufacture it? What will be the production costs?

Human

- Who has *access* to this design? What barriers might users encounter? Is it realistic and feasible for your intended use?
- What *specific* populations or communities will benefit most from this product?
- Who will be affected by the design? In what specific ways?
- Who holds responsibility and accountability for this design and its success/failure? How will they be held responsible/accountable? (Note: Do not simply state that it is the “government’s” responsibility—the analysis must be deeper)
- Who are the stakeholders and what are the “stakes” for each of them? How will we know with certainty?
- How will you ensure that the product is not misused?
- How will this product improve the lives of the people who use it?
- What are the difficulties in the personal transportation industry that this product will help solve?

Technology

- What other technical models have been developed? How successful have they been?
- What modifications can we make to the design to balance the other lenses?
- What are the technical requirements to use this product?
- What technical skillsets will be necessary for consumers to use this product?
- Will training be required to support the product’s use?
- Are the current technologies appropriate for this design? If yes, why? If not, what new technologies would we need to address the issues?
- Are the technical and technological infrastructures of your proposed location appropriate for this design? Where else can this design be used effectively? What are the barriers to use?
- How long will it take for this product to become obsolete? What is the plan for extending its life?

Nature

- Which ecosystems will be affected by this design? How will they be affected?
- In what ways is this design sustainable?
- What are the thresholds for “acceptable” levels of sustainability?
- What projections can be made about improvements to nature by using this product?
- How much waste will be produced when manufacturing this product? Is it recyclable?
- How will sourcing the materials for this product impact the environment or other ecosystems?
- What are the potential negative environmental impacts of this design?
- How long will it take for environmental sustainability to be achieved with this design?