



Socially Sustainable Product Development

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Introduction

There are three pillars of sustainability: environmental, economic, and social (see Fig 1). In this document we will focus on the social pillar and will show how that has not received as much attention as the other two dimensions — environmental and economic. (Vavik et. al. 2010, pp. 296.) First, we aim to define social sustainability and a few other terms. After this, we will generally present how social sustainability can be taken into account in product development. We also present a single framework to guide decision-making at the start of the design process and product evaluation at the end of the design process. We also present why social sustainable development is important, and when and why this field of industry started to develop. Finally, we give some examples of successful projects, but also failed ones.



Figure 1: Three pillars of sustainability (Timo Salmi, 2020)

Defining social sustainability

Many definitions of social sustainability have emerged so far, but its all-encompassing definition is still missing in policy and practice (Amir Ghahramanpouri , p. 185-190). As Michael Jacobs notes, ‘the vagueness of the definition allows business and “development” interests (and their government supporters) to claim that they are in favour of sustainable development when actually they are the perpetrators of unsustainability’. (Jacobs 1999, pp. 24.)

The concept of "social sustainability" in one approach encompasses such topics as: social equity, diversity, interconnectedness, quality of life, democracy, government, livability, health equity, community development, social capital, social support, human rights, labor rights, placemaking, social responsibility, social justice, cultural competence, community resilience, and human adaptation (see Fig 2). (McKenzie 2004, pp. 9.)



Figure 2: The concept of social sustainability (Timo Salmi, 2020)

Other definitions

Digital fabrication

Digital fabrication is a design and manufacturing workflow (CAD -> CAM -> 3D printer or CNC milling machine) (Gershenfeld, pp. 1-2).

DF4D

DF4D means digital fabrication for humanitarian/development (Gershenfeld, pp. 1-2).

How social sustainability is linked to product development?

In response to the challenges posed by the vague definition, research on social sustainability has increased in recent years. However, Design for Social Sustainability (DfSS) remains a poorly understood concept and there is even less guidance on how to practically implement it. Several projects aimed at creating social good have been criticised for not creating social sustainability. For example, Playpumps was a system for pumping water in rural Africa using a children's merry-go-round. It received the 2000 World Bank Development Market Place Award and secured over \$60 million in funding. However, users were not consulted before the pumps were installed and children did not use the pumps to play. Instead, adults had to awkwardly turn the merry-go-round by hand to pump water, which was more difficult than using a traditional hand pump. The pumps were also expensive and difficult to maintain and Playpumps closed operations in 2010 after the project was deemed no longer sustainable. (Corsini et. al. 2019, pp. 2.)

Case: Mr. Papanek

Victor Papanek was a designer and educator born in 1923. Papanek's design for the real world remains one of the most read books in the design world and was the first to address in detail the ethics and social responsibility of (industrial) designers. In his book, Papanek exemplified using the 10 cent Tin Can Radio (see Figure 3) some characteristics of social responsibility and sustainability that we wish to emphasize here. Working together with a student, Papanek came up with a 'one-transistor radio, using no batteries or current and designed specifically for the needs of developing countries. The radio was, of course, non-directional, receiving any

and all stations simultaneously. But in emerging countries, this was then of no importance: there was only one broadcast. (Melles et. al. 2011, pp. 224–225.)



Figure 3: 10 cent tin can radio (Melles et. al. 2011, pp. 225)

Emphasize the social sustainability of supply and demand sides as well

DfSS Framework for DF4D Projects

Corsini et. al. (2019, pp. 5) have developed this framework to guide decision-making at the start of design process and product evaluation at the end of the design process. The DfSS framework identifies 16 criteria related to product, process and paradigm factors (see Figure 4). Rather than suggesting a hierarchy, they emphasize that all three categories (product, process and paradigm) must be considered in order to achieve social sustainability. Simply, they do not believe that social sustainability can exist without addressing all three dimensions from the start of DF4D projects. (Corsini et. al. 2019, pp. 5.)

Paradigm	14. Advancement – does it create jobs in country? Does it build on existing skills? Does it develop new skills?		15. Empowerment – does it reduce dependency? Does it empower people to own and develop the solution?
	9. Local manufacture – can it be manufactured locally?	10. Local control and repair – can it be controlled, maintained and repaired locally?	11. Collaborative – does it consider and engage with all stakeholders?
Process	1. Need – does the user or community need it? Does it support human dignity?	5. Quality – is it robust and long lasting? Does it meet the necessary standards?	12. Transparent – is there supporting documentation? Is information shared?
	2. Suitability – is it socially, culturally and environmentally appropriate?	6. Adjustability – is it flexible and adaptive to changing circumstances?	
	3. Access – is it accessible and affordable now and in the future?	7. Inclusive – is it inclusive of marginalised groups or does it prioritise specific user groups?	13. Scalable – is the production process replicable and scalable?
	4. Usability – is it the solution easily understood and easy to use?	8. Complementary – does it support existing solutions and avoid unnecessary redundancy?	
			16. Systemic – is the solution insular or does it trigger wider social change?

Figure 4: Design for Social Sustainability framework, for DF4D projects. (Corsini et. al. 2019, pp. 5)

So how has Sustainability in a “social” way been developed throughout the history?

As mentioned in the beginning the social aspect of sustainability often was neglected from society because of his more popular and bigger brothers economy and environment:



Figure 5: Social Sustainability as little Child among Economy and Environment (Markus Ogrizek)

The first deeper awareness of social sustainability product development started around the millennium years 2000 (Pisani, 2006). But why that late? That it's a good question because the discussion about sustainability started much earlier. But the focus was set on the environmental and economic aspect (Ceschin and Gaziulusoy, 2016). This can be seen also in the Brundtland report from 1987, in which the word "social..." is 122 times mentioned, compared to "econom..." 573 times and "environment..." 1003 times (Brundtland, 1987). The social aspect was mentioned but the common sense was that when the economy and the environment is going well, then the social aspect will always be fine. This leads to the point the social scientist before the year 1987 had a difficult time by finding key aspects and implementing key values for social thinking in the direction of sustainability. How common problems influenced social scientists is going to be shown in the next graphic (according to Omann and Spangenberg, 2002):

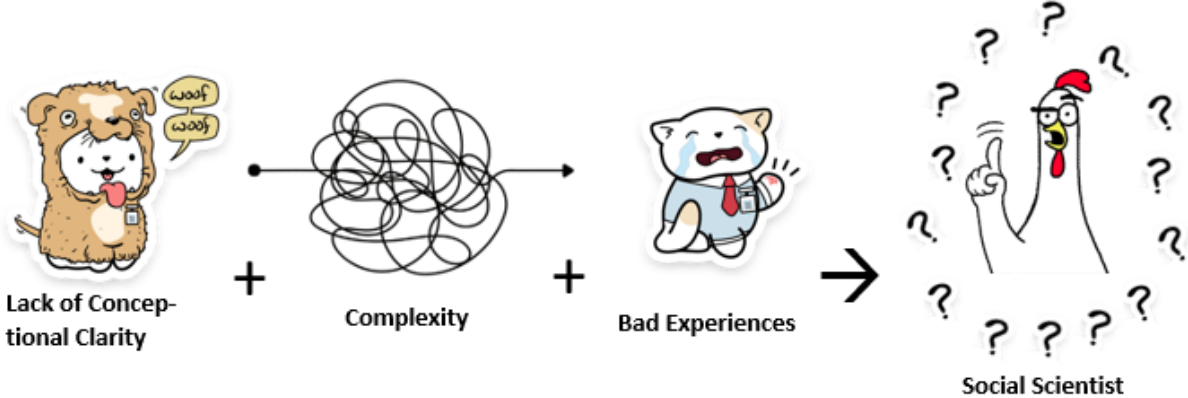


Figure 6: Sum of Problems for social Scientists (Markus Ogrizek)

To summarize these parts: Different countries put different focuses to address the matter of social sustainability (Lack of Clarity) and to measure the social outcome also for acting social sustainable as a company or institution is very difficult (Complexity). First tries at the 1960s to formulate social norms only get limited public resonance or even harsh rejection because of pulling norms over ideologies. The time didn't seem to be ready (McKenzie, 2004).

After the release of the Brundtland Report in 1987 the milestone was set for a more sustainable future. This also include the social part of product development. Since then more tries have been made to find the key factors to describe social sustainability (which are mentioned in the beginning). But how social sustainability looks nowadays? Let's go through a short critical reflection (according to Shirazi and Keivani, 2017, pp. 10):

1. The concept of social sustainability is still not clear. There are no blueprinted common definitions. But is it bad? Beside this mess there is also a positive side, that exactly this unclarity provides us the possibility to adjust social sustainability to different problems, to the specific circumstances.

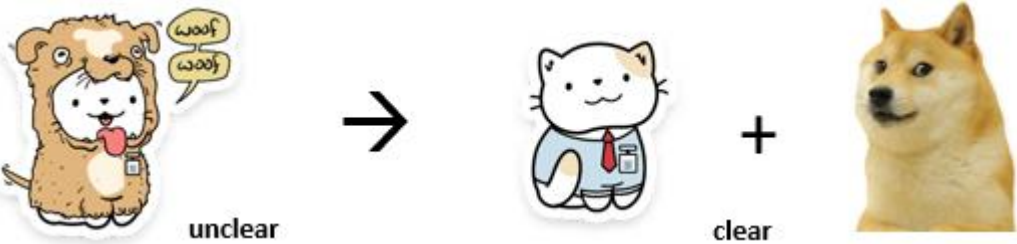


Figure 7: Clarity of Social sustainability (Markus Ogrizek)

- There is a change since the 2000s from so called “hard” themes (employment, poverty, basic needs etc.) which were more likely to be measurable, to “soft” themes (identity, happiness, social networks etc.) which are less measurable.



Figure 8: Change in themes (Markus Ogrizek)

- Social sustainability is not clear to reach, the complexity is and will be one of the main aspects. But it can be subcategorized in the different pillars (key principle

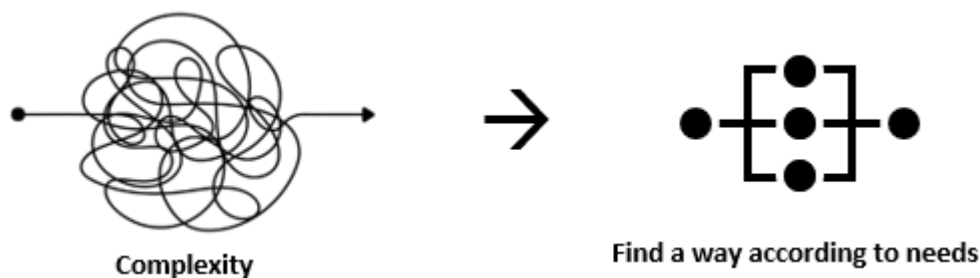


Figure 9: Solving Complexity (Markus Ogrizek)

Besides all the effort to think for social sustainable product development, it is still the least developed sustainable part, or isn't it? Next to the facts that the focus is more on economy and environment, the social aspect often takes part fragmentally in both parts (Shirazi and Keivani, 2017). So the next part will deal with the question, how this approach looks like and how products are created in social sustainable manner.

Cases examples of socially sustainable product development

Tangible products

Inclusive design is a good example of the end result of product development that recognises other social impacts than just the experiences of the majority of the potential user base. (Nedelcheva, 2020)



Figure 10: Safe Grip (McQuarrie, 2019)

Safe Grip -mascara holders by Grace Beauty were designed to make the products easier to hold by people with for example arthritis or cerebral palsy. The design was inspired by Grace Beauty's active participation in different minority communities online. (McQuarrie, 2019.) However, the company has not come up with more products since their launch in 2019 and has taken their home page down. There is no information available why this has happened, but the product could be an example of a design that in the end did not answer to the real needs of the user Figure 5: Safe Grip (McQuarrie, 2019) base.



Figure 11: Guide-suitcase (Hemsworth, 2019)

Another example of inclusive design is the Guide-suitcase. It is a self-driving suitcase that also acts as a walking guide in three ways; by guiding the person with autonomous driving, by communicating through braille in the handle and by having a detachable walking stick in the handle as well. The product was still in conceptual phase in 2019, and there has not been updates about the product coming to market yet. (Hemsworth, 2019.)

Another example product group is products for humanitarian aid. In these products, the social sustainability is not considered as a matter to minimise the negative social impact (i.e. discrimination) but to maximise the positive effect.



Figure 12: Unicef Brick (Laylin, 2014)

An example of humanitarian aid products is the Unicef Brick. The product is meant to help people in extreme poverty or after a crisis by providing food containers that are easy to transport in difficult environments, can be reused and serve as building blocks due to their Lego-like design. (Laylin, 2014.) This is a good example of a product that has been developed by taking the social aspects into account already when scoping the product need, not only the usability.

Intangible products

With new products emerging through technological advancements, the product development processes related to these have to tackle new social sustainability challenges. These include social issues when the product is relied on more, AI bias in digital recruiting tools, for example, and social issues related to its abilities, such as data security and human rights with biometric surveillance systems. (Sinders, 2020.)



Figure 13: Company Logos

Socially sustainable product design can in this case include leaving out functionalities that could cause social harm, even though it would be in the interest of the company's clients. For example, Google left out a facial recognition feature from a test search engine to the Chinese market in the fear of abuse. Similarly, IBM has added a "Check fairness" -button to some of its systems for the user to evaluate, whether the algorithm is basing its decisions on problematic aspects, such as gender or zip code. (Simonite, 2020)

Now we will continue by creating the Link to supply chains and how social sustainability failed today.

Supply chain view

In the process of socially sustainable product development, we want to include the supply chain. This aspect should be considered to enable fully sustainable product development. For example, companies partnering with Fairtrade are required to comply with social sustainability standards throughout the supply chain. (Fairtrade and sustainability | Fairtrade Foundation, n.d.) Also, Ben & Jerry's ice cream brand has leveraged the sustainability aspect and created their strategy around the theme. Their whole product development evolves around sustainability; especially environmental and social aspects are taken into account. They have several campaigns concerning the topic. (Ben & Jerry's is a values-led company), (Causes Ben & Jerry's has advocated for over the years with their corporate social responsibility | Ben & Jerry's)

Failing sustainability

Socially sustainable product development is not easy and it requires a great understanding of social sustainability and its dimensions. For example, Nestlé failed to take into account the whole supply chain while aiming to be more sustainable. As they developed their products to become more environmentally sustainable, they advertised their actions and promoted themselves as a sustainable choice. (Sustainability Fails - 10 Brands that Got it Wrong | Attest Blog, 2020) What they failed to address, was the child labor used in their cocoa farms. In this case, socially sustainable development was compromised due to environmental factors. (Child labour on Nestlé farms: chocolate giant's problems continue, 2015)

Aslo, PlayPump, an example we presented at the beginning is one example of failed socially sustainable product development. There were great intentions during the development of the product: the kids would play and create energy used for the pumping system to help the village to pump water. (Playpumps | All children have the right to clean water ... and the right to play, n.d.) Sadly, the device did not solve the actual problem which was based on the shortage of clean water, not the pumping power. Also, the pump did not work as efficiently as hoped so it created problems with the water supply for the villages. (Stellar, 2010)

Conclusion

When we are looking on today, our conclusion out of this background is, that the social aspect gets more and more into focus, especially during the pandemic. People feel less connected to their human social kind, even when companies try connecting the people more and more. It is also on us to go into deep here and help addressing the social needs in product development.

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