

FOLLOWING IN THE FOOTSTEPS OF CIRCULAR DESIGN

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PAPER ABSTRACT: Circular design has become one of the well-known methods to create a better, sustainable, and livable future. Design schools started to embrace circular design in their curriculums, and designers are looking for ways to come up with alternative materials, renewable resources, and traditional methods of making along with emerging technologies. Designers are now looking for ways to design products that come from nature and return to nature without leaving waste behind. They employ different strategies such as reusing, repurposing, and repairing for longer-lasting products. Therefore, this paper explores circular design, systems thinking, and their potential in the near future through reimagining existing products and services.

Keywords: Circular Design, Sustainability, Circular Economy, Design for Sustainability

1. INTRODUCTION

While the idea of CE (Circular Economy) has recently gained increased attention, its origins can be traced back to the 1960s (Blomsma & Brennan, 2017). The concept of circularity and what comes from nature goes to nature have been discussed and experimented with over the years within sustainability studies. According to Walker (2006), after the Brundtland Report, various sustainability concepts have been developed and are primarily focused on environmental responsibility, social fairness, and economic aspects. These ideas aim to clarify the principles of sustainability for businesses and governments. In addition, grassroots movements have begun to create and adopt different strategies, models, and recommendations to help the public comprehend sustainability better (Edwards, 2005). John Elkington introduced the Triple Bottom Line (TBL/3BL) to provide companies with a broader comprehension of values discussed in the Brundtland Commission's report, aiming to encourage the capitalist world to pursue sustainability and involve customers in sustainable development (Henriques & Richardson, 2004). Elkington also coined the 3P (People, Planet, and Profit) slogan to simplify and promote the Triple Bottom Line concept among businesses (ibid.).

The Triple Bottom Line has effectively captured corporations' attention and presented a new perspective on balancing financial goals with ecological considerations in sustainability (McDonough & Braungart, 2002). However, the TBL concept has also faced criticism from various sources (Walker, 2011; McDonough & Braungart, 2002; Norman & MacDonald, 2003). Walker argues that TBL concerns, such as national or global issues, are often on a larger scale, making it challenging to involve individuals in supporting its development (2011). McDonough and Braungart suggest that focusing solely on the "bottom line" may hinder innovation (2002). Norman and MacDonald question the practicality of the TBL concept and suggest that the three components may be seen as "metaphors" that create a false impression of achieving sustainability (2003, p.245).

Moreover, several design frameworks have been introduced to businesses to incorporate sustainability into their agenda, including Eco Design/Life Cycle Design/Design for the Environment and others. Life Cycle Design (LCD), also known as EcoDesign or Design for Environment, combines design with environmentally conscious manufacturing (Vezzoli, 2007). Eco Design emerged in the late 1980s to redefine design and industrial practice for longer-term sustainability goals (Ryan cited in Madge, 1997). However, according to Madge, Eco Design may not be realistic since it relies on ecology to function perfectly, which may only sometimes be true (ibid.). Thackara (2005, p.14) acknowledges the advancements in Life Cycle Design but criticizes the method of calculating the environmental impacts of a product during its lifecycle, stating that it can lead to counterintuitive outcomes such as the discovery that natural materials are not always more environmentally friendly than artificial or manufactured ones.

Designing emotionally engaging products is another approach to promoting sustainability, as most materials end up in the trash within three months (Chapman, 2005, p.8), and extending a product's longevity by creating an emotional attachment to it could be an effective strategy. According to Norman (2004, p.5), the emotional aspect of design may be more critical to a product's success than its practical features. Chapman also notes that before the Industrial Revolution, people were not naturally wasteful, but the norm has shifted towards short-term, disposable products (2005). Chapman proposes that "emotionally durable design" can move users away from the transient world of technology-centric design towards a more engaging realm of objects and experiences that are emotionally durable (ibid.).

To achieve sustainability, designers are now focusing on creating products made from natural materials that can be easily recycled or composted without leaving waste. The Ellen MacArthur Foundation is a leading organization promoting a circular economy, which involves designing out waste and pollution, keeping products and materials in use, and regenerating natural systems (The Ellen MacArthur Foundation, n.d.). However, now and then, sustainability, the TBL, the circular economy, and many more frameworks need to be revised toward the desired goal: Creating a better world. Leyla Acaroglu writes (2022)

The solution according to the contradictions is to move beyond sustainability and replace it with new terms like resilience, thriving, and now, regeneration. All of these are important concepts and hold very desirable end goals, but what happens when new frames are created without the context and applicable knowledge to fill them?

We have a linear materials economy where natural resources are extracted, processed, used, and disposed of. However, due to population growth, increased affluence, and limited resource availability, there is a need to transition to a more circular way of using materials. This means repairing, reusing, and recycling products at the end of their life rather than disposing of them.

These three Rs create a technological cycle similar to the biosphere's natural cycles. The idea of repair, reuse, and recycling is familiar and has been used for centuries in less developed economies. However, in developed nations, they became less popular as the cost of labor and materials decreased.

Governments have implemented regulations to reduce waste, such as take-back policies, recycling targets, and minimum product lifetimes. However, these measures can be seen as punishment for poor behavior rather than a positive call to action. There have been movements promoting efficiency, such as eco-efficiency, material efficiency, and energy efficiency. While these are commendable efforts, they may aim to continue business as usual while reducing the impact on natural resources and minimizing guilt.

In his predictions for design in the 21st century, Papanek (1995, p.48) envisioned a multidisciplinary approach to design that would address socioeconomic and political concerns. According to Chick and Micklethwaite (2011), the definitions of "design" and "sustainability" are not fixed, and the emerging language of "design for sustainability" is still evolving. However, the sustainability agenda challenges designers to ask fundamental questions about their work. Sustainability should shape our worldview, and everything we design should contribute to achieving a sustainable future (ibid., 2011, p.165). As the industry depends on design to remain competitive and create new markets, design can be crucial in driving change.

2. CIRCULAR DESIGN IN ACTION

As a sustainability scholar, I have been collecting cases and teaching circularity over the years following the frameworks that Ellen MacArthur Foundation (2023) proposes: Design out waste, keep materials in use, and regenerate natural systems. For instance, Alvaro Catalán de Ocón devised a unique solution by combining modern industrial design with traditional handcraft techniques (PET Lamp, 2020). In Colombia, displaced artisans affected by guerrilla warfare were employed to create the lampshade by weaving cut plastic strips, while the bottle's neck was used to connect with the light fitting (ibid.). This innovative design prolongs the lifespan of plastic material and reduces its impact on the environment (PET Lamp, 2020) while creating job opportunities for local artisans. Çöp Madam is a company that originated as an innovative initiative in the western region of Turkey. The project was established to tackle women's employment challenges and emphasize the significance of recycling and reusing, with its primary objective being the artistic and exclusive utilization of waste materials (Çöp(m)adam, 2022). Their products range from purses to bags to accessories. Another example from Turkey is Toyi, a sustainable and imaginative construction set that empowers children to turn ordinary items into extraordinary toys while promoting environmental friendliness (Toyi, n.d.). Toyi can be used to generate a diverse range of playmates which is only limited to the children's imagination.

Another compelling example is a graduation project called Precious Plastics (Spekkink et al., 2022). Spekkink et.al. write

Here, too, environmental motivations played a key role: The initiator observed that our societies produce large volumes of plastic each year, of which only 10% was recycled at the time. The idea for [t]his graduation project was, therefore, to develop small-scale plastic recycling machines that people can use to recycle plastics themselves.

In another example, Ottan Studio (2023) works with biomaterials to create new mediums for product and interior designs. Their emphasis lies on addressing the issue of excessive resource consumption, asserting that attaining the Net-Zero objective necessitates a harmonious utilization of resources alongside the implementation of circular economy models (ibid.). Full Grown is a furniture company that 'reconsider[ed] and bypass[ed] the previous profligate commercial use of trees as a timber commodity (together with the attendant machinery and processing) and create[d] each piece with a 'carbon sink 3d printer', a magnificent tree' (Full Grown, 2023). This company is taking nature's power in creating things into consideration, and while they still control nature- trees in this case- they also give back the power to the wilderness (ibid.). I acknowledge all examples as immaculate in the sense that they revamp our understanding of what design can do when we- designers- act to solve the world's environmental and social concerns. However, the product or the production process alone seems not to make the 'radical change' (Thackara, 2005; Manzini, 2008) that many sustainability scholars have called for decades.

3. SYSTEMS THINKING IN CIRCULAR ECONOMY

All the above examples, in one way or another, can be considered valuable examples of circular design. However, the question remains: Is creating a 100% circular product possible? Systems thinking is one of the approaches implemented for circular or sustainable transitions. New advancements are challenging current systems on a larger scale, with concepts like circular design and circular economy presenting innovative strategies for building a more sustainable world (Gumus Ciftci et al., 2023). These approaches draw upon traditional ways of establishing people's economic and emotional bonds with their possessions, and the goal of circular design is to revolutionize the complete product life cycle by prolonging the usage period beyond its original phase (ibid.). Spekkink et al. (2022) also reflect on circular approaches saying that CE visions often believe that businesses should be responsible for implementing circular strategies, such as circular business models. This implementation can be facilitated by legal frameworks established by policymakers and driven by consumer demand for more sustainable products. According to Acaroglu (2022)

Sustainability is the business imperative of our time. Because customers and employees want to invest in, buy from and work for companies that have social and

environmental values, it's no longer good enough to buy carbon credits and claim a product is "carbon neutral" or has recycled materials in it.

Therefore, she suggests implementing a mindset shift and moving from siloed understandings of sustainability to a system thinking, which will be the way to create a deeper dive into the systems that create the issues, coupled with authentic cultural and organizational change, driven by actions that go well beyond the obvious' (Acaroglu, 2022). Wright and Meadows (2009, p.75) propose that systems work well because 'of three characteristics: resilience, self-organization, or hierarchy.'

So, what is a system? A system is a set of things— people, cells, molecules, or whatever— interconnected in such a way that they produce their own pattern of behavior over time. The system may be buffeted, constricted, triggered, or driven by outside forces. But the system's response to these forces is characteristic of itself, and that response is seldom simple in the real world.

Some critical initiatives employ a systems approach and have the characteristics mentioned earlier. Fairphone is a mobile phone company that offers repairability to their customers, and they gained an excellent repairability score with iFixit (Circular Design, 2023). They claim they are working towards a fairer and more sustainable electronics industry by responsibly sourcing materials, advocating for workers' welfare, and setting new standards for the electronics sector (Fairphone, 2023). Another example comes from a clothing company: Patagonia. Gaziulusoy and Ceschin (2020, p.77) write

Patagonia sells all its products with a set of services that are available at any time. These include repairs (free, excluding damage due to wear and tear), returns (with a full refund) and care and maintenance advice. In addition, if the customer no longer wears a piece of clothing, she or he has the option of trading in that product in exchange for credit towards another garment.

As noted, systems thinking is required and beneficial to consider the whole life cycle, from the extraction of raw materials to strategies for extending the lifespans of products and/or services. The systems approach to creating longer-lasting products and services result in 'optimizing material and energy consumption, economic and competitive benefits, and enduring socio-technical benefits' (Gaziulusoy & Ceschin, 2020, pp. 80-81).

4. DISCUSSION

The era, which started with the Industrial Revolution and went on to scientific and technological progress has brought severe problems, most strikingly for the environment. Consequently, sustainability arose in the latter part of the 20th century as a response to environmental concerns. Sustainability is complex and requires a deeper understanding and strong commitment (Worster, 1993). Van der Ryn and

Cowan (1996, p.19) claims that 'the emergence of the sustainability movement is deeply inspiring, for it potentially offers a holistic response to the environmental crisis that makes much-needed connections between nature, culture, values, power relationships, and technology'. Therefore, there have been various attempts to introduce sustainability principles to governments, corporations, and the public. These provided an understanding of ensuring sustainability, though all have some inefficiency.

Design movements might have targeted the designers themselves previously (Fuad-Luke, 2009, p.48, 50); however, now may be the right time to communicate environmental, social, cultural, and personal messages by designing considerate systems to be conveyed to a broader audience. Considering that 'design ought to be one of the professions at the forefront of making the world a better place' (Whiteley, 2006, p.132), designers can make that change happen. Besides, they can create sustainable systems or products that are considerate. Following Fuad-Luke (2009, p.72), 'knowing all the issues above equips a designer with a broader awareness of how design decisions can have a significant knock-on effect on distant ecosystems, lands, and peoples.'

As investigated above, there have been various attempts to reveal other layers of sustainability in different sectors. Economists, the public health sector, and political and social scientists are the leading experts with different understandings of sustainability (Worster, 1993). The most important thing not to ignore here is that sustainability is an issue on both the global and local scales. It is a concern of policymakers, environmental experts, grassroots ecological and social groups, indigenous people, and people committed to changing their communities' (Van der Ryn & Cowan, 1996, p.20), and it is a challenge that could be resolved if we start thinking in systems.

5. CONCLUSION

Sustainability is a multifaceted problem beyond just environmental issues and encompasses social, economic, and personal factors impacted by contemporary lifestyles and globalization. To address this, the circular economy has emerged as a potential solution, and design is at the forefront of circular strategies. Additionally, design practices have recently begun challenging the consumption patterns and lifestyles contributing to unsustainable practices. A systems approach- in which all stakeholders are considered and involved- creates more robust, applicable, and reliable solutions for sustainability issues. The examples above are proof of emerging initiatives from around the world and how design can lead the way to create a more just, circular, and resilient way of living. Designing for sustainability demands a comprehensive approach that considers all aspects of sustainability, and putting on a systems-thinking mindset might advance the radical change the world needs to create a just, sustainable, and circular future.

6. REFERENCES

- Acaroglu, L. (2022). *Swivel To Sustainability: A Full Systems Business Transformation Guidebook*. (n.p.): Disrupt Design LLC.
- Blomsma, F., & Brennan, G. (2017). The emergence of circular economy: a new framing around prolonging resource productivity. *Journal of industrial ecology*, 21(3), 603-614.
- Chapman, J. (2005). *Emotionally Durable Design*. London: Earthscan.
- Ceschin, F., Gaziulusoy, İ. (2019). *Design for Sustainability: A Multi-level Framework from Products to Socio-technical Systems*. United Kingdom: Taylor & Francis.
- Chick, A.; and Micketwaithe, P. (2011). *Design for Sustainable Change: How Design and Designers can drive the sustainability agenda?* Lausanne: AVA Publishing SA.
- Case studies\Circular Design*. Circular Design. (2016). Retrieved April 1, 2023, from <https://www.circulardesign.it/case-studies/#>
- Çöp(m)adam. (2022) Retrieved June 18, 2023, from <https://planeterra.org/copmadam/>
- Edwards, A. (2005). *Future Pathways*. In: *The Sustainability Revolution: Portrait of a Paradigm Shift*. Gabriola Island: New Society Publishers, pp. 123-140. Fairphone, 2023
- Fuad-Luke, A. (2009). *Design Activism - Beautiful Strangeness for a Sustainable World*. London: Earthscan.
- Full Grown. (2023). Retrieved April 1, 2023, from <https://fullgrown.co.uk/>
- Gumus Ciftci, H., Beecher, M.A., Proulx, S., Nickley, W. (2022). If it's broken, don't just fix it: Exploring repair as design through a two-week design charrette. Cumulus Conference 2022. *Design for Adaptation Proceedings*. Detroit.
- Henriques, A., and Richardson, J. (2004). *The triple bottom line, does it all add up?: assessing the sustainability of business and CSR*. Earthscan. Madge, 1997
- Manzini, E. (2008). *Enabling Solutions for Sustainable Living: A workshop*. (E. Manzini, S. Walker, and B. Wylant, Eds.) Calgary: University of Calgary Press. McDonough and Braungart, 2002
- Norman, D.A. (2004). *Emotional design: Why we love (or hate) everyday things*. Basic books.
- Norman, W., MacDonald, C. (2003). Getting to the Bottom of "Triple Bottom Line". *Business Ethics Quarterly*.
- Ottan Studio. (2023). Retrieved June 18, 2023, from <https://www.ottanstudio.com/>
- Papanek, V. (1995). *The Green Imperative: Ecology and Ethics in Design and Architecture*. London: Thames and Hudson.
- PET Lamp. (2020). Retrieved April 1, 2023, from <https://www.petlamp.org/>
- Spekkink, W., Rödl, M., & Charter, M. (2022). Repair Cafés and Precious Plastic as translocal networks for the circular economy. *Journal of Cleaner Production*, 380, 135125.
- Thackara, J. (2005). *In the Bubble: Designing for a Complex World*. Cambridge: MIT Press.
- Toyi, (n.d.) Retrieved June 18, 2023, from <https://toyi.io/en/whatistoyi/>
- Van der Ryn, S., and Cowan, S. (1996). *Ecological Design*. 2007 ed. Washington: Island Press.
- The Ellen MacArthur Foundation. (n.d.). Retrieved April 1, 2023, <https://ellenmacarthurfoundation.org/>
- Vezzoli, C. (2007). *System Design for Sustainability: Theory, Methods and Tools for a Sustainable 'Satisfaction-System' Design*. Milan: Maggioli Editore.
- Walker, S. (2006). *Sustainable by Design: Explorations in Theory and Practice*. London: Earthscan.
- Walker, S. (2011). *The Spirit of Design: Objects, Environment and Meaning*. London: Earthscan
- Whiteley, N. (2006). *Design for Society*. London: Reaktion Books Ltd.
- Worster, D. (1993). *The Shaky Ground of Sustainability*. In: W. Sachs, ed. *Global Ecology: A New Arena of Political Conflict*. Halifax, Nova Scotia: Fernwood Books Ltd., pp. 132-145.



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Meadows, D. H. (2009). *Thinking in Systems: A Primer*. United Kingdom: Chelsea Green Pub.