

5P Sustainability Profile: An Attempt to Gauge Design' Impact

Shivam Vats¹, Sugandh Malhotra¹, Lalit Kumar Das²

¹IDC School of Design, Indian Institute of Technology Bombay, India

²Delhi Technological University

Abstract: This paper introduces a design-oriented method for building a project “Sustainability Profile” that makes a product’s contribution to sustainable development visible and discussable through a UN SDG–inspired 5P lens: People, Planet, Prosperity, Peace, and Partnership. Using a grounded, bottom-up approach, we coded 30 Master of Design project abstracts to extract design concerns, motivations, values, and intended impacts, then mapped these codes to the 5Ps. Cross-project consolidation and clustering yielded a reusable set of 5P indicators assembled into a sustainability rating matrix. Projects are assessed with a binary rule (indicator present/absent) and normalised within each pillar to account for differing indicator counts, then visualised as radar charts. A pilot on five projects shows how profiles reveal “spikes” and “slumps,” enabling reflection and earlier integration of sustainability beyond environmental optimisation, including Peace and Partnership and a broadened view of Prosperity. Results show skew toward People and Prosperity; Planet is often neglected overall.

Keywords: Sustainability rating, Sustainability matrix, 5P Framework, Sustainability Profile, Sustainable Development

1 Introduction

Design practice has often been guided by near-term priorities such as aesthetics, usability, and market viability. Yet many design problems are “wicked” and systemically entangled, meaning that interventions frequently generate trade-offs and unintended consequences across interconnected domains (Buchanan, 1992; Meadows, 2008; Sterman, 2000). In this context, sustainability is increasingly framed as a requirement, but it is still commonly treated as an add-on, an optimization task applied after the core “design intent” has been established resulting in responses that remain fragmented and insufficiently redirective (Fry, 2009). Conventional evaluative tools such as Life Cycle Assessment (LCA) provide essential evidence for environmental decision-making and are internationally standardized (International Organization for Standardization (ISO, 2006a, 2006b) However, a recurring challenge in practice is that such assessments are not always integrated early enough to shape fundamental concept directions; design-for-sustainability research therefore emphasizes tools that support earlier-stage reflection and iteration (Bernstein et al., 2010; Bovea & Pérez-Belis, 2012; Vicente & Camocho, 2024).

This paper proposes a 5P Sustainability Rating Matrix, a diagnostic and discussion-oriented tool that visualizes a project’s potential contributions across the five pillars of the 2030 Agenda for Sustainable Development: People, Planet, Prosperity, Peace, and Partnership (United Nations, 2015). By integrating sustainability profiles into prototyping, critique, and design review processes, the matrix encourages designers to move beyond narrowly defined “green” improvements and consider the broader social, ecological, and systemic implications of design decisions (Giaccardi & Redström, 2020; Forlano, 2017). Intended for designers, design students, educators, and sustainability practitioners, the matrix is designed for use during early-stage concept development. Rather than replacing established assessment tools such as Life Cycle Assessment (LCA), it functions as a reflective instrument that helps identify overlooked sustainability dimensions and supports more holistic design decision-making.

2 Background

Many sustainability indices, labels, and assessment matrices prioritize quantifiable and proximate impacts (e.g., resource use, energy, emissions). While these are crucial, design-for-sustainability scholarship has repeatedly noted the need to complement such approaches with tools that better support designers in balancing environmental requirements with other design requirements, and in working with life-cycle and multi-criteria perspectives earlier in the process (Bovea & Pérez-Belis, 2012; Vicente & Camocho, 2024).

Moreover, a product’s impact is rarely confined to the moment of use; it propagates through feedback loops, delayed effects, and downstream dependencies that are characteristic of complex systems (Meadows, 2008; Sterman, 2000). These dynamics point to three recurring blind spots in many design-evaluation practices, Temporal displacement: impacts that surface long after the primary lifecycle, including persistent waste burdens and lock-in effects (Meadows, 2008). More-than-human impacts: ecological integrity and systemic health that matter beyond immediate human utility (Forlano, 2017; Giaccardi & Redström, 2020). Systemic interconnections: pathways through which a “green” intervention may generate justice-related harms or exclusions that are not captured by narrow environmental metrics (Costanza-Chock, 2020).

To address these gaps, this study adopts the 5P Lens embedded as pilers for sustainable development the 2030 Agenda: People, Planet, Prosperity, Peace, and Partnership (United Nations, 2015). The United Nations General Assembly (2015). defines the 5Ps as the following :

“People: We are determined to end poverty and hunger, in all their forms and dimensions, and to ensure that all human beings can fulfil their potential in dignity and equality and in a healthy environment.

Planet: We are determined to protect the planet from degradation, including through sustainable consumption and production, sustainably managing its natural resources and taking urgent action on climate change, so that it can support the needs of the present and future generations.

Prosperity: We are determined to ensure that all human beings can enjoy prosperous and fulfilling lives and that economic, social and technological progress occurs in harmony with nature.

Peace: We are determined to foster peaceful, just and inclusive societies which are free from fear and violence. There can be no sustainable development without peace and no peace without sustainable development.

Partnership: We are determined to mobilize the means required to implement this Agenda through a revitalized Global Partnership for Sustainable Development, based on a spirit of strengthened global solidarity, focused in particular on the needs of the poorest and most vulnerable and with the participation of all countries, all stakeholders and all people.”

While commonly applied at policy and development levels, the 5Ps offer a rigorous structure for design reasoning because they expand evaluation beyond environmental performance to include social, institutional, and relational dimensions. Design-for-sustainability has also evolved beyond product-level concerns toward system innovations and socio-technical transitions, reinforcing the need for broader lenses that can handle cross-scale effects and longer time horizons (Ceschin & Gaziulusoy, 2016; Gaziulusoy & Erdoğan Öztekin, 2019). The proposed Sustainability Profile shifts evaluation from “rating” a finished outcome to visualizing and negotiating a design in progress. This orientation aligns with design-for-sustainability tool research that emphasizes operational, designer-facing instruments often visual and comparative that help teams identify trade-offs and redirect concepts earlier (Bernstein et al., 2010; Vicente & Camocho, 2024). For designers and students, noticing an early “slump” in a pillar such as Peace (justice, inclusion) or Partnership (stakeholder collaboration) creates a structured prompt to revisit assumptions, reframe the brief, and re-align decisions with intended values (Costanza-Chock, 2020; Manzini, 2015). In this way, the profile reframes assessment from a compliance-oriented audit into a generative support for more ecologically responsible and socially transformative outcomes (Fry, 2009).

3 Methodology

This study adopts a grounded, bottom-up strategy to develop a sustainability scoring matrix for design projects. Rather than starting with predefined indicator lists, the method derives indicators from design outcomes (project abstracts) and progressively consolidates them into generalized factors aligned with the 5P model (People, Planet, Prosperity, Peace, Partnership) (Bowen, 2009; Krippendorff, 2018; United Nations General Assembly, 2015). The approach combines qualitative coding, interpretive mapping, and quantitative scoring to produce a project “Sustainability Profile” (Miles et al., 2014). The dataset comprised 30 Master of Design project abstracts collected from the institute’s library. Each abstract served as the unit of analysis because it captures the designer’s framing of the problem, the proposed solution logic, and the intended outcomes sufficient for identifying the project’s stated intent and projected impacts (Bowen, 2009). Project abstracts were selected due to their concise and standardized representation of project objectives, motivations, outcomes, and intended contributions. Since all projects possessed abstracts while complete reports varied considerably in length and structure also being visually heavy, abstracts offered a comparable basis for cross-project analysis. However, relying on abstracts may omit nuanced sustainability considerations that are discussed elsewhere in full report.

3.1 Qualitative Data Extraction

Each abstract was read closely and coded to extract four analytic dimensions that together represent the project’s sustainability-relevant narrative (Charmaz, 2014; Miles et al., 2014):

- Design Concern — the core problem or gap being addressed.
- Design Motivation — the underlying “why” or purpose driving the intervention.

- Design Values — the principles embedded in the solution (e.g., accessibility, dignity, innovation, stewardship).
- Design Impact — the intended real-world effects on stakeholders and the environment.

These four dimensions were opted because together they represent the major components through which design intent is articulated in project documentation. Design concern captures the problem space, motivation reveals the purpose driving intervention, values expose normative commitments embedded in the solution, and impact reflects anticipated consequences. Collectively these dimensions provide a comprehensive representation of how sustainability is framed within a design project.

3.2 Mapping the 5P and Pillar Allocation

The extracted codes were then interpreted through the lens of the 5P pillars:

- People (health, equity, wellbeing, inclusion, capabilities)
- Planet (resources, waste, emissions, material/energy cycles)
- Prosperity (livelihoods, innovation, productivity, economic resilience)
- Peace (justice, cultural dignity, safety, social cohesion, rights)
- Partnership (collaboration, stakeholder networks, shared value creation)

Each extracted element (concern, motivation, values, impact) was assigned to one or more pillars based on what the abstract explicitly implies or states. This produced a project-level 5P footprint, A structured representation of where and how a design claims to contribute systemically.

The table 1 demonstrates the process of extracting initial codes and aligning them with the analytical dimensions.

Project 1:

“A personal aid to treat Parkinson's disease

Parkinson's disease (PD) presents a complex array of symptoms affecting both motor and non-motor functions, often challenging patients quality of life. This project aims to develop a novel wearable photobiomodulation (PBM) device targeting key areas affected by PD, specifically the brain and gut, to alleviate symptoms and improve overall well-being. Drawing insights from extensive research on PD pathology and treatment modalities, as well as user-centered design principles, the project focuses on creating two distinct wearable devices: a headgear for brain treatment and a belt-like device for gut therapy. These devices incorporate PBM technology emitting therapeutic wavelengths, including 650nm, 810nm, 904nm, and 1076nm, proven to aid in PD management. The design process involves iterative prototyping and testing, considering factors such as comfort, usability, styling, etc. Anthropometric data analysis guides the sizing and customization of the devices to accommodate a diverse range of users. Furthermore, consultation with electronics fabrication experts ensures the integration of high-quality components for reliable performance. Overall, the development of these wearable PBM devices holds promise in providing accessible and effective adjunctive therapy for individuals with PD, addressing both motor and non-motor symptoms to improve their quality of life.”

Table 1. Example of qualitative coding and 5P mapping procedure

Extract from Abstract	Analytical Dimension	5P Pillar	Initial Code
"PD presents a complex array of symptoms affecting both motor and non-motor functions"	Design Concern	People	Care for patients, Improvement of quality of life
"develop a novel wearable PBM device... to alleviate symptoms"	Design Motivation	People	well-being

"user-centered design principles"	Design Value	People	Care for patients,
"Anthropometric data analysis guides sizing and customization"	Design Value	People, Peace	Inclusivity, justice by catering underserved
"consultation with electronics fabrication experts"	Design Value	Partnership	Collaboration
"wearable photobiomodulation device"	Design Value	Prosperity	Technological Innovation
"high-quality components for reliable performance"	Design Value	Prosperity	Innovation
"improve overall well-being"	Design Impact	People	Wellbeing
"improve quality of life"	Design Impact	People	Quality of life

3.3 Consolidation and Clustering

Across the full dataset, the project-level 5P-coded values were consolidated and clustered to form a generalized indicator set. Consolidation synonymous or closely overlapping values were merged later Clustering the consolidated values were grouped into thematic clusters within each pillar The resulting clusters acts as Indicator, Each cluster was articulated as a reusable design indicator as a factor that can be applied to new projects.

3.4 Establishing the Sustainability Profile

Finally, these consolidated factors were assembled into a Sustainability rating matrix to assess each project's contribution across the five pillars.

- Scoring: Each project was assigned a quantitative score for each pillar based on binary factor , wheter they reflect that indicator or not.
- Visualization: The resulting scores were plotted on a radar chart to generate a "Sustainability Profile."

This Sustainability Profile functions as a visual signature of a project's systemic contribution shifting evaluation beyond functional performance toward a holistic view of how a design supports a more sustainable and equitable world.

4 Results

4.1: Audit Trail of Coding and 5P Mapping

Design Motivation/concern, reflected design values, and intended Design impact. The purpose is to make the extraction process transparent showing how statements in the project abstract were translated into qualitative codes and then mapped onto the 5P pillars (People, Planet, Prosperity, Peace, and Partnership). The following section walk through two projects. For each project, the section includes the title and abstract as originally documented, followed by the qualitative data extraction like Design Concern, Design Motivation, Design Values and Design Impact, the 5P mapping and pillar allocation that explains how the extracted codes reflect the 5P.

Project 2:

"MyRay - Solar Vegetable/Fruit Dehydrator for Farmers of Maharashtra

MyRay is a revolutionary solution for preserving vegetables and fruits through solar dehydration. Addressing the challenge of decaying excess produce, MyRay integrates cutting-edge technology with thoughtful design. After extensive research and

collaboration with farmers, I refined three innovative concepts into one seamless product. Its intuitive user interface lets you effortlessly set the type and amount of produce, while advanced sensors precisely control humidity and temperature for optimal drying. Inspired by the traditional Koozh Vadagam making process of Tamil Nadu, MyRay uses cloth for easy handling and damage-free removal of produce. Baffle panels ensure even airflow for consistent drying.”

In the “MyRay” project, the design concern emerges from a recurring and practical challenge in agricultural contexts: excess vegetables and fruits often decay due to limited preservation options, leading to post-harvest losses for farmers. The design motivation is therefore to enable a feasible, day-to-day preservation method through solar dehydration reducing wastage while improving outcomes for farmers by extending the usable life of their produce.

The project communicates several key design values through both its technical and contextual choices. It emphasizes user-centred usability by providing an intuitive interface that allows users to set the type and quantity of produce with ease. It also prioritizes precision and reliability through the integration of sensors that monitor and regulate humidity and temperature for optimal drying conditions. Beyond technical performance, the design reflects contextual sensitivity by drawing inspiration from the traditional “Koozh Vadagam”-making process, translating familiar practices into a contemporary product experience. Attention to careful handling is evident in the use of cloth to support damage-free removal of produce, while quality and consistency are reinforced through airflow management using baffle panels to ensure even dehydration.

Finally, the intended design impact is a meaningful reduction in food wastage and a corresponding improvement in produce longevity. By supporting preservation at the farm level, the project contributes to broader goals of food security and strengthens farmers’ economic wellbeing and resilience by helping protect value that would otherwise be lost through spoilage.

When mapped to the 5P, the “MyRay” project demonstrates a strong alignment with People through its emphasis on supporting farmers’ day-to-day realities and improving their social and practical security. The design’s usability features such as an intuitive interface and careful handling mechanisms reduce operational friction and make adoption more feasible in real working conditions.

The project also clearly contributes to Planet, primarily through its focus on preventing food wastage by extending the life of perishable produce. In addition, because the solution is based on solar dehydration, it implies a lower dependence on conventional energy sources for preservation, strengthening its environmental relevance within the limits of what is stated in the text.

In terms of Prosperity, MyRay is closely tied to food security and economic wellbeing. By reducing post-harvest losses and preserving the value of produce that would otherwise decay, the project supports farmers’ livelihoods, improves resilience, and strengthens the economic viability of small-scale agricultural practice.

The Peace pillar is reflected more indirectly but remains meaningful: the project’s care-oriented framing toward an often under-supported group (farmers) speaks to fairness and dignity, particularly in enabling resilience against everyday vulnerabilities such as spoilage and income instability.

The project reflects Partnership through its explicit collaboration with farmers during research and concept refinement. The framing also suggests the potential for shared or community-level use, indicating a broader stakeholder ecosystem where value is co-created rather than delivered in a top-down manner.

4.2: Consolidated Indicators

This exercise was conducted across 30 projects, producing an extensive set of qualitative codes and corresponding 5P mappings. The two audit trails presented above clarify and validate how qualitative data were extracted and translated into the factors reflecting the 5P. The following section presents the consolidation and thematically clustered 5P factors, which were formalized as indicators and used for scoring and generating Sustainability Profiles for five projects.

From the qualitative data extraction, the People pillar initially produced a broad and heterogeneous set of project-level values. These included recurring concerns such as accessibility, assistive support, patient care, healthcare improvement, quality of life, comfort, and physical as well as mental wellbeing. Several projects emphasized education, knowledge, and learning, including child-focused learning outcomes (e.g., cognitive skills, child education, child development, and child growth). Other recurring People-oriented impacts related to community wellbeing, community building and socialisation, and care for specific groups such as older adults, patients, and underserved communities.

Additional themes also emerged around social security and identity (for example, farmers' social security), tackling social stigma, and strengthening human–product relationships through sentimental or symbolic value, reflecting the social and cultural dimensions of human wellbeing.

After consolidation removing duplicates, merging overlapping terms and clustering conceptually similar items—these People-related values were standardized into a smaller set of generalized factors. The final nine consolidated People indicators used in the 5P Scoring matrix are as shown in table 2 below, Similarly same exercise were done for Planet, Partnership, Prosperity and Peace.

For More consolidated and clustered factors could be seen [here](#)

Table 2. 5P Sustainability Rating Matrix

People	Planet	Partnership	Prosperity	Peace
Accessibility/Assistive	Serviceability /Durability /Longevity	Fostering collaboration	Operational efficiency /Efficiency in work	Justice and ethical treatment of underserved/ marginalised
Health care	Preventing/Red ucing Food wastage	Teamwork	Economic opportunity /Cost effectiveness/ /Economic wellbeing	Education of moral values
Wellbeing	Environmental consideration	Fostering Socialisation /Community building	Technological innovation	Care and catering for elderly/ children and Patients
Contributing in Education/ Knowledge/Learning	Energy efficient in Consumption	Caring for marginalised community /underserved	Shared usage	Building harmony in society and community
Community Building/Strengthening	Modularity/Mu lti use	Development of social empathy	Food Security	
Child Development/ Child Growth	Renewable source of energy	Product for emergency Situations and Communication	Fostering learning/ Education/Training/ Knowledge/Skill Development	
Public Transportation		Human nature connect		
Human Efficiency		Culture Preservation		
Quality of life		Building Relationships/Fri endship		

4.3 Sustainability Profiles and Scoring Results

The Rating matrix was applied using a simple binary rule: if any aspect of a project/product satisfied a given indicator, it received one point for that indicator. Scores were then converted into percentages within each 5P pillar to account for differences in the total number of indicators across pillars. These normalized percentages were used to generate the project's 5P Sustainability Profile.

The following section presents an audit trail of project rating, demonstrating how the 5P sustainability rating matrix was applied to produce a Sustainability Profile. In this example, the project “D” Abstract written in *italics* below:

“This project focuses on designing an interactive and playful music-based tool to support the fine motor skill development of specially-abled children aged 6 to 14. These children, often diagnosed with conditions like Cerebral Palsy, Autism Spectrum Disorder, ADHD, and Intellectual Disability, undergo regular occupational therapy to build skills required for daily living. However, therapy routines can become repetitive and disengaging over time. Music, when used as an active element rather

than a passive background, has shown significant therapeutic value in improving motor coordination, attention span, and emotional regulation. This project aims to bridge the gap between therapy and play by developing a modular, tactile musical tool that enables explorative and guided interaction. Through field visits, expert consultations, and iterative prototyping, the final concept integrates digital music generation with physical interaction. The tool encourages musical sequencing using tactile buttons, and switches, delivering audio-visual feedback that aligns with therapy goals. The design ensures inclusivity, durability, and ease of use for educators while enhancing engagement for students.”

shows strong alignment with the People pillar through impacts related to child development and growth, quality of life, wellbeing, human efficiency, learning, and collaboration, as well as care-oriented outcomes for children/patients. As a result, it scored 4 out of 6 People indicators (including assistive/accessibility, wellbeing, child growth, and contribution to children’s learning). In contrast, the project scored 0 in the Planet pillar, as the available evidence showed no explicit contribution to environmental outcomes. Within Partnership, the project scored 1 out of 6, reflecting collaboration across multiple stakeholders, including the music industry, medical researchers, designers, and subject-matter experts. Within Prosperity, it scored 1 out of 6, based on contributions toward learning and skill development for children with special needs. Finally, under Peace, the project scored 2 out of 4, reflecting indicators related to care and support for children/elderly/patients and justice-oriented, ethical attention to underserved or marginalized groups.

More on Project rating can be seen [here](#). The results of rating activity can be seen in table 2 Below:

Table 2. Project Rating on 5P Sustainability Matrix

Project Name	Tittle	People	Planet	Prosperity	Partnership	Peace
A	Assistive Device for Essential Tremor	3/9	0/6	1/6	3/9	1/4
B	Handheld Braille Embosser for Visually Impaired	2/9	0/6	1/6	1/9	1/4
C	Cooling Solution for Indian Kitchens	1/9	0/6	2/6	0/9	0/4
D	Music-Based Therapy Tool for Specially-Abled Children	4/9	0/6	1/6	1/9	2/4
E	Drying Solution for Clothes During Monsoon	1/9	1/6	1/6	0/9	0/4

The proposed matrix demonstrates preliminary validation through its development from 30 M.Des projects and its ability to generate distinct Sustainability Profiles across diverse design outcomes. The resulting patterns, including the strong emphasis on People and Prosperity dimensions and comparatively weaker Planet-related considerations, align with broader observations in design-for-sustainability literature, suggesting that the framework captures meaningful aspects of design intent. However, several limitations remain. The study is based on projects from a single academic context, limiting generalizability. Furthermore, the analysis relies on project abstracts, which may not capture sustainability considerations discussed elsewhere in project documentation. The binary scoring approach also identifies the presence of indicators but does not account for their relative importance or intensity. Finally, the coding process would benefit from future inter-rater reliability testing to strengthen methodological robustness. Accordingly, the matrix should be viewed as an initial framework rather than a definitive sustainability assessment tool. Future work could expand the dataset across institutions, incorporate full project reports, introduce weighted indicators,

and involve sustainability experts and design practitioners in validating and refining the indicator set. Such developments would strengthen both the applicability and robustness of the framework while preserving its role as a reflective and discussion-oriented design tool.

The following section presents the Sustainability Profile visualizations as **radar charts**, shown in the figure 1 below.



Figure 1. Depicts the radar charts of Project A, B, C, D & E in consecutive Manner from left to right

5 Discussions:

The discussion section of this study evaluates the efficacy of the bottom-up approach in developing a context-aware sustainability scoring matrix. (Charmaz, 2006; Bovea & Pérez-Belis, 2012) By grounding the framework in 30 diverse M.Des projects, the research moves beyond abstract global indicators to identify tangible design values, concerns, and motivations directly from documented project outcomes. (Faludi et al., 2023; Green et al., 2012) This process reveals that even when designers do not explicitly intend to address "sustainability," their projects possess an inherent Sustainability Profile that can be measured and optimized. (White et al., 2013; Boks, 2006)

The 5P Sustainability Matrix is a reflective and diagnostic tool that makes visible the sustainability dimensions emphasized, overlooked, or absent in a design concept, supporting more informed decision-making during the design process. At the project level, it can be used during concept development and design reviews to identify gaps before decisions become fixed. For example, a project may strongly address People and Prosperity while showing limited engagement with Planet, Peace, or Partnership. Such profiles support targeted discussion on alternative directions, stakeholders, materials, and system-level impacts.

In studio education, the matrix provides a structured framework for reflecting on sustainability beyond environmental performance. It enables students and educators to examine how design decisions relate to social, ecological, economic, ethical, and collaborative dimensions, encouraging more holistic design thinking. At a broader level, the matrix can be applied across project portfolios to identify recurring patterns and gaps within design programs and research groups. In this study, results show a consistent emphasis on People and Prosperity, with comparatively weaker attention to Planet-related considerations. These insights can inform curriculum development, benchmarking, and strategic planning in design education and practice.

The results indicate a significant skew toward the People and Prosperity pillars. (Green et al., 2012) Most analysed projects prioritize immediate user well-being, accessibility, and functional efficiency such as enhancing accessibility for individuals with tremors or promoting healthy habits through interactive devices. (Luck, 2018) Consequently, the radar charts consistently show "spikes" in human-centric impacts. (Green et al., 2012) Conversely, a noticeable "slump" frequently appears in the Planet pillar. (Green et al., 2012) This suggests that without an explicit sustainability mandate, design process often treats ecological impact as a secondary consideration or a separate technical requirement rather than an integrated design value. (Boks, 2006; Bovea & Pérez-Belis, 2012)

Another critical contribution of this study is the formalization of the Peace and Partnership pillars (United Nations General Assembly, 2015) within the design process. While these factors are often perceived as being too broad for individual products, our audit trail proves they are deeply embedded in design intent through values like community building and ethical traceability. (Manzini, 2015; Chen, 2022; Costanza-Chock, 2020) By mapping these "silent" pillars, this paper strengthens the case for their inclusion in design process. (Costanza-Chock, 2020; Faludi et al., 2023) Discussing Peace and Partnership during the conceptual phase ensures that products are socially transformative and systemically integrated. (United Nations General Assembly, 2015; Manzini, 2015)

Ultimately, the 5P Sustainability Matrix is intended to support reflection rather than evaluation (Faludi et al., 2023; Bovea & Pérez-Belis, 2012). By visualizing a project's Sustainability Profile through radar charts, it helps reveal strengths, gaps, and imbalances across the five pillars (Green et al., 2012), enabling designers to identify opportunities for improvement and develop more balanced sustainability outcomes.

6 Conclusion:

This study offers a practical, studio-grounded method for translating design narratives into a comparable sustainability assessment. By coding 30 M.Des project abstracts for design concern, motivation, values, and intended impact, and mapping these elements onto the 5P pillars, the research consolidates dispersed project-level claims into a structured indicator set and a **5P sustainability rating matrix**. The resulting **Sustainability Profiles**, visualised through radar charts, function as a proactive diagnostic tool: they do not aim to penalise "low scores," but to make visible where impact is concentrated and where it is missing, enabling targeted discussion and improvement earlier in concept development. Across the pilot ratings, profiles tended to spike in **People** and **Prosperity** dimensions reflecting a strong emphasis on user wellbeing, accessibility, and functional efficiency while **Planet** contributions frequently appeared as a slump. This pattern suggests that, without an explicit sustainability mandate, ecological impact risks being treated as a

secondary or external requirement rather than an integrated design value. A further contribution is the operationalisation of **Peace** and **Partnership**, demonstrating that justice, care, community-building, and collaboration can be identified as “silent” sustainability dimensions embedded in design intent and therefore brought into early-stage design reasoning. The work also has limitations. Because the analysis relies on **abstracts**, some impacts may be under-specified or invisible at the text level. A review of **full project reports**, rather than abstracts alone, would likely enrich indicator extraction, strengthen pillar allocation, and improve scoring confidence. Future work should therefore extend the dataset to full reports, test inter-rater consistency, and explore scoring approaches that capture depth of impact beyond binary presence/absence.

References

- Bernstein, W. Z., Ramanujan, D., Devanathan, S., Zhao, F., Sutherland, J. W., & Ramani, K. (2010). Function impact matrix for sustainable concept generation: A designer's perspective (Paper No. DETC2010-28340). In *Proceedings of the ASME 2010 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC/CIE 2010)*. American Society of Mechanical Engineers.
- Boks, C. (2006). The soft side of ecodesign. *Journal of Cleaner Production*, 14(15–16), 1346–1356. <https://doi.org/10.1016/j.jclepro.2005.11.015>
- Bovea, M. D., & Pérez-Belis, V. (2012). A taxonomy of ecodesign tools for integrating environmental requirements into the product design process. *Journal of Cleaner Production*, 20(1), 61–71. <https://doi.org/10.1016/j.jclepro.2011.07.012>
- Bowen, G. A. (2009). Document analysis as a qualitative research method. *Qualitative Research Journal*, 9(2), 27–40. <https://doi.org/10.3316/QRJ0902027>
- Buchanan, R. (1992). Wicked problems in design thinking. *Design Issues*, 8(2), 5–21. <https://doi.org/10.2307/1511637>
- Ceschin, F., & Gaziulusoy, İ. (2016). Evolution of design for sustainability: From product design to design for system innovations and transitions. *Design Studies*, 47, 118–163. <https://doi.org/10.1016/j.destud.2016.09.002>
- Charmaz, K. (2006). *Constructing grounded theory: A practical guide through qualitative analysis*. SAGE.
- Charmaz, K. (2014). *Constructing grounded theory* (2nd ed.). SAGE.
- Chen, J.-Y. (2022). Responsible sourcing and supply chain traceability. *International Journal of Production Economics*, 248, 108462. <https://doi.org/10.1016/j.ijpe.2022.108462>
- Costanza-Chock, S. (2020). *Design justice: Community-led practices to build the worlds we need*. The MIT Press.
- Delmas, M. A., & Burbano, V. C. (2011). The drivers of greenwashing. *California Management Review*, 54(1), 64–87. <https://doi.org/10.1525/cmr.2011.54.1.64>
- Faludi, J., Acaroglu, L., Gardien, P., Rapela, A., Sumter, D., & Cooper, C. (2023). Sustainability in the future of design education. *She Ji: The Journal of Design, Economics, and Innovation*, 9(2), 157–178. <https://doi.org/10.1016/j.sheji.2023.04.004>
- Forlano, L. (2017). Posthumanism and design. *She Ji: The Journal of Design, Economics, and Innovation*, 3(1), 16–29. <https://doi.org/10.1016/j.sheji.2017.08.001>
- Fry, T. (2009). *Design futuring: Sustainability, ethics and new practice*. Berg.
- Gaziulusoy, İ., & Erdoğan Öztekin, E. (2019). Design for sustainability transitions: Origins, attitudes and future directions. *Sustainability*, 11(13), Article 3601. <https://doi.org/10.3390/su11133601>
- Giaccardi, E., & Redström, J. (2020). Technology and more-than-human design. *Design Issues*, 36(4), 33–44. https://doi.org/10.1162/desi_a_00612
- Glaser, B. G., & Strauss, A. L. (1967). *The discovery of grounded theory: Strategies for qualitative research*. Aldine.
- Green, S., Young, M., & Boulton, J. (2012). Mapping design process and radar analysis of design activities. In *Proceedings of the International Conference on Engineering and Product Design Education (EPDE 2012)*. Artesis University College, Antwerp, Belgium.
- International Organization for Standardization. (2006a). *ISO 14040:2006 Environmental management—Life cycle assessment—Principles and framework*. Author.
- International Organization for Standardization. (2006b). *ISO 14044:2006 Environmental management—Life cycle assessment—Requirements and guidelines*. Author.
- Krippendorff, K. (2018). *Content analysis: An introduction to its methodology* (4th ed.). SAGE.
- Luck, R. (2018). Inclusive design and making in practice: Bringing bodily experience into closer contact with making. *Design Studies*, 54, 96–119. <https://doi.org/10.1016/j.destud.2017.11.003>
- Lyon, T. P., & Montgomery, A. W. (2015). The means and end of greenwash. *Organization & Environment*, 28(2), 223–249. <https://doi.org/10.1177/1086026615575332>
- Manzini, E. (2015). *Design, when everybody designs: An introduction to design for social innovation* (R. Coad, Trans.). The MIT Press.
- Meadows, D. H. (2008). *Thinking in systems: A primer* (D. Wright, Ed.). Chelsea Green Publishing.
- Miles, M. B., Huberman, A. M., & Saldaña, J. (2014). *Qualitative data analysis: A methods sourcebook* (3rd ed.). SAGE.
- Sterman, J. D. (2000). *Business dynamics: Systems thinking and modeling for a complex world*. Irwin/McGraw-Hill.
- United Nations General Assembly. (2015). *Transforming our world: The 2030 Agenda for Sustainable Development* (Resolution A/RES/70/1). United Nations.
- Vicente, J., & Camacho, D. (2024). Design for sustainability tools: Definition and criteria towards practical use. *Journal of Cleaner Production*, 455, 144041. <https://doi.org/10.1016/j.jclepro.2024.144041>
- White, P., St. Pierre, L., & Belletire, S. (2013). *Okala practitioner: Integrating ecological design*. Industrial Designers Society of America.