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Designers as Change Agents: Perceived Roles in Advancing Sustainability in Organizations on Different Design Utilization Levels

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Abstract

Design scholarship has long roots in tackling wicked problems and sustainability, yet less is known about how professional designers interact with sustainability issues in practice. Based on interviews with 104 designers in 101 organizations in Finland, this study compares designer perceptions on the role of design in advancing sustainability. We identify six common roles, each with various foci on different design maturity levels in organisations. The findings support managers and designers in understanding which capabilities might be needed in advancing the role of design and sustainability.

Keywords: design practice, sustainability, design maturity, design competences

1. Introduction

During the past decades, design and design thinking have been expanding their foothold in organizations. Increasingly, design is seen as a strategic capability and a comprehensive approach to creating new value (Fayard et al., 2016; Micheli et al., 2019; Liedtka, 2020; Björklund et al., 2020a). Indeed, multiple studies showcase the positive impact of design utilization on organizational operations and outcomes such as product performance, return-on-investment, and innovativeness (e.g. BEDA, 2017; Candi et al., 2010; Meinel et al., 2020; Rae, 2016). This broadening in design scope can be mirrored in the literature on design sustainability. For example, Ceschin and Gaziulusoy (2016) note a progressive expansion in design for sustainability, moving from product systems to socio-technical systems. They highlight sustainability as a property of systems rather than subcomponents, necessitating a holistic perspective in both assessing and designing for sustainability. As such, designers have both technical, skill-based roles as well as information processing and synthesis roles in such transitions (Gaziulusoy and Ryan 2017), ranging from human-centered inquiry, prototyping, and scenario work to framing and dealing with uncertainty. Hakio and Mattelmäki (2019) add that design for sustainability also requires skills in self-awareness and interconnectedness. Simultaneously with this increasing scope of design skills and foci considered in design for sustainability studies, concern for sustainability in organizations in general has been on the rise. Particularly with an increasing understanding of climate change, it is becoming increasingly clear to organizations, investors, and consumers alike that urgent action is needed for an ecologically viable future. At the same time, increasing attention is paid to social and economic dimensions of sustainability in addition to environmental considerations, captured in the three-pillar model for sustainability (European Commission, 2015) and a growing number of organizational reporting practices (Nishitani et al., 2021).

Practice, however, often falls short of ideals, and designers work in very diverse conditions. While many studies show that most organizations continue to practice very little design in general (BEDA, 2017; Buley et al. 2019; Sheppard et al., 2018), a number of surveys and studies also showcase design being used in a systematic and broad manner in some organizations (Buley et al., 2019; Sheppard et al., 2018; Perks et al., 2005; Micheli et al., 2017). Similarly, the few extant studies on designer perceptions of sustainability note for example varying degrees and forms of tools (Ghazila et al., 2015), resources (Rivard et al., 2019), and access to end-users (Nielsen, 2014). Indeed, understanding design professionals' perspectives and lived experiences in sustainable design is crucial for developing better support for design practice in organizations (Björklund et al., 2020b).

Extant studies suggest that awareness, prioritization, and scope of sustainability considerations are often limited amongst professional designers. For example, Rivard et al. (2019) explored how 31 engineers, designers, clinicians, and entrepreneurs approached health and environmental responsibility in health innovation, noting that health outcomes were prioritized over environmental considerations and the two were rarely integrated. The professionals noted hoping for increased environmental legislation to provide external pressure in organizations. Six designers and product developers in the humanitarian relief context, in turn, highlighted their role in managing and balancing multiple interests, requiring tradeoffs in design (Nielsen, 2014). The designers typically focused on cost, safety, and integration to the wider system in pursuing humanitarian and environmental goals, but, for example, life cycle assessments were not mentioned. Finally, Ghazilla et al. (2015) interviewed five engineering designers and held a workshop for 32 designers to examine design for environment and manufacturability in Malaysia. Designer perceptions varied in their emphasis on product outcomes with minimal adverse environmental effects, design processes incorporating environmental considerations, or material selection. While the designers saw many benefits for such approaches, environmental considerations tended to have low levels of priority and systematicity, and the focus was on operational rather than strategic level decisions.

The current study extends understanding of designers' perceptions of sustainability in a larger sample of 104 designers employed in a diverse range of organizations in Finland, focusing on their perceptions of the role of design in advancing sustainability in organizations. Examining differences across organizations utilizing design to different degrees, we illuminate potential pathways for designers in different types of organizational contexts, paving the way for more effective sustainable design practice and wider scale sustainability transitions.

2. Methodology

In order to explore the perceived role of design in advancing sustainability in organizations from the perspective of professional designers themselves, the current study adopted a qualitative, interview-based design. Interview requests were sent to the highest-ranking designers identified in a wide range of organizations operating in Finland. 104 designers responded, representing 101 organizations. This included 29 consultancies and agencies, 39 large corporations, 27 small-to-medium enterprises, and 6 public organizations, representing a variety of industries from manufacturing and retail to healthcare and telecommunications. 64% of the interviewed designers were in managerial positions and 46% in individual contributor roles within their organizations, and the majority had an educational background in industrial design, user interface design, or service design.

In-depth thematic interviews of approximately 40 minutes were arranged with the designers, where they were asked to reflect on the value and utilization of design in their organization, how design could advance sustainability, and recount examples where they had been working with environmental, social, and/or economical sustainability. Interviews were conducted in either the mother tongue or primary working language of the participants (some presented quotes have been translated by authors fluent in both languages). Interviews were conducted through video-conferencing tools in Spring 2021, and were audio-recorded and transcribed verbatim for analysis.

The present study draws from designer responses to two prompts within the interviews. First, designers were asked to reflect on what they saw as the role of design, particularly, in advancing sustainability in organizations. Interview excerpts related to these reflections were tagged in the transcripts and segmented so that each excerpt contained a single proposed role. As a result, 128 segments were identified. These were then categorized based on semantic level thematic similarity

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(Braun and Clarke, 2006), grouping similar segments together. This resulted in six overarching categories, described in the Results section.

Second, design utilization was determined based on designer assessments. Utilization was framed as the extent of prominent design application in the organization, as assessed by the designers themselves. As such, utilization can be considered as one of the components of design maturity, yet insufficient on its own to reflect the full scope of maturity considerations. While the limits of maturity models is recognized, due to its widespread reference in the local industry, the study prompt on design utilization referenced the Design Ladder (The Danish Design Centre, 2001), asking the designers which step of the ladder they felt represented the current utilization of design in their organization most accurately: non-design, with no or ad hoc utilization of design (step 1); design as form-giving, where design is a finishing touch or styling in new offerings (step 2); design as process, where design is integrated into development processes (step 3); and design as strategy, where design is a strategic element in the business model or operations of the organization (step 4).

While many designers noted that utilization varied across projects, teams, and units, all were able to identify a predominant step from their perspective. Many designers also noted being in-between two steps or being close to transitioning from one step to the next. Accordingly, design utilization was coded into three scopes of utilization:

1. Low utilization, reflecting organizations seen to be on step 1, 2, or in-between steps 2 and 3, where design was either used only late on or in a small portion of projects or more systematically but still in relatively narrow scope (n= 29 organizations);
2. Process utilization, where design was seen as an integrated part of developing products and services, a wide range of development processes including operations (n=49);
3. Strategic utilization, where design was seen to play a strategic role in the organization (n=23).

Responses on the role of design in advancing sustainability in organizations were then compared across designers operating within organizations of different degrees of design utilization, examining both differences across and within the six overarching roles.

3. Results

Six main roles for design in advancing sustainability were perceived by the designers: bringing a human connection to sustainability issues and stakeholders (n=44 segments), balancing multiple interests into a holistic perspective (n=23), exploring new alternatives (n=21), mediating across stakeholders and educating stakeholders on sustainability (n=16), providing expertise in implementation and production (n=15) and handling complex problem solving (n=12). While the portion of these roles varied across different levels of design utilization in organizations, no clear patterns were observed (see Figure 1, below). However, within the categories, some qualitative differences could be noted.

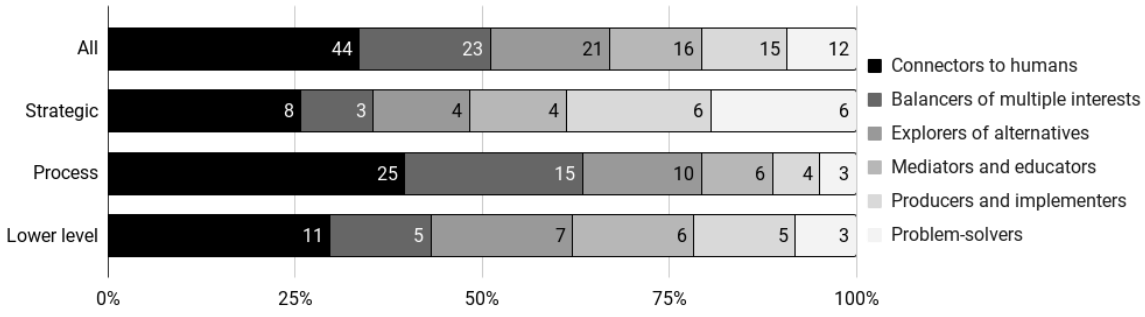

Figure 1. Relative frequency of perceptions of the different roles of design in advancing sustainability by designers operating in organizations of different utilization levels

3.1. Design Connecting Sustainability Issues to and for Humans

The role of design in bringing human connection in advancing sustainability was the most commonly brought up role on all design utilization levels (31% on lower utilization levels, 40% on process level,

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and 26% on strategic level organizations). Bringing in a human-centered way of working, designers engaged with users in two ways. On one hand, they focused on empathizing with users, understanding their wants and needs by doing user research both at the start of the project, as well as during the development process. This ensured time and other resources were dedicated to meaningful development, saving money, and avoiding unnecessary waste. Additionally, designers also connected this role to the third pillar of sustainable development, social progress. Indeed, improving accessibility and usability, in particular for commonly marginalized user groups, was considered an important part of their role. Lastly, they considered ways to simplify maintenance and repairing for users, for instance by creating visualizations.

Designers working in organizations with **lower** levels of design utilization mostly focused on bringing in user-centricity and customer experience angles to sustainability issues. Often, this was connected particularly to the economic pillar of sustainability. For example, several designers mentioned communicating with customers for learning purposes and adding business value in sustainability efforts, connected to the need-finding phase of design.

> *"Starting from the human and humanity is baked into the design way of thinking and seeing the world. Whether we talk about empathy, user-centricity, customer-centricity - those are all just different ways and words to describe that the fundamental mental model is to see things through the eyes of and perspective of people.[...] It's a blurred line between the social and economic elements, the social aspect typically extends to the economic side, too." (Vice President of Design in a large ICT corporation)*

Similar to the lower-level design utilization organizations, designers working in organizations on the **process** level highlighted the role of bringing in user-centricity. However, on this utilization level emphasis was also placed on informing the public, aiming to make environmentally responsible behavior easier and more attractive. As such, foci included both initial design research as well as finalizing output.

> *"In ecological [sustainability], it's through motivating the human, what it's based on and through it. Technically things […], those can be done. But in order for them to be something that people use […], that comes from design being able to do those things." (Head of Design in a medium-sized ICT consultancy)*

Designers working in organizations that utilized design on a **strategic** level typically focused on human behavior within this category. These designers saw the role of design as bringing in impact clarity and considering marginalized groups, indicating a larger emphasis on social progress and engagement during development processes at the strategy level. For example, a designer in a large construction corporation highlighted how design can push to include various special need groups in user testing to ensure more accessible and socially sustainable solutions.

3.2. Design Balancing Multiple Interests for a Holistic Perspective

Design was seen to be able to provide multifaceted perspectives to issues. Complex sustainability issues were seen to require being able to manage tensions between competing perspectives and interests. Designers were seen to play a key role in creating shared understanding across diverse stakeholders, as well as balancing priorities and requirements across the three pillars of sustainability. In addition to tensions between people, tensions were seen across sustainability issues, requiring designers' capabilities to create a holistic solution rather than shallow trade-offs.

> *"No sustainability dimension can be ignored, they all have to be taken into account, giving them a kind of priority. And the role of design is precisely at the heart of determining that, to take a stand on the degree to which a company or service or product addresses each of these issues, and with what emphasis. We may not be able to reach one hundred percent of each of them, but we can set them high as a target value, and then strive to achieve it." (Senior Design Strategist in a consultancy)*

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At organizations with design at **lower** utilization levels, 14% of excerpts described the role of design navigating this balancing act in organizations, most often in the context of tensions between different pillars of sustainability - typically environmental and social, and sometimes also economic considerations.
More references to the balancing act were made on the **process** level, representing 24% of segments on the role of design in advancing sustainability. Typically these were related to discussing impact instead of requirements in relation to the three pillars of sustainability. Designers described balancing the addition of 'empathy' to existing business requirements in the design process. As such, here balancing tensions was more between people than sustainability issues. Additionally, balancing environmental and social concerns in digital ethics were mentioned by several designers in this category. For example, one design manager described the complexity of issues and multidisciplinary collaboration requiring designers' synthesis in advancing sustainability:

> *"We have digital responsibility, we have economic responsibility, environmental responsibility, and then social, so four such pillars. And design can tackle many of these problem areas […], talking about cyber security, talking about accessibility, talking about usability, and then the social side [...]. We've been considering ethical rules in AI, and that has involved designers, sustainability people, and technology people. So maybe my message is that these arenas are starting to blend, and that's a really good thing. So it's not that design solves everything because it doesn't. But everyone together can solve almost anything." (Service Designer in a public service organization)*

In organizations where design was at a **strategic** level, designers rarely described their role as a balancing act (representing 10% of segments). Those that did, emphasized incorporating and balancing environmental and business concerns.

3.3. Design Exploring New Alternative Solutions and Ways of Working

Another way designers advanced the role of sustainability, was by being courageous, and bringing in bold and crazy ideas. This was intended to explore many possible ways forward, however implausible, and experiment with alternative solutions. This included challenging existing norms and opening up discussions around commonly insufficiently discussed components of economic, environmental, and social sustainability. To be able to develop more sustainable products and services, designers felt it was their responsibility to completely reimagine them, in particular when designing for the circular economy.
The exploration of new alternatives was the second most frequently mentioned role by designers working in organizations with **low** design utilization, representing 19% of the excerpts. At the most practical level, this meant design acting as the impetus to try out new materials that could potentially be more durable to advance more environmentally responsible products. Designers in this group also described the role of design in challenging existing norms and coming up with new ways of being and doing to enable circular design.

> *"Design is perhaps the most strongly connected to the circular economy side, enabling circularity. Circular economy requires a lot of that kind of new thinking and closing the circle. [...] But in order for it to be truly profitable and work as part of that whole, it really requires developing quite new ways of working and that it becomes easy and close to people." (Lead at a medium-sized consultancy)*

Similarly, the role of design as exploration was highlighted in 16% of the segments reported by designers working in organizations where design was utilized at the **process** level. These segments were similar in content, but with a somewhat bolder tone, describing design being able to push for a large impact with small changes, to completely reimagine how things are done, and to be the drivers of change in the organizational exploration of more sustainable solutions.

> *"Design has a crucial role, going even so deep that you ask 'Are we talking about material or immaterial services?' […] 'And can we exchange some material service into an immaterial one, because it's possible?' 'And then still produce the same product or service experience? These kinds of questions would probably not be asked by anyone except for a designer." (Senior Design Strategist at a medium-sized consultancy)*

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Designers at organizations with a **strategic** design level focused slightly less on this category (13%), and the focus within the category was rather different from lower and process levels. In contrast to lower design utilization organizations, where designers perceived the role of design more in doing the exploration themselves, designers on this level described more instances of the role of design in enabling experimentation, through bringing people together and supporting others to utilize creativity methods to explore new sustainable solutions.

> *"One role is seeing possibilities, being able to visualize and bring inspiration, materials to help people think about what has been, what is, and what could be. […] On the other hand, also bringing people together to envision, share these thoughts, create shared visions. Strengthen the will to head towards some direction through that." (Lead service designer at a small consultancy)*

3.4. Designers as Mediators and Educators Across Stakeholders

Designers also supported internal collaboration as a way to advance sustainable development. In this role, they used their facilitation and mediation skills to guide conversations between people whose perspectives weren't aligned. This included distilling the essence of a vision, visualizing goals, and creating explanatory prototypes. Furthermore, the designers organized educational sessions to share human-centered design methods and promote social responsibility and created tools to make it easy for people across the organization to implement them.

> *"You have to understand the needs of the users, customers, and stakeholders alike, and the design toolkit is useful there. But in my opinion, it shouldn't be only the design team using it, but rather the whole organization. It's that mindset that needs to be ushered into the organization." (Director and Head of Design in a retail company)*

The role of mediator and educator was most frequently mentioned by designers working in organizations with design utilization at the **lower** level (17%), compared to 13% on strategic design levels and 10% at the process level. At the lower design utilization levels, designers emphasized the role of design in bringing people together to improve collaboration, e.g. by designers distilling core issues, supporting collaborative goal setting, or prototyping to communicate the value of ideas.

> *"I think design is an amazing set of tools and frameworks to help people collaborate […]. You can bring technologies, some business people and scientists into the same team and the design frameworks, because they're genuinely, to use another business expression, outside-in. Designers provide a rallying point and a focus for the team to collaborate together." (Head of Design at a large scientific corporation)*

At the **process** level, designers focused on facilitating dialogues and discussions, e.g. to support understanding and cooperation or arbitrate disagreements.

Designers at the **strategic** level shared similar instances of design distilling the core to improve communication and facilitating interactions between different stakeholders. Additionally, these designers added an emphasis on the role of designers in developing and sharing tools and toolkits for others in the organization as a way to support others in more user-centric work in advancing sustainability. For example, one design director emphasized creating tools for others, such as project management support that enables both better financial outlook as we all more humane tools conductive of employee wellbeing.

3.5. Design Bringing Expertise to Production and Implementation

Some designers also found their role in advancing sustainability by contributing knowledge and expertise to the production process. They considered for example durability of the materials, the environmental impact of the sourcing, the product life cycle, and even looking into what recycling and waste management possibilities are in the implementation location.

On a **lower** design utilization level, the role of design expertise in production and implementation was mentioned in 14% of the segments. For them, this meant designers leveraging their knowledge of the

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environmental friendliness of materials, as well as using their skills to look at the entire production chain and lifecycle, including product and service implementation.
For designers working in organizations with design utilization at the **process** level, 'producers and implementers' was one of the least frequently mentioned roles in advancing sustainability (6%). Their emphasis was mostly on leveraging domain-specific design expertise to ensure the longevity of products, considering durability, reusability, and circularity, alike.

> *"Design can choose materials […] that are compatible with sustainable development, and choose energy-efficient technologies. That would be one role for design, but I think it's rather naive to think we would have that kind of power. So I would say design starts from doing products and services in a user-centered way, what is wanted now and for the next 10 years more, so that they are actually good, functional, and desirable." (Senior Design Researcher at a medium-sized ICT consultancy)*

Designers working in organizations with **strategic** design utilization were more likely to report implementation expertise as a key role in advancing sustainability (representing 19% of segments). In addition to similar roles as mentioned by designers working in organizations on lower design utilization levels, these designers mentioned questioning the basic necessity of the products, and developing measuring tools to evaluate the impact of resources, processes, and development amongst key roles of design in advancing sustainability.

> *"If we do an improvement somewhere, how do we know that improvement has happened? Because we're not staring at the data for its own sake, but rather we need to dig into what's important in it. […] So that's an important thing designers can do." (Lead Product Designer at a medium-sized ICT consultancy)*

3.6. Design Expertise in Solving Complex Problems

While expertise in tackling complex problems was the least frequent role brought up by designers overall, it represented a considerable portion of segments from the responses of designers working in organizations on the strategic level (19%, versus 8% and 5% in low and process levels of utilization.
At the **lower** level utilization organizations, three designers mentioned the value of design bringing in a problem-solving mindset to advance the role of sustainability in organizations, for instance by moving between abstract and concrete. At the **process** level, more specific circular economy and sustainability utilization mapping tools were mentioned as ways to reduce the carbon footprint of their products and services.
Designers working in organizations on **strategic** design utilization levels, in turn, focused on the role of design in handling complex problems through breaking problems down into subproblems. Additionally, they were able to concretize issues by prototyping and experimentation or storytelling and communication.

> *"This ability […] to bring visibility to this complexity that we're working with, to just help make some of these [sustainability] things understandable and to just be able to bring tangibility to things that seem incredibly intangible at times. I think that is certainly one core area where I see designers certainly bringing value." (Head of Product Design of a large retail corporation)*

4. Discussion and Conclusion

Based on the perceptions of 104 designers in 101 organizations, the current study reveals six prominent roles that designers themselves see for design in advancing sustainability in organizations. Interestingly, differences across designers' perceptions working in organizations on different utilization levels had relatively small effects on the relative frequency and tone of the six roles identified in the current study. Indeed, the study focused on the perceived capability of design to contribute to advancing sustainability in organizations in general, informed by the designers' experience but not limited to it. Furthermore, the roles we identified are present at all levels in design for sustainable development (Baldassarre et al., 2019).

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Similarities of the perceptions of the 104 designers, across the wide variety of organizational type, field and design utilization, suggest relatively uniform assessments or perceived overall goals in the role of design. Common themes of human-centeredness, holism, managing complexity, and generativeness can be seen throughout these six roles, and as such, these are well-aligned with extant research on the three service design values of empathy, holism and co-creation (Fayard et al., 2016) as well as six dominant themes in design thinking scholarship (Micheli et al., 2019) in general (see Table 1).

Table 1. Comparison of perceived designer roles in advancing sustainability and design and sustainability capability frameworks

Perceived role of design in advancing sustainability (current study)	Service design values (Fayard et al., 2016)	Design thinking attributes (Micheli et al., 2019)	Cross-cutting competencies for SDGs (UNESCO, 2017)	Design for Sustainability Transitions (Gaziulusoy and Ryan, 2017)
bringing a human connection to sustainability issues and stakeholders	empathy	user centeredness and involvement;	collaboration competency	participatory/human-centred inquiry, transdisciplinarity
balancing multiple interests into a holistic perspective	holism	interdisciplinary collaboration	systems thinking competency; normative competency; collaboration competency	facilitation of participatory inquiry, knowledge synthesis, articulating different value sets, dealing with complexity, transdisciplinarity
exploring new alternatives	(co-creation)	creativity and innovation; iteration and experimentation	anticipatory competency; critical thinking competency; strategic competency	creating options, dealing with uncertainty, iteration and prototyping, visual communication, scenario prototyping
mediating across stakeholders and educating stakeholders on sustainability	co-creation	interdisciplinary collaboration	collaboration competency; critical thinking competency	participatory inquiry, articulating different value sets, transdisciplinarity, visual communication, scenario prototyping
providing expertise in implementation and production	(co-creation)	(creativity and innovation)	(strategic competency)	iteration and prototyping
handling complex problem solving	(holism)	problem solving,	integrated problem-solving competency	vision development, wicked problem solving, dealing with uncertainty/complexity
(not highlighted)	(not highlighted)	(not highlighted)	self-awareness competency	

However, the six roles in the current study also reveal additional nuance in terms of enacting these values through varying emphasis on creating novel understanding, solutions or facilitation in organizations. For example, mediating across stakeholders highlights a combination of co-creation and interdisciplinary collaboration in a facilitative role, whereas exploring new alternatives pairs co-creation, creativity and experimentation with a problem-solving role. The most commonly perceived role of design, bringing a human connection to sustainability issues, in turn, highlights leveraging

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empathy and user-centeredness. The resulting framework of four orientations (human-centeredness, holism, managing complexity and generativeness) and three avenues (designing understanding, solutions and facilitation) can provide a useful starting point for designers in considering various pathways that might be available in their own organization for advancing sustainability. Further research could examine how these dimensions might interact in different types of organizations. While utilization level differences were relatively small in the current study, more pronounced differences might be seen relative to more comprehensive design maturity analyses. For example, examining the relative emphases of the four orientations and three avenues identified in this study relative to different levels of ecodesign maturity, in particular, might yield additional insights on effective pathways towards higher degrees of sustainability in organizations.

Indeed, another comparison point to the six perceived roles of design in advancing sustainability comes from the sustainability discourse. For example, comparing the roles perceived by designers to the cross-cutting capabilities required for tackling the United Nations Sustainable Development Goals, put forth by UNESCO (2017), these roles can be perceived to capitalize directly on seven of the eight listed capabilities: systems thinking; anticipatory competency in evaluating multiple futures; normative competency to understand negotiate underlying norms, values and conflicts; strategic competency to develop and implement innovative solutions, collaborative competency of empathy and empathic leadership, critical thinking in questioning norms, practices and opinions; and integrated problem-solving competency for dealing with complex issues (see also Table 1). The eighth cross-cutting competency of self-awareness, i.e. being able to reflect on one's own role, motivations and desires in relation to local and global communities, was less apparent in the six roles highlighted by the designers. However, self-awareness may be considered as a meta-capability supporting successfully pursuing these roles. All roles of design in transition processes (Gaziulusoy and Ryan, 2017), in turn, were seen across the roles designers took in advancing sustainability in this study. However, where Gaziulusoy and Ryan (2017) found more roles related to inquiry in the context of vision work towards low-carbon cities, process- and outcomes-related roles were equally prominent amongst the 104 designers in this study.

In general, the current study was limited to a single source of data - the designer - in both the main focus of perceptions of the role of design in advancing sustainability in organizations, as well as the design utilization of the organization. As such, it represents a subjective understanding, which could be further deepened in future research through, for example, comparing how designers' perceptions evolve over time, how these might differ within organizations as well as different contexts. Furthermore, subsequent research should explore how such perceptions connect to designers' actions in organizations. Here, self-reported data could be complemented by perceptions of various relevant non-designers in organizations as well as project and organizational outcomes. For example, different roles might be more easy or successful in different types of organizations, vary in their support needs, or manifest in different types of combinations. Finally, as the current data set included only organizations in Finland, subsequent studies might examine variation in and across different national contexts.

In conclusion, our study contributes to understanding the roles of designers in advancing sustainability beyond that of product makers (Baldassarre et al., 2019). Being aware of design utilization and the multiple roles that design may take in advancing sustainability in an organisation can support managers when hiring new designers, as this informs which capabilities are needed to further advance design and sustainability. Lastly, the multitude of roles and different foci across design utilization serve as a reminder to designers that they need to keep learning and adapt to needed roles as design and sustainability expand and mature over time in their organization.

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