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Design for Sustainability Transitions and Sufficient Consumption Scenarios: a Systematic Review

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ABSTRACT

Considering that sustainability can completely modify the design practice, we raise the questions: how the role of design for sustainability transitions change the current design praxis? What would be the role of design in a sufficient consumption scenario? We so attempt to review academic papers about sufficient consumption and design for sustainability transitions to understand the role of design and identify the praxis emphases and gaps. We searched for international peer-reviewed articles published in the last ten years throughout a systematic review, carried out in the *Portal de Periódicos da Capes* database using two search strings: "sufficient consumption" AND design; sustainability AND transition* AND design. We identified 25 articles that show this is an area of research still recent. However, while it's necessary to develop better the sufficient consumption concept, there already are research projects working empirically in the design for sustainability transitions field.

Key Words: System Design. Sustainability Transitions. Sufficient Consumption.

1. INTRODUCTION

Sustainability requires a radical transformation of production and consumption patterns in conjunction with culture and economy. Therefore, some authors (e.g., Vezzoli et al. 2014; Ceschin & Gaziulusoy, 2016; Santos et al., 2016) point out the evolution of design for sustainability since an initial approach, based on the product level, to a more complex one: the socio-technical system level. In this evolutionary path, the designer act as an agent for the transition to sustainability scenarios, changing not only lifestyles towards sustainable ones but also the broader systems. There are already researchers focusing on the new levels of design for sustainability (DfS), addressing issues as product-service system (e.g., Vezzoli et al. 2014), but there seems to be still no clear understanding of what would be the last evolutionary level of DfS. For instance, some authors refer to it as a lifestyle change towards sufficient consumption (Santos et al., 2016), while others emphasize the importance of design for system innovations and transitions (Ceschin & Gaziulusoy, 2016), focusing on technological, social, organizational and institutional changes.

Furthermore, considering that design for sustainability is a different kind of design practice (Ruttonsha, 2017), we can argue that the differences are even more significant when acting in its last levels. So the following questions arise: How the role of design for sustainability transitions change the current design praxis? What would be the role of design in a sufficient consumption scenario? To answer that, we carried out a literature review aiming to understand the role of design and identify the praxis emphases and gaps regarding sufficient consumption and design for sustainability transitions.

2. METHOD

To explore the research about sufficient consumption and design for sustainability transitions, we undertook a systematic review of academic literature adopting a mixed approach: quantitative and qualitative. For that, we followed the instructions of Conforto, Amaral, and Silva (2011). To carry out the searches, we chose the *CAPEs Portal de Periódicos* (CAPEs Journals), a Brazilian database whose collection gathers more than 15,000 international journals with complete text. First, we tested different search strings and settings, until we set those in Table 1 that also shows other search parameters settings.

[Table 1] Search Parameters Settings

Database	CAPEs Portal de Periódicos (CAPEs Journals)	
Search strings	"sufficient consumption" AND design	any field
	sustainability AND transition* AND design	on the subject
Search date	October 30, 2018	
Inclusion criteria	Peer-reviewed article Published in the last 10 years (2008 – 2018) Written in English Open access	
Qualification criteria	Addressing the issue of sufficient consumption OR relating sustainability transitions to the design field	
Exclusion criteria	Only mentioning the topics researched (see the qualification criteria) approaching them superficially or without making contributions to these fields (sufficient consumption or sustainability transitions)	
Filters adopted	Filter 1: analysis of title and publication data Filter 2: abstract reading Filter 3: reading of introduction, method, discussion and conclusion	

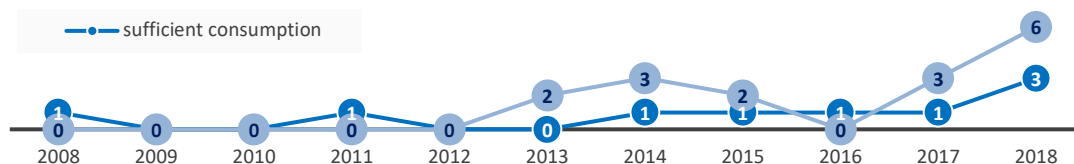
We registered all data resulting from searches in spreadsheets, including the preselected papers' data like journal and year of publication, authorship and authors' country. After the Filter 2 application, we saved the selected article files in the reference management software Mendeley. For the papers' analysis, we created comparative tables where we registered the main information following these codes:

aim/proposal, main themes, focus on design (yes or no), method/methodological procedures, results/contributions, (design for) sustainability transitions or sufficient consumption definition, definition of other related concepts, relevant quotes, observations and main references about sufficient consumption or design for sustainability transitions.

3. RESULTS AND DISCUSSION

After reading the introduction, method, discussion, and conclusion of the papers preselected on Filter 2, 25 articles form the material for systematic review. There are papers from 13 different journals of which attract attention Journal of Cleaner Production (44%). Regarding the nationality of the authors' institutional affiliation, we can feature Australia (n=6), United Kingdom (n=5), Netherlands, Finland and Germany (n=4). This last one stands out for papers about sufficient consumption, while the others address sustainability transitions especially. European countries represent 64% of overall articles, while there are only two from emerging countries: Brazil and Indonesia. Among the authors, we highlight Alcott (2008, p. 775) as a pioneer with an economy article in which he coined the sufficient rebound concept, defined as follows: "in constituting a drop in demand, it initially lowers prices, and this in turn raises others' demand, so that in the end some of what was 'saved' through non-consumption is consumed after all — merely by others." Thereby, strategies to achieve sufficient consumption must be systemic, i.e., not focusing only on individual consumption.

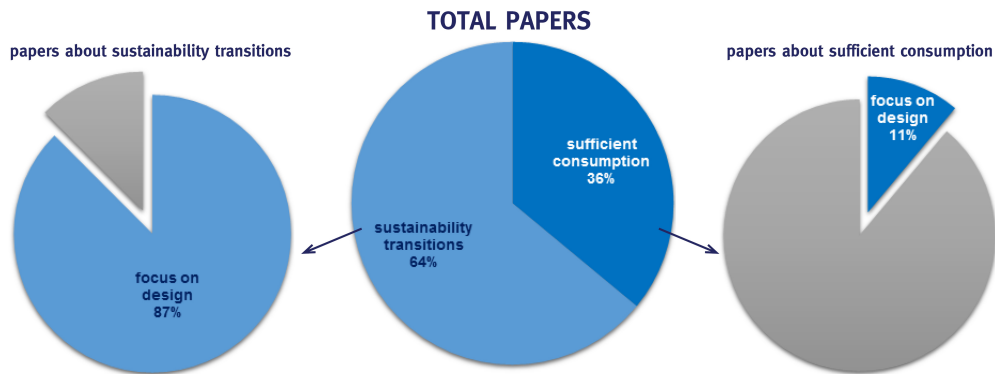
However, as Figure 1 shows, the first articles on sustainability transitions arise only five years later. Gaziulusoy et al. (2013) present a new scenario method for generating innovation pathways for product development to respond to systemic changes towards sustainability, while Bos, Brown, and Farrelly (2013) focus on the design and organization of experimentation intended to generate social learning aiming at sustainability transitions. Therefore, the timeline in Figure 1 suggests that researches on sufficient consumption have been conducted for most time than investigations on sustainability transitions. Nevertheless, these last ones have grown at a higher rate since 2013. Both, however, are more representative in 2018. Thus, it is possible to imply that these research fields are still recent and in development: 56% of the papers date from the last two years (since 2016).



[Figure 1] The spread of articles included in the review based on year of publication

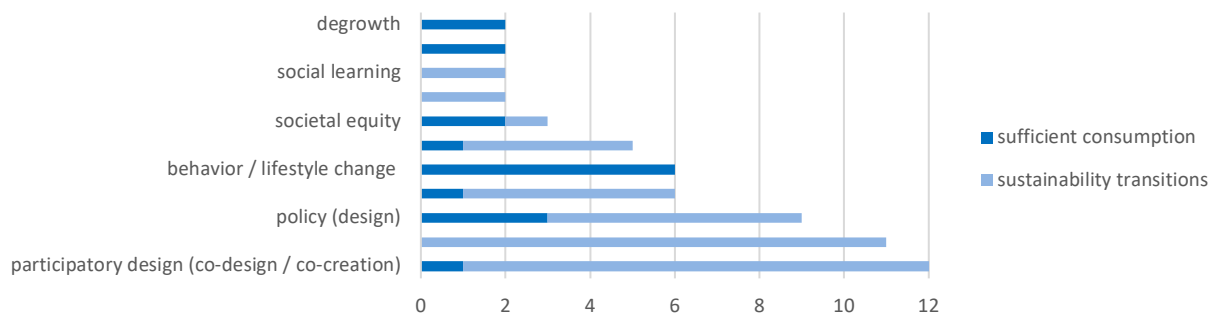
Although both fields are recent, sustainability transitions more than sufficient consumption, there are more articles about the first one (n=16) among the overall selected, as shown in Figure 2. There is furthermore a higher ratio of papers with a focus in design among the ones about sustainability transitions (n=14) than those about sufficient consumption (n=1). Hankammer & Kleer (2018) are the only ones that relate sufficient consumption to the design field. According to them, sufficient consumption is part of the degrowth concept and could be achieved by new enabling technologies (e.g., 3D printing) and participatory approaches such as mass customization, crowdsourcing, modularity, co-design/co-creation, and commons-based peer production. However, the authors evoke Alcott's (2008) sufficient rebound, by highlighting that these technologies and approaches can actually stimulate consumption if they are not used according to the goals and requirements for degrowth. They are the reduction of overproduction and obsolete production capacity, the increase of the meaningful lifespan of products, potential to promote sufficient consumption, the need for resilient and highly self-sufficient local economies, collective and democratized downscaling. Among the papers about sustainability transitions, Idil Gaziulusoy stands out as (co)author of 44% of them (n=6). Her articles focus on the design field, approaching themes as scenario methods (Gaziulusoy et al., 2013), a research agenda for future research on design for sustainability transitions (Gaziulusoy, 2015), a conceptual framework that integrates design with sustainability science, system innovation and transitions theories (Gaziulusoy & Brezet, 2015), and design

visioning/roles/contributions in transition projects (Gaziulusoy & Ryan, 2017a,b; Mok & Gaziulusoy, 2018). Another author to highlight is Ceschin (2014), whose paper about the design approaches and capabilities required to work with sustainability transitions was cited in another article from the review.



[Figure 2] The ratio of articles according to the research field and focus on design

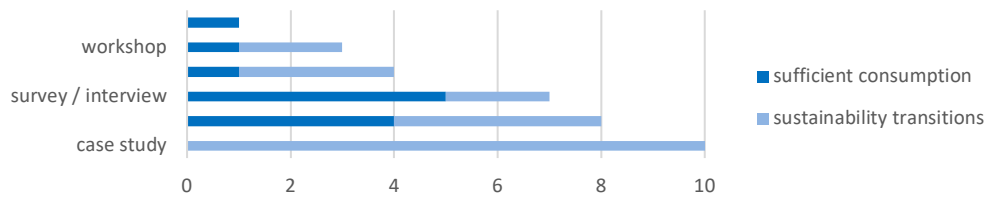
Figure 3 shows the main themes addressed in the articles about sustainability transitions and sufficient consumption. The analysis indicates that both domains deal with participatory design, policy design, social innovation and future scenarios. However, systems innovation/change, strategic design, and social learning are topics that seem to be related notably to sustainability transitions, while behavior/lifestyle change, degrowth, and economy are questions that appeared particular on papers about sufficient consumption. Although papers from both research fields address societal equity, Chapman and Pambudi (2018) stand out for focusing specifically on this issue. They investigated the sustainability and social equity impacts of the ongoing transition toward a low carbon society in Japan to assess the merits of top-down and bottom-up approaches. As a result of their research, the authors point out that householder participation (throughout liberalization to choice the energy source) is a more important factor within social equity than a policy approach. Other themes that emerged are product development (Gaziulusoy et al., 2013; Gaziulusoy & Brezet, 2015) and product-service systems (Ceschin, 2014). The areas in which the papers focus vary from eating habits (n=1), to the company system (Gaziulusoy et al., 2013; Gaziulusoy & Brezet, 2015), urban systems (n=6), farming/agriculture systems (n=3), and aquaculture systems (Mok & Gaziulusoy, 2018), including also university partnerships (n=1).



[Figure 3] Main themes addressed on the articles

As well as themes, there are other differences between the researches about sufficient consumption and sustainability transitions. Figure 4 reports the methods adopted in both research fields. Although there are some correspondences regarding scenario building, workshops, and surveys, we highlight there is a larger ratio of papers about sufficient consumption that undertakes literature review exclusively as the method: they represent 44% of the articles about this subject, while 25% of papers about sustainability transitions adopt only bibliographic research. Furthermore, case studies appear solely on the articles that address transitions. These findings may indicate that investigations about sufficient consumption concentrate more on theoretical exploration, while (design for) sustainability transitions would be a field more advanced in praxis, balancing theory and practice. That is an interesting observation considering that this research domain seems to be more recent than sufficient consumption, as Figure 1 shows.

However, the vital role socio-technical experiments play in sustainability transitions (Ceschin, 2014) may explain the prevalence of case studies in this field.



[Figure 4] Methods adopted to undertake the researches reported on the papers analyzed

Regarding the role of design, Hankammer & Kleer (2018) highlight the importance of participatory design approaches to support the transition to sufficient consumption. We can imply that this position is similar in sustainability transitions since Ceschin (2014) underline that the designer acts as a facilitator, not to mention the roles as a communicator, networker, and negotiator. Nevertheless, the primary purpose of design in this context is “influencing changes at the sociotechnical system level” (Ibidem, p. 16). For that, the designer needs to not only conceive sustainable innovations but also consider “the technical, socio-cultural, institutional and organisational contextual conditions that might favour or hinder the societal embedding process” (Ibidem, p. 15; Gaziulusoy & Ryan, 2017a). Furthermore, “the key design activity in transition projects is process-oriented design rather than output-oriented design” (Gaziulusoy & Ryan, 2017a, p. S1922). All these tasks require new socio-technical system design skills, as stated by Ceschin (2014): a strategic attitude (e.g., Mok & Gaziulusoy, 2018), a co-design approach (e.g. Gaziulusoy & Ryan, 2017a), a dynamic design and management attitude (e.g., Gaziulusoy & Ryan, 2017a; Ruttonsha, 2017). Likewise, Ruttonsha (2017) reassess the role of design in processes of systems transformation, emphasizing its complexity (e.g., Gaziulusoy & Brezet, 2015; Gaziulusoy & Ryan, 2017b). She describes three design approaches to design-like thought and action: adaptive response (everyday design-like decisions of “nonexperts”), creative agency (outdated conceptions of creative visionaries) and emergent engagement (decentralised and participatory approaches). In this last one, the professional acts as systems designer turning “attention towards influencing contexts just as often as we create forms” (Ibidem, p. 12). Gaziulusoy and Ryan (2017b) similarly highlight that the roles design can play in sustainability transitions vary from tangible/technical (e.g., generating visualizations or outputs) to intangible ones related to inquiry and process (e.g., how problems and potential solutions are framed and how knowledge is acquired and synthesized).

Hence, to work in transitions projects, designers need skills and knowledge that is not part of traditional design education, the reason why there is a need for new curriculums development in design education institutions, identifying best-practices in terms of learning goals and teaching methods (Ibidem). According to the literature review, the other two requirements for the improvement of design for sustainability transitions field are: 1) “integrating theories of socio-technical and socio-ecological transformations with theories of design and design education in general and design for sustainability in particular” (Gaziulusoy & Ryan, 2017b, p. 1306), as well as system innovation and transition management theories (Gaziulusoy, 2015); 2) “development of frameworks and associated tools and methods for design, innovation and decision making to help design and innovation teams in product, service and strategy development for achieving systemic transformations to sustainability” (Gaziulusoy, 2015, p. 376).

4. CONCLUSIONS

Aiming to understand the role of design in a sufficient consumption scenario and the changes brought by design for sustainability transitions, we analyzed 25 international peer-reviewed papers from the last ten years. The results suggest both research fields (sufficient consumption and design for sustainability transitions) are new and under development. There is, consequently, a lot to explore regarding the role of design in both of them. However, it is already possible to highlight research emphases and gaps. First, there seem to be more advances regarding sustainability transitions than sufficient consumption, considering the number of papers, including those focusing on design, and the methodological procedures adopted. While the research about sufficient consumption has mainly explored the theory, there are already several case studies about sustainability transitions, suggesting that there is already a praxis under construction.

Secondly, there are some connections between both fields: they address the participatory approach and future scenarios development, as well as the importance of social innovation and policy design. There are not, however, an integration of sustainability transitions and sufficient consumption, what could be achieved by combining their conceptual framework related to degrowth, behavior change, social learning, systems innovation/transition theories, and strategic design.

The pieces of work reviewed confirmed that the roles of design in these new scenarios and approaches are quite different from the contemporary. The designer in this level of design for sustainability is no more an object maker, but a facilitator, communicator, networker, and negotiator. The objective of his or her activity is not only the output, and this last one is not limited to physical objects. Instead, the aim of design is to change the sociotechnical system, and doing so the process can be even more important than the output. The design practice thus is more complex and require some skills and knowledge different from the traditional design curriculum. Here we have a gap regarding design education. There are others related to frameworks, methods, and tools, as well as the role of design in a sufficient consumption scenario (this would be the same as in sustainability transitions?) and the differences that these roles and systems change processes can play in developing countries.

The results presented here can have limitations associated with the database chosen to carry out the searches and because the analyses were restricted to the articles of the literature review, not expanding to other sources. Nevertheless, we hope that this systematic review contributes to the establishment of theoretical bases, which can be used as a reference for future research and further reflections about the design practice shift in a scenario of sustainability transitions and sufficient consumption.

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