SERVICE DESIGN IN ACTION: TRANSFORMATION, CONSIDERATION, AND SYSTEM THINKING

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ABSTRACT

Service design has been an emerging transdisciplinary field that includes product, system, and social science, since the term was first introduced to academic research in the early 1990s. With socioeconomical shifts and emerging technologies, people have faced more complex and systemic challenges, which enable researchers to consider how to reapply service design not only as problem-solving tools but also as ways for communication and alignment to adapt to the change. The study focuses on the paradigm shifts of service from its definitions to applications by interviewing nine design experts from academia and industry, and utilizing survey results to help us explore applying service design to solve complicated social-technological challenges. We present four takeaways: 1) a new understanding of service design, 2) the purpose of using service design tools, 3) the evaluation of service quality through time, and 4) the applications of service design in the public sector. We proposed a macro-trend model with service systems: product, service, and experience to conclude 1) constructing service systems in the macro-trend context and 2) gaining holistic views and building service implementation capability in the era of transformations.

Keywords: Service design, Product-Service Systems (PSS), Design process, Service system, System thinking

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1 INTRODUCTION

In the 21st century, with socioeconomic shifts (Coughlin, 2017), emerging technologies, demographic transformation (World Health Organization, 2022), climate change, multigenerational workforce and environment (Golden, 2022), and other complicated influential global challenges (Wizinsky, 2022), humans are facing more complex, systemic problems than ever in our history (Haberfellner et al., 2019; Crawley et al., 2016; De Weck et al., 2016). This environment makes us rethink modifying and designing our current education system to adapt to the transformation. Especially design education has transformed in many aspects from designing curricula, building individual design capabilities, delivering education services, establishing learning objectives, and cultivating designer's roles and responsibilities, to making social impact (Spitz, 2021; Lee, 2021). In the study, we hypothesize that design expertise from different disciplines including industrial design, interaction design, communication design, business design, experience design, and service design has been under a transformative paradigm shift (Jones and Ael, 2022; Kim, 2021; Holmlid and Evenson, 2008) to cater to the wave of transformations from the individual, to the organizational, to the societal level, connecting the public and private sectors (Seravalli and Witmer, 2021).

Service design is an emerging transdisciplinary field of study that includes products, systems, and business (Penin, 2017; Polaine et al., 2013). The term was first introduced at the University of Applied Sciences in Cologne as an academic research area in the early 1990s (Mager, 2009). We are especially interested in the major shifts in service design in terms of its definitions, tools, and applications through the lens of service design experts (Lee, 2022a). Therefore, we recruited and interviewed nine experts including designers, educators, and consultants and conducted a pre-interview survey to help us explore the future potential of what needs to be considered when we apply service design to solve complicated social-technological challenges. This paper presents four main discussions: 1) service design is a context-driven term, 2) service design tools are created for communication and alignment, 3) measuring the quality of service design needs to consider the dimension of "time" and 4) leverage the "currency" of service design in the public sector versus the private sector.

2 LITERATURE REVIEW

For further constructive discussion of the transformation of service design, we emphasize not only service design including its definition, service system, and future implementation but also our research approach: expert interviews.

2.1 Service innovation under social transformation

Under the new wave of industrial and digital transformation, Wizinsky proposed Postcapitalist Design (PCD) including a change in 1) economic models, 2) material production, and 3) allocation of collective resources and services. In particular, Wizinsky's service design framework will focus on design for social innovation. His perspectives originate from the community-engaged study, participatory design, and service design to build new social and economic capabilities (Wizinsky, 2022). Service design has increasingly played a critical role in the field of social innovation. The Service Design Network (SDN), a non-profit professional service design association founded and led by Birgit Mager, Professor of Köln International School of Design, promotes service design, establishes open-mined global networks, and builds collaborative education platforms to share knowledge and social values (Mager, 2004).

In 2009, Manzini initiated the Design for Social Innovation towards Sustainability (DESIS) Lab based in the Polytechnic University of Milan to leverage academic research with industry resources aiming to achieve systemic, sustainable, and long-term service innovative solutions to make an invaluable social impact (Manzini, 2015). Vink and Koskela-Huotari considered service design as a series of evolutionary processes of value cocreation catalyzed by current institutional social structures. They mentioned that social structures, e.g., norms, rules, roles, and beliefs, are like nutrition and input material to nurture service design (Vink and Koskela-Huotari, 2021; Amatullo et al., 2021). In addition, culture can be projected as part of the social structure to discuss how culture entangles with the transformation of the service system and describe, adapt to, shape, and enact cultures (Duan et al., 2021).

2.2 Extended service design definitions and service systems

The era of experience and service economy has already come (Shostack, 1984). Unavoidably, people's desires and behaviours are more sophisticated than before and they crave more than materialized satisfactions. The service component has come to play a critical role. Consumers want to not only own the physical products themselves, but also experience the service around the products they purchase (Lai *et al.*, 2022; Downe *et al.*, 2020). Therefore, we as service designers need to consider the concept of service systems that is beyond service providers, service recipients, and support teams. How do we apply and integrate system thinking into the service design process to reframe, solve, and maintain the ecosystem? Jones and Van Ael experimentally used systems thinking, design process, and service design to address complex large-scale socio-technical challenges extending the traditional definition of service design by considering hyper-ambiguous socioeconomic problems, technological complexity, and socially impactful results (Jones and Ael, 2022). Design scholars and educators defined and extended service design to service systems, since they have already considered service itself as a transdisciplinary domain knowledge (Meroni and Sangiorgi, 2011).

2.3 The future and applications of service design

Essentially, service and service design are a transdisciplinary domain of knowledge that covers aspects from product experience, to business model, human behavior, emerging technology, and economic impact, to system thinking (Lee, 2022b). We need more adaptable, sustainable, inclusive, scalable, innovative and powerful service design frameworks and methodologies to empower designers, researchers, and creative talents to prepare for future transformations and systemic challenges (Furrer *et al.*, 2016). In the study, we integrated representative literature around service innovation under systemic changes with interview results from service design practitioners across industries and academia to identify the key considerations, reflections, and educational opportunities for future service design.

3 RESEARCH METHOD AND PROCESS

The following four key steps show how we conducted nine expert interviews (remote) guided by a standard process to prepare materials, recruit interviewees, facilitate discussions, document information and learnings, and synthesize these interview outcomes (Figure 1).

Figure 1. Research method overview

3.1 Expert interviewee recruitment and demographic

Expert interviewee recruitment was carried out through personal networks to identify our expert interviewees in the service-design-relevant field of study. We have 58% designers, 25% educators, and 17% others including design consultants, technologists, and researchers (Figure 2 left). All interviewees are in leadership positions with more than a decade of service design experience either from industry or academia across various age ranges (30-70 years old), relatively balanced gender ratio (40% male, 60% female), and diverse industries: banking service, education, design consulting, and corporate, which also gives us a bird's-eye view in discussing service design topics with holistic considerations.
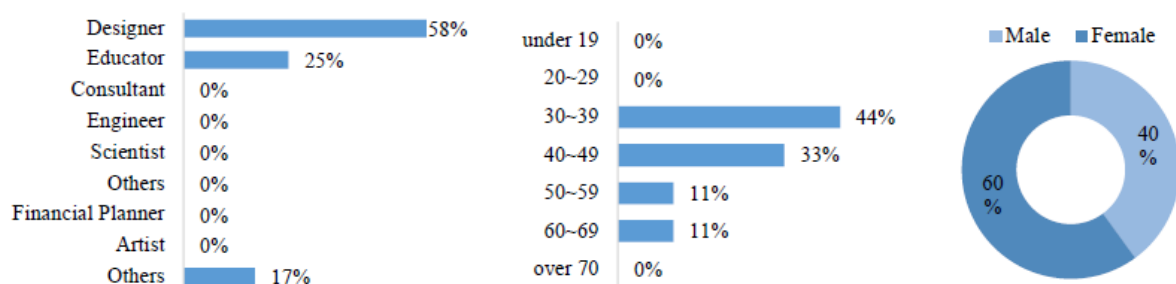

Figure 2. The demographic of interview (n=9): occupations, age range, and gender ratio

3.2 Preparation and pre-interview survey

The design intention of using a 2-3-minute pre-interview survey is to give the expert interview facilitators and researchers: 1) better background information on our interviewees, 2) knowledge of their service design and industry experience, and 3) selected quantitative data, e.g., rating the options relevant to service questions or making arrangement of options that we are interested in learning. The structure of the pre-interview survey consists of three types of questions: 1) options rating, e.g., use score 1 (I have no idea) to 5 (expert level) to measure your understanding of service design; 2) open-ended questions, e.g., use three keywords to describe the concept of service design, and the typical 3) multiple choice questions.
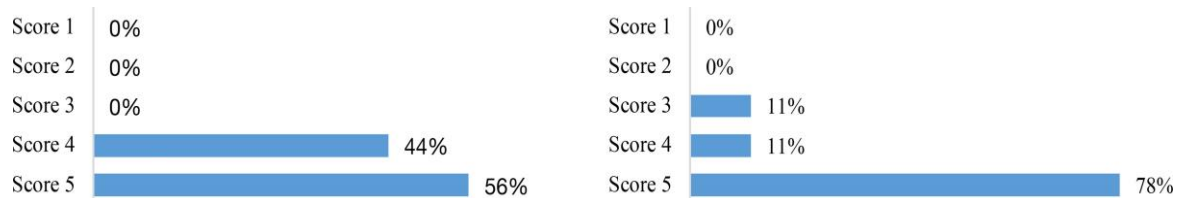

*Figure 3. **Left**: From score 1 (I have no idea) to 5 (expert level), how much do you think you understand the word "service design"? **Right**: From score 1 (not important) to 5 (very critical), what is the importance of service design in your work and life experience? (n=9)*

The pre-interview survey is intended to efficiently help us understand interviewees' knowledge of services and service design. For example, Figure 3 revealed service design experts' understanding of the term "service design" and the importance of service design in their work and life experience. More than 50% of interviewees viewed themselves as professional (Figure 3 left) and a significant 78% thought service design was critical in their work and life (Figure 3 right).

3.3 Discussion guide design and expert interviews conducting

An approximately 45-minute online expert interview per section is the core source of the research input. Prior to expert interviews, we asked each interviewee to finish an interview consent form required by the research institute and a 2-3-minute pre-interview survey to give interview facilitators a brief understanding of their backgrounds and knowledge of service design. The expert interview is followed by the discussion guide through the following three parts: 1) background, 2) service design, and 3) future roles and responsibilities of service designer. In specifically focusing on the second part, service design, we probed questions by breaking down into four categories: 1) service design definition, 2) tool, 3) example, and 4) personal experience to better help us create a holistic description.

For the first category, service design definition, we want to know how these interviewees define a service, the qualities of an ideal service/experience, how they define service design, and the difference between service design, experience design, and system design. We asked service design experts to complete a short sentence about what the service design meant to them in the pre-interview survey (Table 1) and asked them to describe the idea of service design with three keywords.

The most frequent terms are: 6-time keyword (journey/touchpoints/end-to-end/overtime), 4-time keyword (system/ecosystem), 3-time keyword (co-creation/interaction), 2-time keyword (human/people), and the rest (connected, multi-dimensional, experience, value, holistic, tackle the invisible, orchestration but outcome-driven, blueprint, and offering). The survey response showed the emerging explanation of service design was at the intersection of end-to-end journey, system thinking, participatory process, and multiple stakeholders' management.

Table 1. The pre-interview result about nine expert interviewees' concepts of service design

Interviewee 1	Interviewee 2		Interviewee 3	Interviewee 4
Service design means connecting systems to work for humans.	*Service design means* bringing people's life experiences with a business (as a customer or employee) to the forefront of the discussion of whether what is being delivered truly has added value.		*Service design means* designing experiences for an entire ecosystem.	*Service design means* a key to understanding and rethinking human exchange.
Interviewee 5	**Interviewee 6**	**Interviewee 7**	**Interviewee 8**	**Interviewee 9**
Service design means to design services for the quality of life on this planet.	*Service design means* designing the interactions between people and organizations, in a way that is viable, desirable and sustainable.	*Service design means* a multi-disciplinary design discipline to resolve complex real-life problems with a systematic and human-centric approach.	*Service design means* designing to balance benefits for multiple stakeholders, the business, and planet.	*Service design means* the intentional shaping of social structures to enable desired forms of value cocreation.

Regarding the second category, service design tool, we are curious to know if the interviewee has a preference for service design frameworks, methodologies, or tools. How do they measure the effectiveness and quality of the outcome by applying service design frameworks, methodologies, and tools? How do they prototype and make complicated service concepts from intangible, and abstract to tangible, physical, and meaningful experiences? We also cover some examples of service design that reflect the applications of service design methodologies and frameworks. The last category, personal experience, focuses on interviewees' stories and learnings to give us takeaways such as 1) what they think is the most important thing to remember when designing a service, 2) how they deal with very subjective experiences, 3) whether they are grateful for it or sceptical of its usefulness, and 4) what common misconceptions they have heard about service design.

3.4 Downloading interview content and synthesizing insights

With the permission of the interviewees, we recorded most interview conversations via Zoom cloud which can help us document the content for internal research and review the video transcription to organize our notes in detail, identify less obvious patterns of thinking process and draw insights through the 45-minute interactive discussions. After each expert interview, we organized and documented the notes into three categories: 1) key takeaways, 2) provocative quotes, and 3) design ideas inspired by the interview discussion. The following discussion is the result synthesized from pre-interview results, the video/audio recording, and notes from nine expert interviews.

4 DISCUSSION AND CONCLUSION

Here, we summarized our research result by discussing four learnings: 1) a new understanding of service design, 2) the purpose of using service design tools, 3) the evaluation of service quality through time, and 4) the applications of service design in the public sector. We proposed macro-trend models with service systems to conclude the findings of the study and identify further research opportunities of service design in the era of transformations.

4.1 Discussion

Based on the nine expert interviews and the literature review, we highlighted four points for discussion: 1) definition: service design is a context-driven term, 2) tool: service design tools are created for communication and alignment, 3) measurement: consider the dimension of "time" to measure the quality of service design, and 4) application: leverage the "currency" of service design in the public sector versus the private sector.

4.1.1 Service design is a context-driven term

If we view service design as an accumulated series of interactions and experiences unfolding through time (Penin, 2017), we understand that the process and framework of service design need to be modified based on the types of challenges we are going to solve, the scope of the project, and the expectation we have for the internal team and the key stakeholders (Downe *et al.*, 2020). One expert, a service design manager from a design consultancy, shared with us, "*Designing a unified experience and creating synergy between different service touchpoints are critical.*" Service touchpoints are normally built in different contexts to create and curate consistent and comprehensive services considering targeted service recipients and designated service providers, planned environment, tangible and digital resources, and interactions between humans, space, and products. Thus, the definition of service design and its tools can be a dynamic concept that evolves and transforms through time and service design conditions.

4.1.2 Service design tools are created for communication and alignment

One interviewee, a service design director from the banking industry, said, "*To be a great service designer, people need to be comfortable in ambiguous situations, know how to build relationships and trust, be objective, and orchestrate different stakeholders within the ecosystem to make steps forward, even just a tiny step.*" In the era of transformation, service offerings have evolved and diversified to adapt to the change in organizational structure, culture, and people's behavior. It will be more critical to have better service design tools at hand, e.g., Journey Map, Experience Map, Service Blueprint, GAP Model, and Causal loop, which are all created to visualize the service touchpoints. These mapping tools or analysis tools are intended to make collective alignment, create transparent conversation, and facilitate effective and inclusive decision-making processes with the internal cross-department teams and external key stakeholders.

Other than communication and alignment, can future service design tools help designers, researchers, and other creative talents to understand, reframe, and even solve social-economic challenges with emerging technologies? How can we modify the existing service design tools and frameworks to help service design practitioners embrace ambiguous situations, complicated research questions, and problematic results? From the nine expert interviews, most responses cover how to implement service design tools as part of design culture. People, including designers, the leadership team, and other staff can have enough "nutrition" to think, apply, and reflect on these service design tools, decisions, and outcomes strategically and purposefully with meaning and impact.

4.1.3 Measuring the quality of service design needs to consider the dimension of "time"

When discussing measuring service quality, service designers and researchers, many factors need to be considered in evaluating service design outcomes (Lynn Shostack, 1982). *"Service design is really being thoughtful about every single touchpoint within an ecosystem, e.g., people-to-people touchpoint, people-to-machine touchpoint, machine-to-machine touchpoint, and how you are designing with intentionality and with the human beings at the center and the entire ecosystem,"* mentioned the VP of software design at a financial service company. However, among all factors, the element of time was what we heard most frequently from the interviews. Therefore, we consider time as one of the important aspects amid service design projects, which also reminds us that service as a dynamic flow of experience, like a first impression, is critical for new consumers versus multiple-time users.

For example, if one consumer never goes to Blue Bottle Coffee, his/her first in-store experience will be critical for the service provider to leave a good impression on him/her. If the customer has already been to the café multiple times, he/she probably knows the staff and enjoys chatting with them while having coffee and a snack. Mindfully considering the dimension of time in the service can give us multifaceted angles to review service quality, user/customer journey, and service system. In a further study of service design, we need to not only consider the time dimension, but also apply service design approaches in context. To be more specific, when we are immersive a complicated and systemic environment, how do we tackle these systemic problems with strategic thinking under service ecology (Grimes, 2018)?

4.1.4 Leverage the "currency" of service design in the public sector versus the private sector

Service design for the public sector, e.g., government work, versus service design for the private sector is different in terms of system stakeholders, scope, process, business models, and social impact, which

we consider our service design currency. We can also define service design for the public sector portfolio as one type of challenge like a design for social innovation. For example, in 2014, the NYC Department of Consumer Affairs Office of Financial Empowerment and Citi Community Development initiated the Designing for Financial Empowerment (DFE) project collaborating with the NYC mayor's office, Design for Social Innovation and Sustainability (DESIS) Lab at the Parsons School of Design and the Mayor's Fund to apply service design to make financial services of the public sector more accessible, human-centered, and effective, such as helping immigrants in NYC have equitable taxation tools and financial platforms (NYC, 2014). One of the invisible-yet-impactful benefits was that the NYC mayor's office initiated the first service design studio in the government because of DFE (NYC Service Design Studio, 2017).

In the pre-interview surveys, we asked the nine interviewees to rank the different types of projects based on the effectiveness of applying service design methodologies, frameworks, and tools to solve them (1: least effective, 5: very effective). The question also enabled the interviewees to think about how to effectively apply service design approaches in the public sector (e.g., socio-technological challenges, design for social impact projects), the private sector (e.g., product-design-related challenges, organizational transformational projects), and other neutral options (e.g., experience design projects, systematic and complicated challenges, and concept designs).

Figure 4 shows that systematic and complicated challenges (78%), organizational transformational projects (78%), and product-design-related challenges (65%) were thought of as having relatively effective results from applying service design methodologies, frameworks, and tools, whereas 22% thought socio-technological challenges, design for social impact projects, and concept designs were more neutral depending on. Surprisingly, no experts selected experience design projects as a type of challenge to be considered in a service design context. Figure 4 can also inform us how we further develop a set of service system tools, methods, and processes to tackle and adapt challenges from the public sector or the private sector.
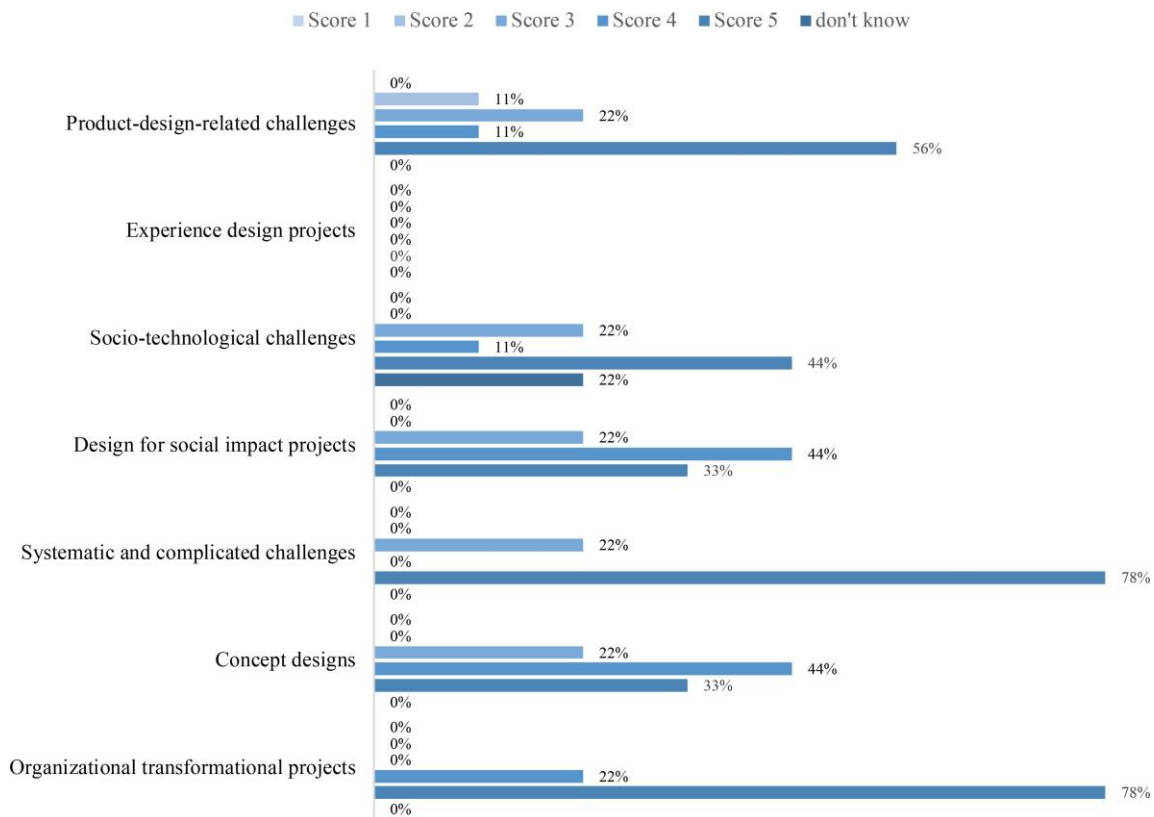

Figure 4. The result of ranking the different types of projects based on the effectiveness of applying service design methodologies, frameworks, and tools to solve them (1: low effective, 5: very effective, n=9).

4.2 Summary

Service design is like curating people's choreography of experience.s Service designers often require an understanding of people's behaviours and desires to address specific pain points or problems (Mager, 2009). Therefore, broadly speaking, we can also view service design as part of a human-centered design (HCD) approach to anchor in functionality and form of services from the angles of users or stakeholders within service systems. Interestingly, people consume services and generate services or other potential services or user needs at the same time. For example, when getting a haircut at a barber shop, a customer consumes the hair-cutting service, while generating new needs for the future haircut or wanting to try a new hairstyle (Hegeman, 2017). Or people go to a restaurant to enjoy a dining experience from a service provider (restaurant), but also create a new desire to try food they never ordered before.

However, in the process of organizational shift and digital transformation, new types of service offerings and complex service systems have become more complicated and diverse. This gives rise to a new definition of service design as cross-disciplinary, differentiating itself from traditional design craft. This newly defined service design consists of a transdisciplinary domain of knowledge that requires collaborative teamwork, design leadership capabilities, system thinking, and a wide range of knowledge connecting design, social science, and technology.

Echoing what one expert, a service design manager from an international design consultancy, shared with us in the interview, *"Designing a seamless customer experience requires full synergy in terms of collaboration inside a company. And you need to prepare the ground in an organization for change to happen because service design is cross-functional and cross-disciplinary in its nature. It's about changing mindsets and changing the ways of working internally."* This also indicates the root questions in terms of (re)designing the (design) education system to tackle these complex problems. The emerging concept of "design literacy" ties to multiple aspects from individual, educational, communal, and social perspectives.

4.2.1 Construct service systems in the context of macro-trend

Referring to the purpose of the study, what needs to be considered when we apply service design to solve complicated social-technological challenges? Following the previous four discussion points, including service design as a context-driven term, service design tools created for communication and alignment, measuring the quality of service design needing to consider the dimension of "time", and leveraging the "currency" of service design in the public sector versus the private sector, we proposed our learning in Figure 5 as a synthesized outcome to map three types of macro-trend models: 1) people-centered model, PCM, 2) technology-centered model, TCM, and 3) hybrid model, HM, connecting with three service systems: 1) product design, 2) service design, and 3) experience design presented as a 2X2 diagram.

The diagram helps us visualize the future service design opportunities as well as think about the service design transition at a macro-level from PCM, a traditional people-serve model (e.g., five-star premium hospitality service to bring customer's suitcase, offer meal ordering, or other room service and tailor-made service offering), to self-serve approach, HM (e.g., Airbnb service, a self-check-in kiosk at an airport with ground staff on the side to support customers) to autonomous and TCM, tech-driven process (e.g., autonomous vehicle service, autonomous delivery services or financial chat-robot system fully controlled and operated by machine or artificial intelligence).

With the visual of Figure 5, we can identify the relationship of macro-trend models with three different service systems from a more tangible aspect (e.g., product design) to more invisible and experience-based perspectives (e.g., experience design). Meanwhile, service design can be viewed as a bridge with many tangible, digital, visible, and invisible service touchpoints to connect the above two.
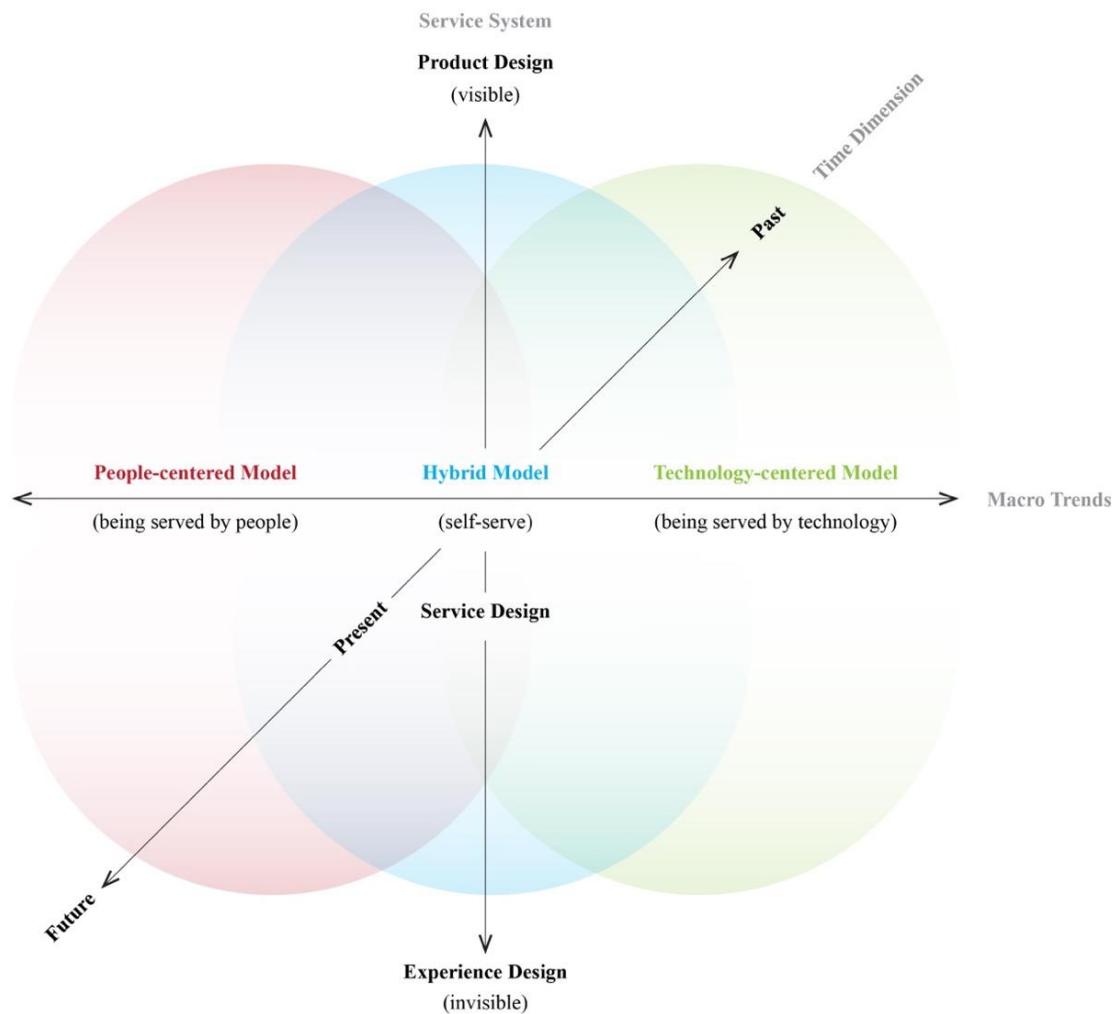
Figure 5. The map of macro-trend models with service systems

4.2.2 Gain holistic views of service systems and build the capability of service implementation

Undoubtedly, service design has been under the large-scale transformative paradigm shift to cater to the dramatic change from the level of individual, institution, country, and society with an impact on both the public and private sectors. The map of macro-trend models with service systems (Figure 5) indicates that we should have more holistic and systemic views in service design especially considering the element of time as another critical service design dimension to 1) analyze the quality of service design, 2) evaluate its service design outcome, and 3) scale its social-technological service impact.

It remains even more important to translate service ideas to service implementation for putting these service design concepts into practice, since these service design actions and execution plans are the core foundation of most service design innovations. The macro-trend models with service systems can also help us envision and (re)design the (design) education system to increase "design literacy" for the purpose of addressing these complex problems associated with people's desirability, business feasibility, and technology viability (IDEO, 2022) in the midst of organizational, cultural, and digital transformation.

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