What do We Design with the Public Sector? Disentangling Service Design Deliverables in Education

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The landscape of service design is expanding and includes multiple layers of complexity. These dynamics influence how we teach and practice service design, particularly when designing with the public sector. The topics under investigation increasingly address relationships and broader societal challenges, the interplay between intangible and tangible, and visible and invisible materials in the design process. This inherent complexity can introduce ambiguity, leading to confusion among both design students and public sector partners. This paper centers on service design education in projects carried out in collaboration with the public sector, analyzing the components forming the final outputs at the delivery phase–namely, the service design deliverables. This is done by reviewing 45 student reports from a practice-based service design course in collaboration with a local municipality. Our findings show that while the intangible outputs have a significant role in defining the design proposal, the tangible gives an actionable form to the intangible through design interventions. Our proposed framework presents how intangible and tangible outputs work together in cycles shaping the service design deliverables. Our study further highlights the significance of creativity, adaptability, and systems design as core competencies in service design education and public sector practice.

Keywords – Materials of Service Design, Service Design Deliverables, Project-Based Learning, Public Sector, Intangible and Tangible Outputs.

Relevance to Design Practice – For design practice, the paper provides a finer-grained understanding of service design deliverables in project work in the context of the public sector. For education, the paper gives insights for teaching, explaining, and articulating to students the intangible and tangible outputs and outcomes resulting from service design work.

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Introduction

While the number of landmarks in research on design with, within, and for the public sector is increasing (e.g., Deserti & Rizzo, 2014; Hyysalo et al., 2023; Lee, 2020), the ground where and how service design meets the public sector is still relatively unmapped. The pioneers describe how design gets introduced to the public sector, and vice versa, laying out barriers and enablers for a wider application of service design practice with the public sector (e.g., Bailey, 2010, 2012; Pirinen, 2016). Additionally, extant research maps different types of design activities in the public sector to better understand their role, scale, reasons, and designed outcomes (Villa Alvarez et al., 2022; Hyysalo et al., 2023). Those include new frontstage interactions, new internal tools, changes in practices, and culture, including improving citizen participation and competence building in the public organization, among others.

To facilitate a better match and integration of service design and the public sector in the long term, education plays a major role. Human-centered and co-design processes and tools have been at the core of service design education. When working with public organizations, the attention on education needs to be shifted from basic tools to abilities in dealing with complex networks, cross-departmental, and cross-sectoral collaboration, at multiple system levels. In such conditions, on the one hand, the existing repertoire of design competence is still valuable. On the other hand, students need guidance in adjusting and re-defining service design outputs and outcomes when working with multiple systems with long and short-term goals, and in the interplay of concretizing and abstracting (e.g., Lee, 2020). In this setting, the questions on what the making elements and expected service design deliverables are in practice-based courses, and their role when addressing more complex societal challenges, are confusing for both design students and public sector partners.

The authors of this paper have fostered a long-standing collaborative relationship with local municipalities and ministry-level public organizations. The primary collaboration platforms have been two master-level design courses conducted over the past decade. During these partnerships, we have taken small but steady steps from small co-design experiments to more systemic and societal challenges, working with timely real challenges in the country's public administration. For our partners, this has

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meant learning to use design as a process and strategy (e.g., McNabola et al., 2013) and participating in their value-driven creative framing, reframing, and thinking about the future in co-creation. For our students, the partnership has provided real-life, experiential learning (e.g., Schön, 1983) about the nuances of designing in complex public service contexts. For the teachers, this learning platform has facilitated the study of various themes that are timely and relevant to service design, such as citizen participation, immigrant integration, or inclusion in digital service transformations. Over the years, student teams, in collaboration with their public sector partners, have developed numerous proposals with varying tangible and intangible outputs, each differing in their potential and feasibility.

In these courses, we have observed that a common threshold concept (Land, 2013) in learning the practice of designing in public service contexts is uncertainty over the design deliverable as the final assignment, but most importantly, as the main output that students provide to their partners. For example, in 2022, we worked with the participation unit in the municipality, in a challenge framed as: "How to reach and involve young and international residents in the city development?" (see DfS22_5 in Appendix B). The lack of specification on the service area, channel, or interaction to improve reflects our partners' uncertainty over the problem. It leaves our students in an uncomfortable suspense, having to wait for the research phase to clarify which of the infinite possibilities they will work on, e.g., is the participation unit the object of design? Is it the city's current engagement frontstage channels? Whereas in product design, students know from the start that a product will be their final deliverable and assignment, in service design, however, this cannot be anticipated, and the possibilities overwhelm the novice designer.

When we adopt the perspective that " the service designer is forming the materials from which the service is co-produced" (Blomkvist et al., 2023, p.16), it opens a new repertoire yet ambiguous for students with a background connected to form-giving disciplines (e.g., product design, interaction design, human-computer interaction, visual communication). As a result, it increases students' uncertainty about an already complex public sector briefs, and students may experience resistance to designing with the unfamiliar service design repertoire. Additionally, when the design process itself can also become the deliverable (e.g., journey maps), it clashes with our students' mental models, surprisingly anchored in an artifact-oriented idea of what constitutes a deliverable in a design project. We choose the term deliverables commonly used in the service design practice to underline the nature and expectations of students' tasks; "at the end of the project, the outputs are handed to the project owners as deliverables" (Lee et al., 2018, p.25).

This paper aims to map and analyze service design deliverables in practice through a master's-level course conducted in collaboration with the public sector. The course's real-world setting and project-based learning pedagogy facilitate the understanding of practice-oriented deliverables. Enhanced by teachers' extensive practical experience, the course deliverables mirror the realities of design practice, providing a robust platform for examining service design deliverables in public sector contexts.

We do so by categorizing student work outputs (i.e., tangible and intangible project deliverables) and outcomes (i.e., expected broader changes or benefits resulting from the outputs). We first introduce the conceptual background with an overview of the evolving field, focusing on service design materials as terms contributing to the entanglement, and finally, discuss the input-output-outcome-impact (IOOI) model and interventions as terms with the potential to disentangle service design deliverables in public services. Then, we describe the research setting, including the course description, the data, and the analysis method. Finally, we present a service design deliverables framework and discuss its implications.

The Expanding Landscape of Service Design and the Evolution of Its Deliverables

To set the stage to address service design education and the meeting point with the public sector, we first lay out the development in the field of service design. From designing touchpoints and interfaces (i.e., designing of services era) to designing for value co-creation and socio-material configurations (i.e., designing for service era), there have been significant changes in the service design promise and what it delivers (e.g., Vink et al., 2021).

The evolution of design from form-giving products and services (e.g., McNabola et al., 2013) to an approach for value co-creation opened the discussion of what designers do and produce in this new service context. As service design is a multidisciplinary field of research and practice, it has numerous definitions and characterizations. In somewhat abstract terms, service design is defined as an approach used to implement the value co-creation perspective in developing new services (Yu & Sangiorgi, 2018) and involves transforming the elements or materials of service, though there is no consensus on what these elements are (Blomkvist et al., 2016; Vink & Koskela-Huotari,

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2021) and what they produce. This opens the discussion on the relationship between these materials and the service design deliverables (e.g., outputs and outcomes). Furthermore, Kimbell (2011) defines designing for service as "an exploratory process that aims to create new kinds of value relation between diverse actors within a socio-material configuration" (p. 41). Designing for services recognizes that "what is being designed is not an end result, but rather a platform for action with which diverse actors will engage over time." (Manzini, 2011, as cited in Kimbell, 2011, p. 45). The emphasis on exploratory processes, socio-material relations, and open-ended results further entangle the view of what we design and what is expected as a deliverable of a service design project.

As service design expands into new landscapes, there is consensus that the design value goes beyond its artifacts. Academic research on service focuses on evidencing the value of design beyond the artifacts it produces and articulating its enabling role for societal impact (e.g., Manzini, 2011; Secomandi & Snelders, 2011; Sangiorgi & Prendeville, 2017). This is reflected in an impact-oriented view of the service design practice. For example, in service innovation and public service contexts, an increasing literature stream integrates a systemic view recognizing the transformative role of design (e.g., Patrício et al., 2020; Junginger & Sangiorgi, 2009; Kimbell, 2011).

Tangling Service Design Deliverables

Materials and materialities are foundational terms in the literature that aid scholars in conceptualizing and articulating the role of service design. These terms, broad in nature, offer multiple meanings that contribute to the entanglement:

1. Materials as the constituents of the service, the elements that make up the service. The term materials aids conceptualizations of what a service is by describing its material components. For example, process, systems, and people in the design of services (Edvardsson & Olsson, 1996) or rules and norms in service ecosystem design (Vink & Koskela-Huotari, 2021).
2. Materials as the means to design the service. Secomandi and Snelders (2011) claim that service exchange relations between providers and clients are grounded on the materiality of their interfaces, even in the case of interpersonal encounters (p. 31). They argue that service interfaces become the object of design by materializing the intangible process exchange. Others have also used materialities to describe the designers' repertoire (Blomkvist et al., 2023) and the means to do so, for example, institutionalized social structures (Vink & Koskela-Huotari, 2021); representations of the future (Blomkvist et al., 2016); touchpoints (e.g., Clatworthy, 2011); service evidence (Shostack, 1982).

These diverse examples aim to disentangle the material inputs that participate in the process of co-creation and the elements involved in transforming the service, but not what they produce. Although the term materials aids the design process disentanglement and what services are, little is explored about the material outputs of service design specific to the delivery phase and the materialities configuring the service design deliverables.

When situating the service deliverables discussion at the end of a project, the term materials is insufficient. While the final delivery is in focus, we need a design lexicon that disambiguates the material sources that the service design activity transforms (e.g., constituents of service, the means to design the service) from the material outputs that the service design activity produces. For the service design practice that develops through projects, service design deliverables are vital not only to the end phase but also when negotiating new projects at the commissioning phase. Therefore, it is essential to explore the outputs as unique materials and establish a clear terminology that differentiates between material inputs and material outputs, as well as the design process itself from the delivery phase.

Disentangling Service Design Deliverables

We now explore three terms with the potential to disentangle service design deliverables, the IOOI model, design interventions, and the dichotomies of the intangible/tangible.

IOOI Model: Input, Outputs, Outcomes, and Impact

In mapping the evolving field of service design in the context of practice, the required skillsets, expectations of expertise, and design outcomes have shifted and expanded. Sangiorgi and Prendeville (2017) proposed three categories to characterize this expanding field in relation to their contribution to innovation. The first category focuses on service interfaces and interactions, emphasizing the design of touchpoints. The second highlights the collaborative design approaches, which prioritize co-creation and stakeholder involvement. The third category centers on transformational, organizational, and social design, reflecting the broader impact of service design (Sangiorgi et al., 2017).

With these categories, Sangiorgi et al. (2017) also outlined the expected outputs and outcomes, their role in driving change, and the relationship between clients and designers. In the first category, service design can be seen as a rather independent skill contribution that guides the change through its distinct designed deliverables. The second category frames service design as a people-centered, creative, and systematic process, where challenges focus on open, exploratory topics, and change is driven by the design process itself, with outputs being work in progress documents and prototypes. The third category labels service design as a people-centered and collaborative mindset and approach, where challenges remain exploratory, change is driven by learning, and outputs are less defined and more emergent (Sangiorgi et al., 2017).

To further explore what is being designed and to build on the output and outcomes terminology that describe the multiple dimensions of service design deliverables, we utilize the input-output-outcome-impact (IOOI) project management model (e.g., Bagnoli & Megali, 2011). This model helps us distinguish core elements in service design deliverables in projects often intertwined in service design literature: Inputs (the material and immaterial resources in a service design project), Outputs (the project deliverables encapsulating what to change and how to enable it), Outcomes (the immediate benefits intended by the deliverables), and Impact (the desired long-term change).

Design Interventions

In our service design courses, which collaborate with municipalities, government, and the broader public service ecosystem, we have adopted the term interventions to refer to the students' project deliverables. This shift not only aligns with systems thinking principles (Meadows, 1997) but also serves as a valuable pedagogical guide, steering students away from viewing deliverables as definitive solutions and instead emphasizing them as entry points for change.

The term design intervention reflects the influence of systems thinking and a behavioral approach commonly used in policy design. This perspective resonates with scholars and practitioners who draw from other traditional disciplines, such as political science and behavioral economics. For example, Meadows (1997) describes leverage points as areas to intervene in a system, classifying twelve types of intervention points according to their effectiveness in transforming a system. In the realm of policy sciences, Howlett (2005) describes policy interventions as instruments that shape government practices and their relationship with citizens. In behavioral sciences, interventions focus on modifying human behavior, often through techniques like nudging to achieve social goals (Thaler et al., 2013).

Within co-design, interventions often refer to playful, experimental, and open-ended design inquiries aimed at exploring and discovering possibilities (e.g., Halse & Boffi, 2020). However, design scholars studying public services and governance also refer to interventions (e.g., Bason, 2014; Bailey & Lloyd, 2016) to examine how design can address systemic transformations in public services. In this context, interventions are discussed as proposals that contribute to transformative systemic change.

Dichotomies: The Tangible and Intangible

Dichotomies provide intelligible labels to describe the designer task in transforming services, such as tangible/intangible (e.g., Secomandi & Snelders, 2011), concrete/abstract (e.g., Lee, 2020), visible/invisible (e.g., Shostack, 1982), material/immaterial (e.g., Blomkvist et al., 2023). Although these dualities are used for multiple purposes and are frequently used interchangeably, they create a descriptive vocabulary for presenting the qualities of service design deliverables, the products of services, or their outputs. Penin (2018) reclaims the design tradition of making in service design by referring to the tangible qualities of service design deliverables: "The outputs of service design do comprise material artifacts, and how these shape the conditions for interactions." (p.34). Similarly, Clatworthy in Blomkvist et al. (2023) argues that the material of service design should be seen as something to form.

On the other hand, there is an acknowledgment of multiple elements at interplay, such as subordinating relationships described in Blomkvist et al. (2023); para and pseudo materials and the complementary relationship between the tangible and intangible in Secomandi and Snelders (2011):

> [T]he danger resides in defining a touchpoint as a tangible interface between providers and clients that is peripheral to an intangible service core. In stark contrast, we claim that the client-provider interface is crucial to service design because, ultimately, it brings new services into being. (p.33)

The distinction between the intangible and tangible outputs provides an outlet for classifying service design deliverables and studying their distinct qualities in more depth. In our study, we take the already well-established discourse on tangible/intangible as a starting point for categorizing service design deliverables.

Methodology

Research Setting

The paper reviews the last eight years of collaboration between Aalto University and the public sector. These collaborations happened as study projects through a master-level course (we will refer to it as DfS) with the City of Espoo as a main course partner.

DfS is a course in the Collaborative and Industrial Design of the Master's Program in Design at Aalto University since 2011. Most of its students have a design education background and are adept in principles and methods grounded in human-centered design. In this course, students apply a service design mindset, process, and associated methods and tools to address real-world problems, which typically relate to socio-cultural or technological shifts within public organizations. The course emphasizes holistic, human-centered, and co-design approaches. It also encourages sense-making of complexity and organizational and networked relationships. See Table 1 for an overview of the seven-week course.

The collaboration between the public sector and the Design Department was initiated in 2009. The early days included student projects and small research interventions that were characterized as adventures (Hakio & Mattelmäki, 2011), as the landscape between design education and research and the public sector was still uncharted territory. Today, on the one hand, many civil servants are knowledgeable and trained in service design practices, and on the other hand, service design research and education have progressed. However, we still have a landscape to explore, particularly when addressing systemic complexity, digital solutions, and their entanglements.

From the university's side, working with the municipalities has been significant. Over the years, what started as a small step has become a steady pathway representing dozens of design interventions with diverse partners and a variety of briefs. In DfS, we worked with more than 50 design briefs and 250 students addressing topical and societally relevant challenges, ranging from citizen participation (Hatami & Mattelmäki, 2016) and fostering care (Hakio et al., 2019) to internationalization and diversity and inclusion (Svanda et al., 2021), among others.

Data Collection

This paper employs a systematic review of course projects following the adaptation of steps from systematic literature reviews (e.g., Kitchenham, 2004; Snyder, 2019). Rather than focusing on the published academic work, this review collects and analyses course projects dealing with designing public services from the DfS course. Four reviewers (i.e., three responsible course teachers throughout the eight documented study years and a project employee) were involved in collecting, archiving, scanning, and reviewing the project materials (e.g., project reports, project presentation slide decks, brochures, booklets, and

tangible project tools) produced within the course. The original course partner briefs and final student reports were identified as the best-suited materials for further review (Figueiredo et al., 2022) as they were data-rich and contained relevant information for detailed data extraction in the following step. In total, we compiled 45 project reports from DfS (2016-2023), capturing student service design project deliverables for addressing public sector challenges (see Appendix B).

Data Extraction

After compiling the dataset of 45 projects, we extracted the data summarized in Table 2.

The data extraction was done manually, by copying and pasting text from the project reports into Excel. For some extraction elements, the data was transformed into a format appropriate for easy analysis (e.g., public service context, analytical levels). We identified employed service design methods leveraging the Service Design Methods Database presented in Vink and Koskela-Huotari (2022). Initially, other elements were discussed to be extracted, including identified challenges and what happened with the project after the course. However, since encountered challenges were not always reported in project reports, and a systematic way of tracking the implementation of the projects after the course had not been implemented yet, we had to remove these elements from the extraction sheet.

Table 1. The DfS course's overview.

Learning objectives	Course contents and activities	Weekly assignments and assessments
• Apply co-design and service co-creation and differentiate their roles in the design process and outcomes • Recognize, explain and apply the key principles and concepts in service design practice and research • Outline networked systems and organizational structures for service design • Create and justify service design proposals that are based on creative collaborative exploration, and reflective evaluation of and with project partners, contexts, methods and frameworks	**KNOWING MODULE** • Key principles and concepts in service design and designing for services • User research and co-design principles and tools, customer experience • Organizational systems, service networks, design in and for the public sector	• Independent readings (Formative assessment) • Active participation in class (Summative assessment) • Individual learning portfolio reflecting both knowing and making modes (Summative assessment)
	MAKING MODULE • Re-framing the brief and planning qualitative research • User and background research & co-design sessions • Synthesizing research and defining further the proposal through examples and visualizations • Justifying and communicating the proposal with evidence from research and literature	• Independent teamwork and weekly meetings with partners (Formative assessment) • Active participation in teamwork (Summative assessment) • Provotype, Research plan, and Mid-term presentation (Formative assessment) • Final presentation and Project report (Summative assessment)

Note: While there have been slight modifications in the choice of literature and lectures, as well as the duration of the course over the years, the core structure, activities, and assignments, along with the learning objectives, have largely remained constant.

Table 2. Data extraction.

Extracted elements	Description
1. Public service context	What was the service context of the project brief (e.g., healthcare, immigration, education, employment)?
2. Project brief	What was the initial brief from the course partners? What was the problem/challenge the brief owners identified? What were the partners' intended outcomes and desired change?
3. Employed service design methods and tools	Which service design methods and tools did students employ throughout the project?
4. Stakeholder involvement	Which and how many stakeholders were involved throughout the service design process (e.g., in co-creation workshops)?
5. Project reframes (by students)	How did the students redefine the project problem/challenge to better align with the desired outcomes and new insights that have emerged from the research?
6. Project outputs	What were the tangible and/or intangible outputs delivered at the end of the project to their project partners?
7. Project outcomes	What were the intended or desired outcomes of student interventions?
8. Analytical levels	What was the level of analysis: i) micro (i.e., individual; small-scale), ii) meso (i.e., groups, organizations, communities; intermediate scale), iii) macro (i.e., societal or global level; large-scale)?

Note: We categorize elements 1-5 as project inputs.

Data Analysis

To analyze the data, we adopted a qualitative approach, initially utilizing the established IOOI model (e.g., Bagnoli & Megali, 2011) to structure our data. This step helped us disentangle how diverse resources (i.e., inputs) were transformed into tangible and intangible project deliverables (i.e., outputs), which then aim for short-term and medium-term benefits and changes (i.e., outcomes) and long-term and broader societal changes (i.e., impact). In the following step, the reviewers employed the 1st-order categorization, labelling three project elements: i) tangible outputs, ii) intangible outputs, and iii) outcomes, while staying close to the terminology used by students in their project reports. For each course year, there were three independent coders (i.e., the course-responsible teacher and two members not involved in teaching in that specific year; see Figure 1).

As the analysis progressed, we identified similarities and differences among the 1st-order categories, allowing us to consolidate them into a more manageable number. The reviewers met four times for joint analysis sessions, in which we shared and fine-tuned our categorizations. At this point, we started moving between the evolving bottom-up categories and the broader literature on objects or materials of service design, public sector design, and design interventions. In the process of 2nd-order categorization and labeling, we adopted the approach by Gioia et al. (2012), whereby we reviewed the literature to determine whether the existing service design terminology accurately represents our data. We paid particular attention to the categories that did not have adequate referents in the existing literature. We present our final categories in Tables 3 and 4.

Findings

This section presents a qualitative analysis of the 45 student projects developed in collaboration with one municipality between the academic years 2016 and 2023. First, we briefly present project descriptives to situate the course challenges. Second, we introduce the findings structured into three main emerging categories of the project: Outputs intangible, Outputs tangible, and Outcomes. Each category classifies projects further with examples of our students' works and commissioned projects.

Course Projects' Descriptives

We first describe and situate the course project according to public service contexts. In total, we identify eight public services, including Immigration services (12), Economic development & Employment services (9), Culture & Leisure services (8), Healthcare services (5), Social services (4), Civic engagement & Accessibility (4), Education services (2), and Transportation services (1). The challenges tackled by the course include supporting immigrant employability, engaging senior citizens in the City's activities, increasing residents' participation in joint decision-making and/or urban planning, supporting students in finding career opportunities, and innovating the healthcare service journey, among others. For an overview of all 45 projects, please see Appendix B. In the earlier years of the collaboration, a course theme was created by the teaching team as a red thread to connect the different briefs. It included themes such as participation, caring, diversity, and inclusion.

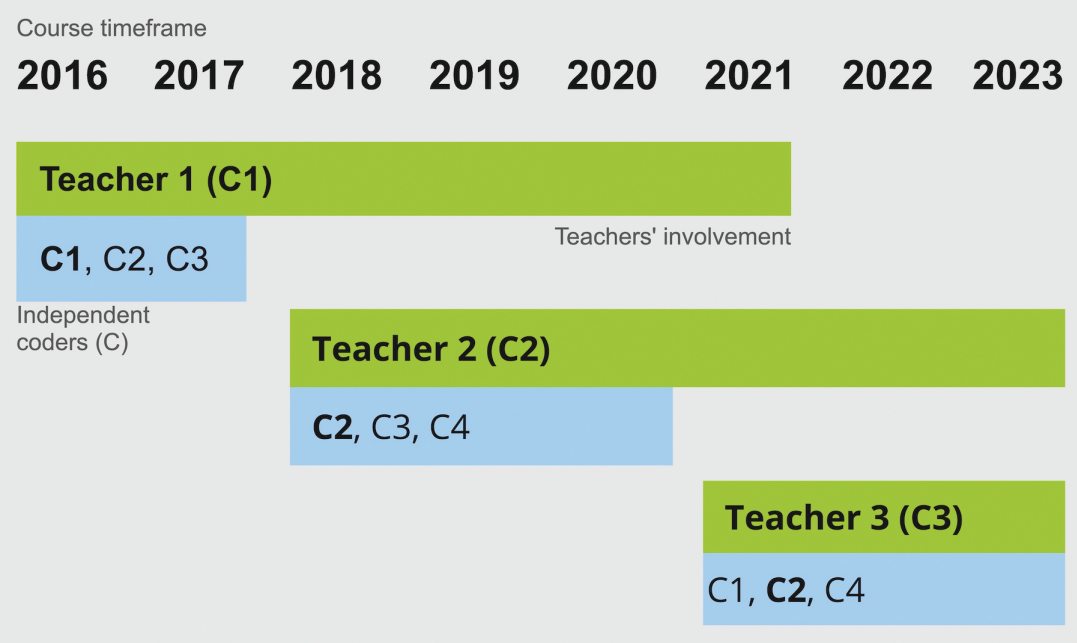

Figure 1. Teachers' and coders' involvement in the data analysis.

Note: Four reviewers: Teachers 1, 2, and 3 (T1-3) and a Project employee (PE); and four independent coders: T1 = C1, T2 = C2, T3 = C3, PE = C4; three coders were involved in each study year. The bolded coders highlight when a coder was involved as a teacher in the reviewed study year.

In contrast, in more recent years, civil servants interested in posting their challenges have joined a workshop in which we collaboratively craft their project briefs without a course theme. Over the years, we have noticed an increased interest in addressing the topic of immigrant integration within the City, which aligns with the City's strategy. The course also offers a great platform for experimenting with such topics due to many international students participating in the course.

Emerging Categories of Service Design Deliverables

Following qualitative data analysis, we present our findings under three meta-categories: (1) intangible outputs, (2) tangible outputs, and (3) outcomes. Each meta-category comprises categories capturing types of deliverables, with the total number of represented projects stated in parentheses, out of the 45 reviewed projects. Since student projects had multiple intangible and tangible outputs, the same project entry can be represented under multiple categories.

Outputs

We divided outputs into intangible and tangible. Table 3 provides an overview of the two.

Table 3. Intangible and tangible outputs.

Intangible outputs	Tangible outputs (Examples in Appendix A)
1. Ecosystem actors a) Working groups b) Actions & Responsibilities **2. Service strategy** a) Value propositions b) Vision **3. Organizational practices** a) Co-creation process b) Collaborative practices	**1. Internal resources** a) Physical props (e.g., design games for workshops) b) Tools & Templates (e.g., canvases) c) Service design manuals (e.g., customized tools with instructions) **2. Operational and implementation guidelines** a) Maps and data visualizations (e.g., a filled-in service blueprint) b) Action plan (e.g., roadmaps) c) Principles (e.g., service principles) **3. Representations of future service** a) Touchpoints (e.g., low-fidelity prototypes) b) Visual narrations (e.g., storyboards) c) Concept visualization (e.g., scenario visualizations)

Intangible Outputs

In this meta-category, we classify the service design deliverables encapsulating the core changes proposed by the design team. These propositions dictate what needs to change or be adjusted to achieve the desired outcomes. We classify such propositional and abstraction qualities of outputs into three types: (1) ecosystem actors, (2) service strategy, and (3) organizational practices.

1. **Ecosystem actors (31/45)** propose new actors of value co-creation and align them for a new purpose. This formalizes existing relationships or establishes new connections across organizations and sectors.
    a. **Working groups** are a set of actors that are identified as value co-creators within a new value network, repositioning their traditional roles (e.g., establishing new actor relationships, new alliances, and partnerships).
    b. **Actions & Responsibilities** clarify, organize, and specify who and what needs to be done, commonly in already established networks. This typically involves aligning backstage processes and internal operations with the customer journey (e.g., defining the backstage and frontstage roles in a new service experience).
2. **Service strategy (28/45)** proposes a new rationale for value co-creation through conceptual models that structure thinking and inspire collective action. These provide forward-looking direction through shared meanings and common frameworks.
    a. **Value propositions** propose new ways to co-create value, defining what value is created, and the benefits and purpose of engaging in service (e.g., a new service idea articulated through attributes that frame a new service offering).
    b. **Vision** articulates the desired future state or direction that can act as inspirational and motivational signposts (e.g., aspirational goals about the ideal service).
3. **Organizational practices (21/45)** contain proposals that outline the conditions for implementing the suggested changes within the organization. This category further defines how diverse actors work together.
    a. **Co-creation process** as a new collaborative practice that engages diverse service actors, including users, partners, employees, and experts, in identifying challenges, generating ideas, and co-designing interventions (e.g., working sessions with users and diverse organizations).
    b. **Collaborative practices** encourage the continuation of dialogues, engagement, and collaboration between diverse service actors (e.g., regular meetings across departments, conversations, and feedback sessions).

Tangible Outputs

In this meta-category, we classify service design deliverables as the form-giving outputs that provide the means and enablers for achieving the desired change. Tangible outputs guide how change should be achieved through concrete, practical, and diverse actionable formats. We classify such instrumental qualities into three types of outputs 1. Internal resources, 2. Operational and implementation guidelines, and 3. Representations of future service. Appendix A includes visual examples of tangible outputs produced by our students' work, illustrating the following categories.

1. **Internal resources (17/45)** support internal teams by providing new resources for planning, facilitating participation and collaboration, as well as developing services following design principles. These resources shape and make visible new organizational practices (e.g., design games for

workshops, service design toolkits) and provide tactical tools for systematically maintaining a customer orientation and participatory mindset (e.g., canvas for internal workshops). The formats of these deliverables can range from physical props, tools, and templates, and include the basic service design tools, such as a customer journey customized for everyday use.

   a. **Physical props** with tactile and visual properties used to facilitate understanding, engagement, and interaction (e.g., design games for workshops, trigger cards).
   b. **Tools & Templates** for thinking, facilitating, and executing cross-collaboration with internal and external stakeholders in a structured manner (e.g., canvases, internal templates, layouts, and frameworks).
   c. **Service design manuals** with customized service design tools and instructions for strategic service design and management (e.g., service blueprint, customer journey, user archetypes). It provides guidance and structure for incorporating human-centeredness, co-creative process, and holistic viewpoint throughout the organization.

2. **Operational and implementation guidelines (32/45)** include easy to socialize and empathize operational and implementation information while also inspiring action. In this category, we do not include the templates but its content synthesizing research findings. For example, the data that is visualized through a service blueprint instead of a blueprint template that needs to be filled in.
   a. **Maps and data visualizations** include information and visualization of the research data, about the status quo or future service (e.g., filled-in service blueprint or journey maps).
   b. **Action plan** incorporating a step-by-step process of adopting and implementing proposed changes (e.g., roadmaps, pilot plans, specifications for service experimentations).
   c. **Principles** forming foundational guidelines that permeate a user-centered culture across teams (e.g., service principles, service values, design drivers, engagement principles).
3. **Representations of future service (32/45)** envision the future service through visual representations. These low-to-high-fidelity sketches and visualizations make proposals concrete through examples of use case frontstage and backstage interactions.
   a. **Touchpoints** representing points of contact between service beneficiaries and the public sector (e.g., low-fidelity prototype, visualization of a touchpoint, behavior-oriented nudges, service evidence such as a photo booklet).
   b. **Visual narrations** provide use-case scenario examples that articulate the benefits of the imagined future and how the proposed changes would be experienced (e.g., storyboards, scenarios, video narrations).
   c. **Concept visualizations** include visual representations of abstract ideas such as a new value proposition or service offerings in a new service ecosystem (e.g., service concepts, scenarios, operational models, community-based ideas).

Outcomes

In this meta-category, we classify the desired benefits directly affecting the municipality's commissioning unit and its users. Each student project was associated with two outcomes, one for each beneficiary group. In total, we identify nine project outcomes that we define and organize under two groups of beneficiaries: Citizen & Service Users and Public Sector Partners, see Table 4.

Table 4. Project outcomes ranked by frequency.

Citizen & Service User Outcomes	Public Sector Partner Outcomes
1. Improved customer experience (21/45)	1. New service ecosystem partnership (12/45)
2. Culture of participation and civic engagement (13/45)	2. Competence development and culture (10/45)
3. Sense of community (7/45)	3. Operational efficiency and innovative service offerings (8/45)
4. Reflexivity (4/45)	4. Value alignment and network orchestration (8/45)
	5. Visibility and integrated communication (7/45)

Citizen & Service Users

1. **Improved customer experience** makes citizens' lives and the use of everyday services better. As service offerings become more innovative and seamlessly integrated, they not only enhance the experience of everyday service interactions but also the experience of being a resident or a business in the city.
2. **Culture of participation and civic engagement** mobilizes resident action beyond the political or electoral mechanisms, encouraging proactiveness in public service affairs and promoting residents as active decision-makers in the city.
3. **Sense of community** strengthens bonds between residents and their city by connecting them to the local community, public space, and local service providers.
4. **Reflexivity** activates the self-reflection of individual residents improving their skills and abilities for work and everyday life. For example, improving employability outcomes or becoming a better professional.

Public Sector Partners

1. **New service ecosystem partnership** is a new configuration of actors integrating cross-sectoral organizations, offerings, and resources from diverse local and public service providers as a new formalized alliance of value co-creators.
2. **Competence development and culture** bring participatory and human-centeredness as the new everyday organizational mindset through new working practices, tools, strategies, and/or processes.
3. **Operational efficiency and innovative service offerings** provide a common ground for decision-making and future visioning for the scattered service providers by creating a shared view of the service experience and prioritizing action.

4. **Value alignment and network orchestration** facilitate knowledge sharing, synchronizing activities, cooperation, and shared goals across diverse groups of value co-creators (public services, third sector providers, local communities, users or/and service actors).
5. **Visibility and integrated communication** simplify the complex offerings and public service ecosystems and improve the awareness of the service among citizens, users, and other actors.

Cross-analysis of Service Design Deliverables

Intangible Outputs Define the Design Proposal, Tangible Outputs the Design Intervention

Our analysis shows that each of the 45 student projects is comprised of more than one service design deliverable, always containing intangible and tangible outputs. Since most projects (41) included more than one intangible output, the tangible outputs addressed multiple proposed changes (e.g., Service principles in project DfS23_3 enable both Ecosystem Actors and Service Strategy changes). Whereas intangible outputs encapsulate the design proposal, the tangible outputs shape it through concrete actions to enable the desired change. These tangible outputs act as interventions that are easy to adopt for the commissioning partners and their teams.

Following the functional roles each output plays, we further divide service design deliverables into two parts: (A) a design proposal, comprised of one to three intangible outputs, and (B) a design intervention that enables the proposed changes through the tangible outputs (see Figure 2). Because intangible outputs are conceived as a coherent whole, combining two or three intangible outputs, we cannot draw direct relationships between each intangible and tangible item nor generalize a taxonomy that pre-determines specific correlations between all the intangible (3) and tangible outputs (9).

This finding helps us to introduce a lexicon with specificity to discuss service design deliverables that can be adopted by practitioners when managing project expectations, for example, by clarifying upfront which type of proposals the service design project will address (e.g., intangible output types), and allowing the project duration and design process to determine which design interventions will be created to enable them (e.g., tangible output types). For educators, breaking the deliverable into two distinct terms, proposal and intervention, can help communicate the course results upfront and alleviate the students' anxiety over the unknown result of the course, as well as serve as a pedagogical guide for teaching the practice of service design in projects, for example, in the course's tutoring sessions.

Outputs for Delivering Ecosystem-Level Outcomes

Although the types of intangible and tangible outputs did not differ across outcomes, we now draw particular attention to the two service partner outcomes addressing ecosystem-level changes: New Service Ecosystems Partnership–the most frequent partner outcome, and the Value Alignment & Network orchestration, 20 projects in total.

For these outcomes, Working Groups (9/20) are delivered by forming new diverse groups (e.g., internal teams, local service providers from the public, private, and third sector, and resident communities), with which students engaged throughout the design process, for example, in co-creation sessions. Although these sessions were conducted as project meetings following the co-design ethos of the service design approach, in the delivery phase, however, the same workshop participants became the intangible output, and the Working Groups became essential to the design proposal.

Those co-creation sessions served as pre-developments of the design proposal and prototypes of the new working group, where students explored new value-creation possibilities and roles. For example, physical props deployed in those sessions, which we categorize as Internal Resources outputs, are common tangible outputs shaping the Working Group proposal. In designing for the ecosystem-level, the Ecosystem Actors type of intangible outputs, such as Working Groups, play a crucial role in shaping the new networks of value co-creation, which internal resources and operational guidelines help to deliver through the concrete and actionable tangible outputs. These deliverables start as unconscious prototypes during the design process in co-creation sessions.

Touchpoints, Props, or Probes?

There were nine projects with physical props (e.g., trigger cards, design games), of which four were also considered touchpoints (e.g., a new frontage interaction between the user and the city). In these cases, the tangible output plays a double role, both as an internal resource and as a representation of the future service. This is, for example, the case of immigrant employment in DfS23_2 (see Appendix B), where students developed a canvas with multiple purposes, which the partner immediately implemented. Whereas for job seekers and counselors, the canvas acts as a touchpoint to discuss progress, for the management team, it is a physical prop to internally guide innovative service offerings.

In alignment with the previous findings, in all these cases, the props originated as a generative probe during the research phase, which student groups evolved into touchpoints (internal or external) in the delivery phase towards the end of the course.

Earlier studies compared probes with toolkits and prototypes at different phases of the design process (Sanders & Stappers, 2014). Our study claims, however, that probes or prompts also play a role in the delivery phase, acting as tangible outputs in the final deliverable. Rather than designing different artifacts for each phase, such as toolkits during the research phase (Sanders & Stappers, 2014), our study demonstrates that the tangible output evolves throughout the design process, taking on different roles while the core artifact remains unchanged. For example, the canvas initially served as a generative probe and later as a prototype, undergoing small iterations from the research phase until becoming the final deliverable output.

Discussion

Service Design Deliverables Framework

At the core of service design deliverables sit the intangible outputs, containing transformative and innovative changes related to actors, strategy, and practices. We call this the core service **design proposal.** The types of intangible outputs correspond to three levels of system change: reconfiguring the ecosystem of actors, envisioning service strategy, and facilitating organizational practices. The tangible, instead, takes a crucial role in enabling the intangible across all levels through examples that make the intangible outputs actionable. We call this the **design intervention.**

In contrast to other disciplines of design where the tangible artifact is at the core of the design deliverable, in service design, the tangible output takes a complementary yet crucial role in making the intangible service tangible (e.g., Secomandi & Snelders, 2011). For example, frequently, students propose new co-creation practices for which they design internal tools or games to enable them. The added physicality and practical qualities not only make the deliverable concrete but also real to its users, as it enables them to experience it in context and contribute their own interpretations and meanings. In Figure 2, we provide a framework synthesizing our findings and depicting relationships between intangible (i.e., service design proposals) and tangible (i.e., design interventions) outputs.

For educators, in project-based courses, the framework provides a pedagogical aid for guiding stressed students in the development of final course assignments and project deliverables, but also at the initial phase of the project. At the start of the project, it helps students to start a conversation with public sector partners about what is expected. The intangible outputs examples can support students and public sector partners in navigating the exploratory scope and ambiguous nature of the project briefs early on. At the end of the project, the framework prompts students to situate and articulate their proposal based on *what to change* (e.g., Actors Ecosystem) and define *how change can be delivered* with the help of tangible output examples (e.g., Internal Resources). The cyclical arrows encourage an iterative process in the service deliverable creation, by keeping an alignment between the two. Adopting our framework can reduce the ambiguity over the final deliverable and avoid the students' unnecessary overproduction in the final project stage, supporting, in turn, more balanced workloads.

For practitioners and public sector actors, it can improve the procurement of service design work by formulating more specific project briefs and increasing the success of service design projects. Clarifying what service design work delivers can also support the advocacy and adoption of the service design practices in the public sector, for example, understanding what a design consultancy or in-house service design team can offer to the other units across public service administrations.

In clarifying service deliverables, we expect to gain intentionality and coherence, directly improving the quality of service design deliverables, benefiting the quality of the students' and practitioners' work, and those working with them in the public sector.

New Lexicon for Service Design Deliverables

Terms like materials, materiality, or objects of design recognize the multi-dimensionality of service design and offer useful lexicon for articulating perceptions of service and their possibilities to

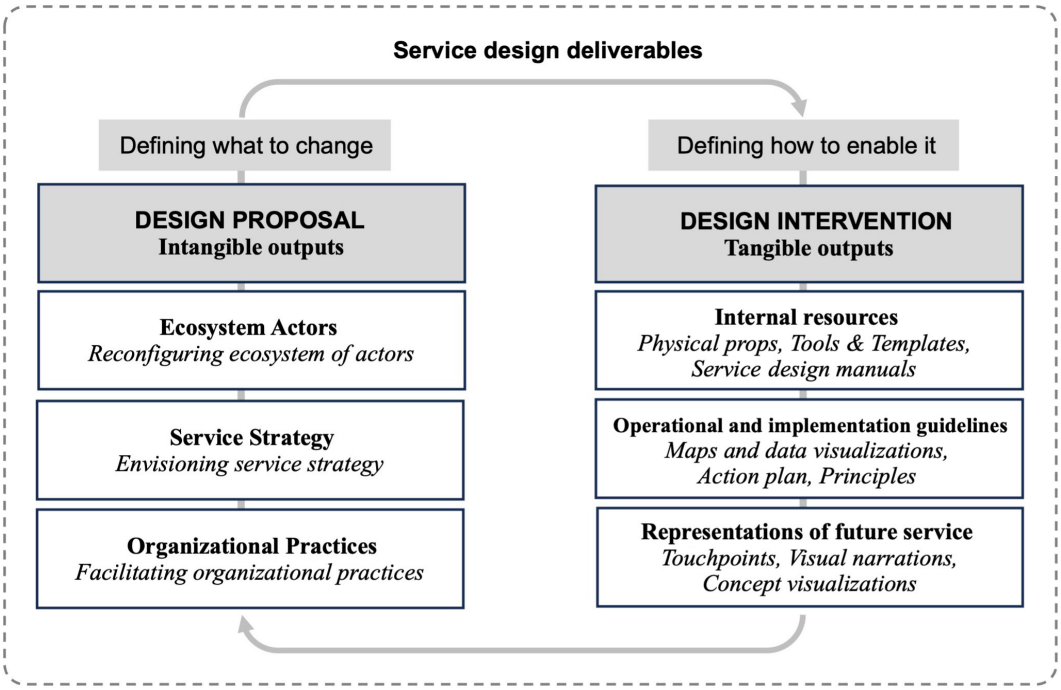

Figure 2. Proposed framework of the service design deliverables.

design them. These broad terms, however, are anchored within the context of the service design process with multiple meanings (e.g., Blomkvist et al., 2016, 2023; Vink & Koskela-Huotari, 2021). This highlights a need for adopting a lexicon at the delivery phase, especially in project-based contexts, to disentangle the activity from the result, and the sources from the outputs.

The IOOI model offers a pedagogical aid in distinguishing the sources of design from its outputs. This division can further aid the educator in separating the teaching of the service from the teaching of the project. IOOI addresses important competencies in the service design practice, for example, crafting the service design deliverables in line with its intended outcomes, and the benefits associated with each system level and their actor groups.

Additionally, adopting the intangible and tangible lexicon adds specificity to the qualities of the service design deliverables and clarifies the relationship between the two. Our study aligns with the tangible complementing the intangible view (e.g., Secomandi & Snelders, 2011) and the fundamental role of making in shaping deliverables through tangible outputs (e.g., Penin, 2018; Clatworthy in Blomkvist et al., 2023).

Our study provides a set of outputs that contribute to the shaping discussion and recognizes that the shaping of service design deliverables happens through both the tangible and intangible. When working with the public sector, many deliverables aim at multiple levels of systems change that require time (e.g., Kimbell, 2011; Manzini, 2011), for example, Working Groups, Collaborative Practices, Actions & Responsibilities. Therefore, we propose viewing the deliverables as entry points for change rather than absolute solutions.

In Figure 3, we map service design deliverable outcomes on three levels: Customer experience level, improving journeys in specific contexts, through service interactions and service offerings (e.g., Jaakkola et al., 2022), Public service units, informing service processes and practices involved in the public sector's development and delivery processes (e.g., Yu, 2021), and the Service ecosystem level, shaping the institutional arrangements, such as social structures, to facilitate value co-creation across actors (e.g., Vink et al., 2021). Service design deliverables enable outcomes across these levels, acting as an entry point for unlocking change across them.

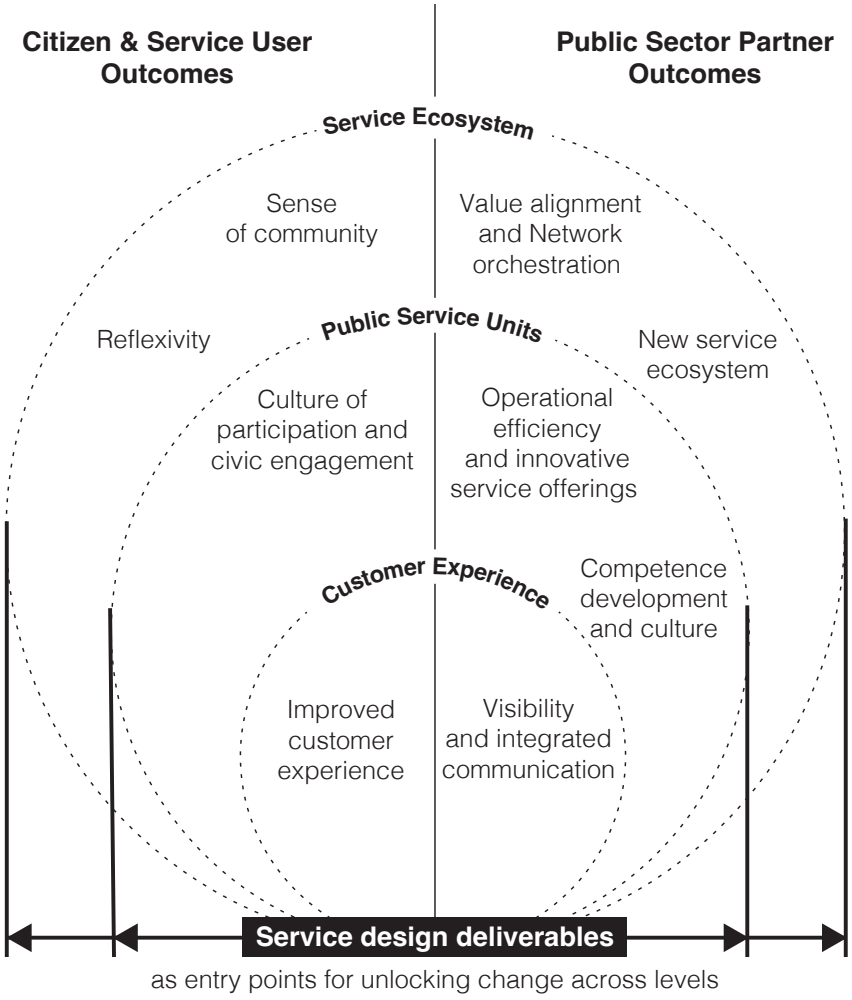

Figure 3. The outcomes of service design deliverables across levels.

Old and New Competencies for Designing with the Public Sector

Our study corroborates that form-giving the material of the immaterial must be kept at the core of the design practice (Blomkvist et al., 2023) and that tangible outputs, despite having a complementary role, are crucial in adding value to the service design deliverables. As Clatworthy (2023) writes and as Secomandi (2024) states, formgiving is still essential, as we see the making as a core competence not only for shaping deliverables but also for increasing their adoption success.

We also reinforce that creativity, adaptability, and systems design should be at the core of service design education. As our data analysis shows, there is no specific set of outputs that can be packaged and replicated in other projects with similar outcomes or themes. Since service design deliverables cannot be pre-defined in advance, creativity comes into play to define outputs that address systemic change, and that can be adopted as entry points by a first group of stakeholders, who in turn will make change happen over time. The outcomes categories demonstrate that service design in the public sector is getting closer to systems design as deliverables aim to reach multiple levels of systems change. Leveraging the design interventions catalog from other disciplines, like systems thinking or behavioral design, should be considered in the future of education and practice in the public sector.

Conclusions

In this paper, we have focused on the expanding field of service design from the perspective of service design education. To better understand this, we have investigated a data set based on eight years of design students' work in collaboration with the public sector.

To disentangle the current discourses and terms, we propose to adopt service design deliverables in our design lexicon. The deliverables integrate intangible outputs containing transformative and innovative changes defined through the design proposal, and the tangible outputs are the design interventions that enable the proposed change. We conclude that both tangible and intangible outputs have a crucial role in shaping the service design deliverables. Our findings also indicate that service design deliverables should be considered as entry points to enable service design systemic change outcomes.

We want to underline that these findings do not propose an engineered process in which project briefs in particular contexts result in a pre-defined set of deliverables. In the context of design, creativity, and sensitivity continue to be significant drivers when we do service design with the public sector. This highlights the motivation of educating service designers who cope with the complexities of the public sector context through confidence in new formgiving of the intangible outcomes.

This study directs us to consider two future research directions. On the one hand, we want to continue looking at service design reflective practice with the public sector partners. On the other hand, we aim to expand our investigation to study the impact on deliverables when service design moves towards more systemic layers of societal challenges. During our research, we have also observed that the role of artificial intelligence will influence the way we work, on the inputs and outputs, and we aim to follow that development closely.

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55. Vink, J., Koskela-Huotari, K., Tronvoll, B., Edvardsson, B., & Wetter-Edman, K. (2021). Service ecosystem design: Propositions, process model, and future research agenda. *Journal of Service Research, 24*(2), 168-186. https://doi.org/10.1177/1094670520952537
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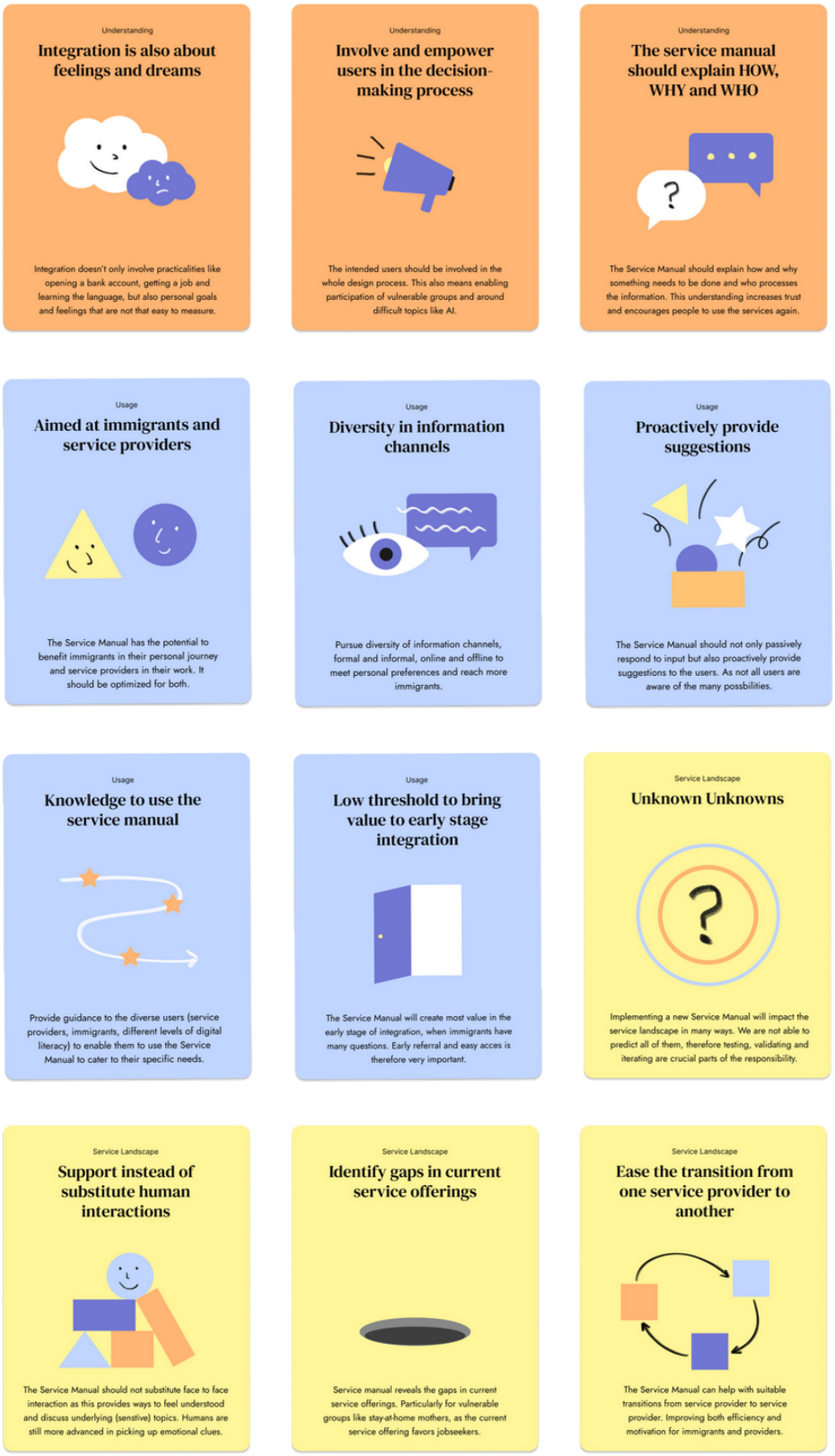
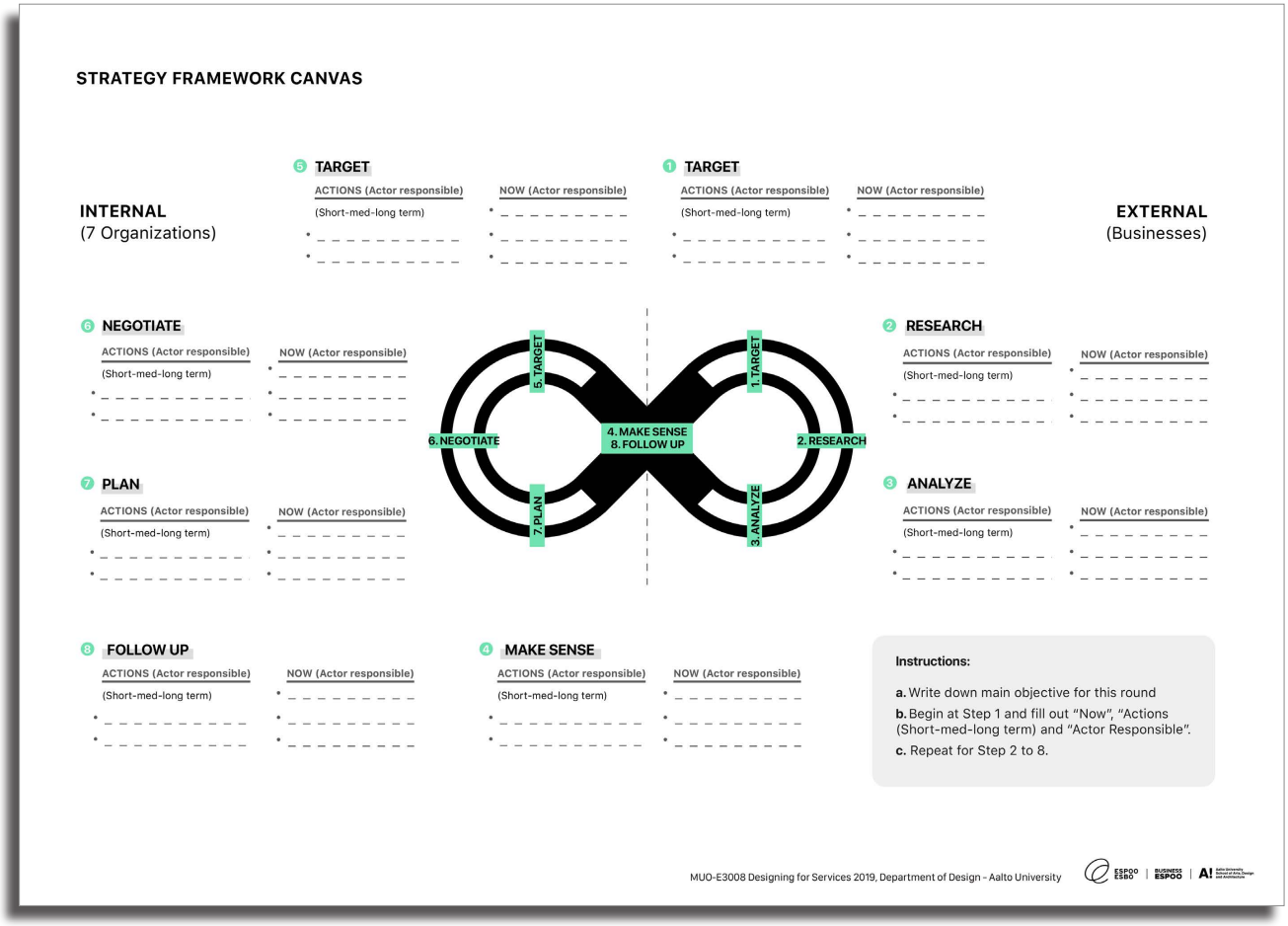
Appendix

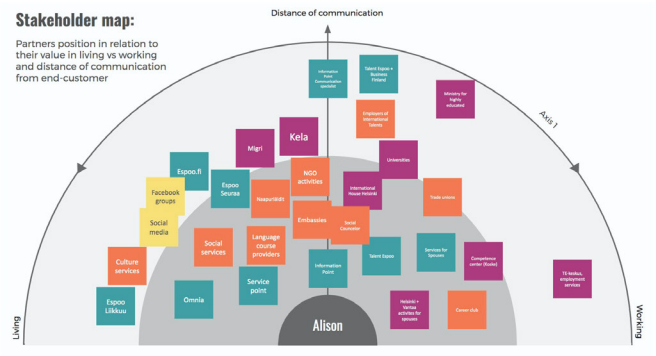
Appendix A-1. Example of tangible outputs (1): Initial resources.

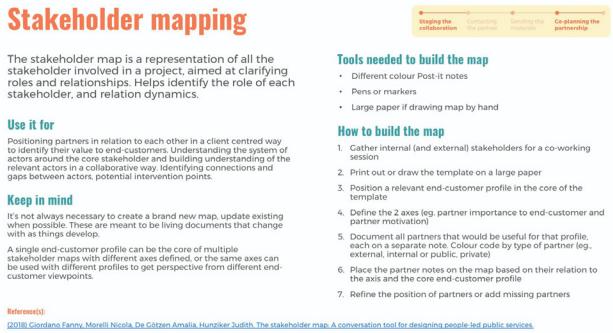


A) Physical props. Authors: Ann Fan, Emilia Ahlroos, Kalle Nikula, Mirte van der Nat. DfS 2023.



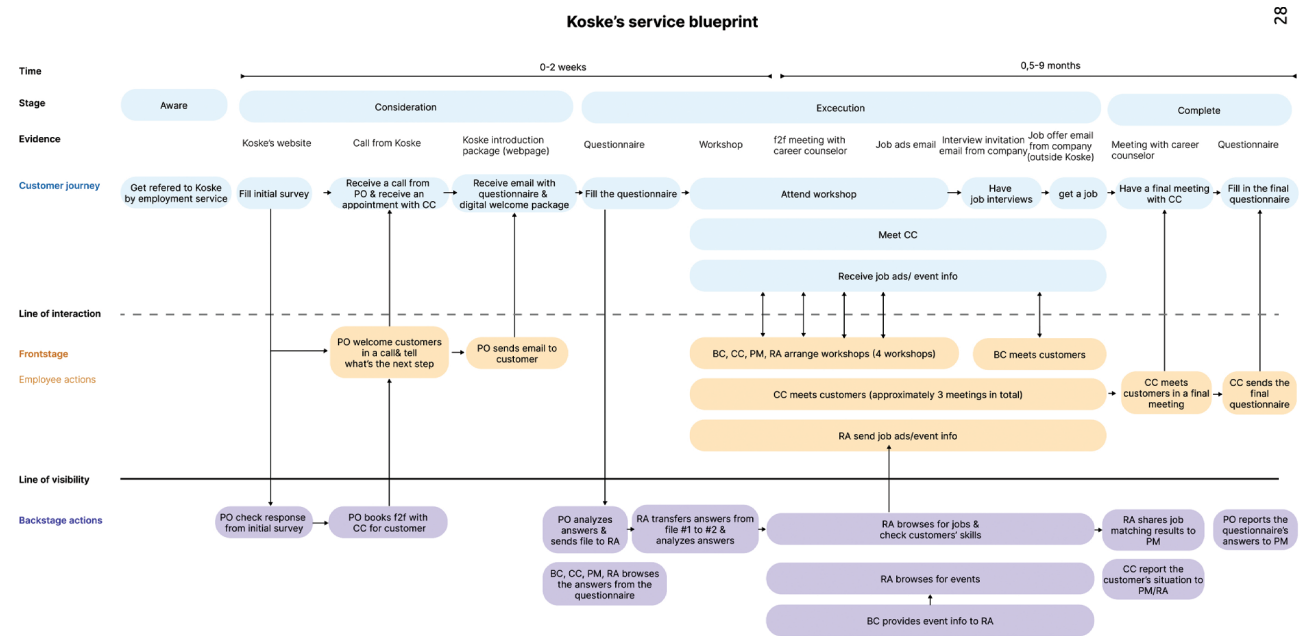
B) Tools & templates. Authors: Deniz Ibanoglu, Daud Imran Bin Shamsul Amri, Natalia Villaman, Serpil Oguz, Xiaoyi Cheng. DfS 2019.



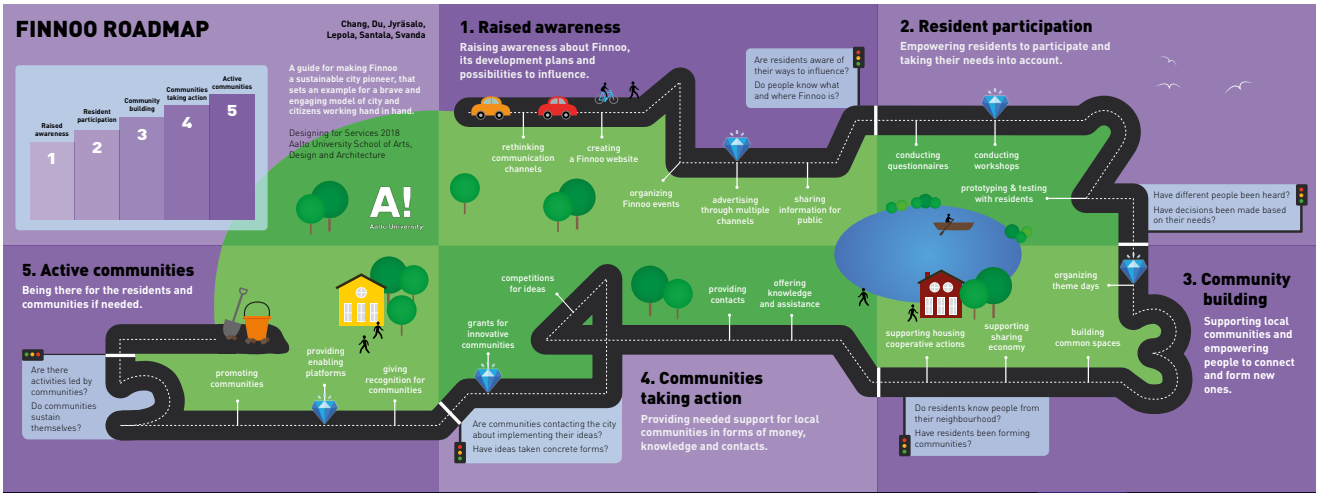


C) Service design manuals.
Authors: Esko-Matti Helin, Maria Okkonen, Joosep Laht, Decirée Bruce, Anastasiya Grachova, Aurora Tani. DfS 2021.

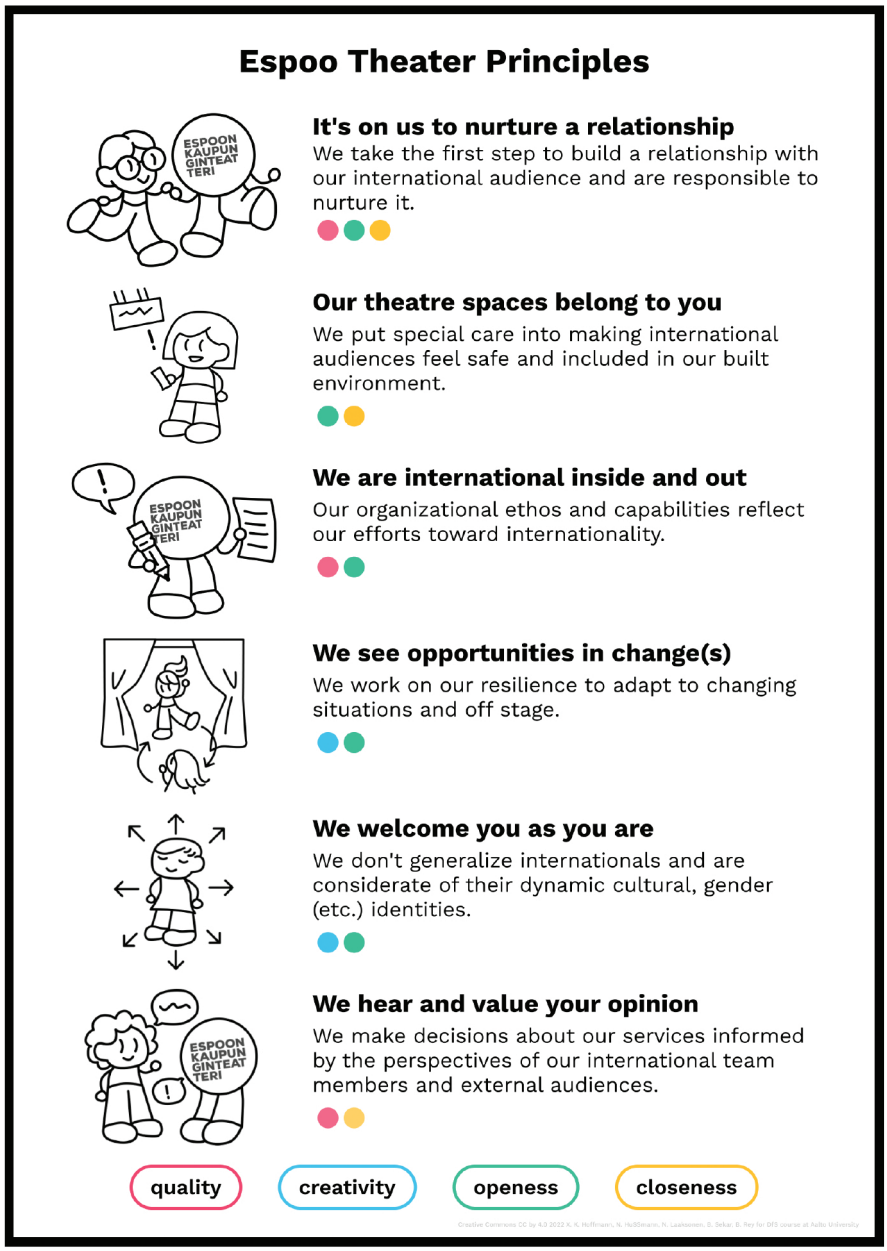
Appendix A-2. Example of tangible outputs (2): O perational and implementation guidelines.



A) Maps and data visualizations. Authors: Daniela Borgström, Jingchun Zeng, Nicha Tantitavewat. DfS 2023.



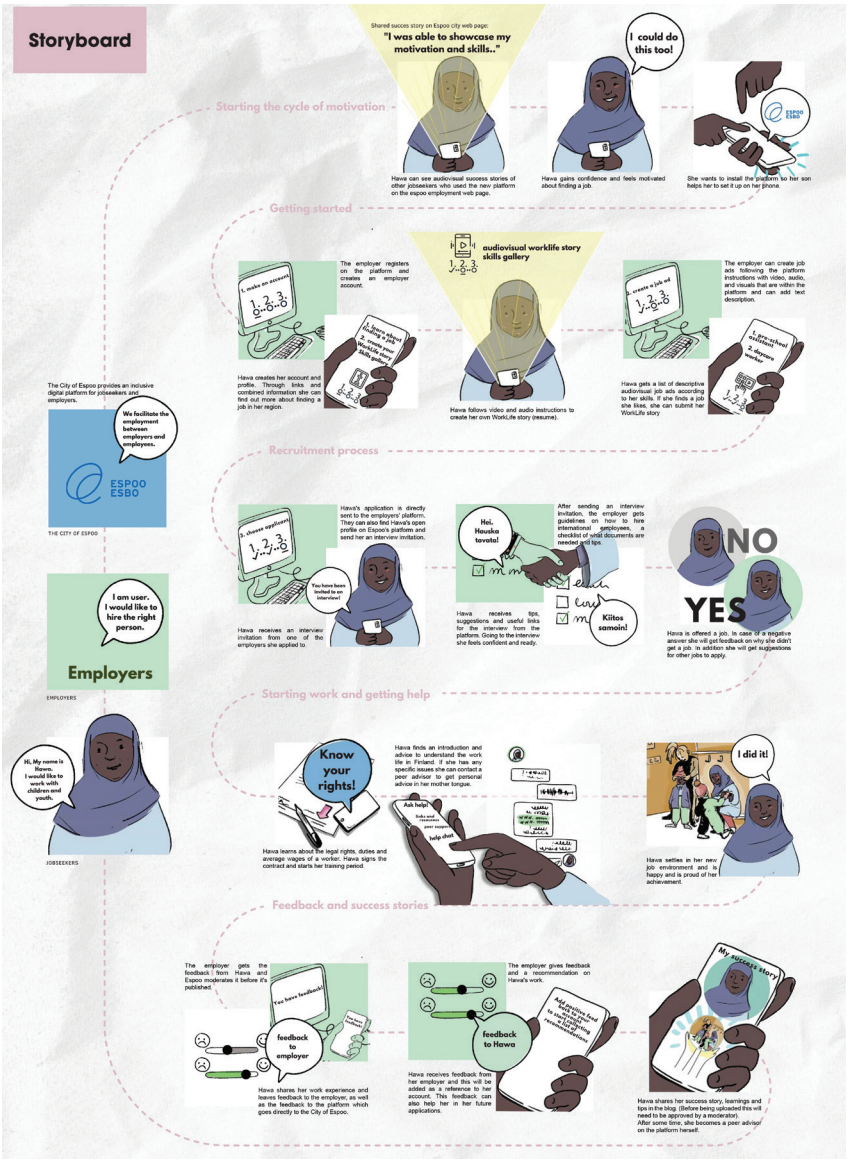
B) Action plan. Authors: Annukka Svanda, Chiayu Chang, Saga Santala, Siiri Lepola, Tilda Jyräsalo, Xinyue Du. DfS 2018.



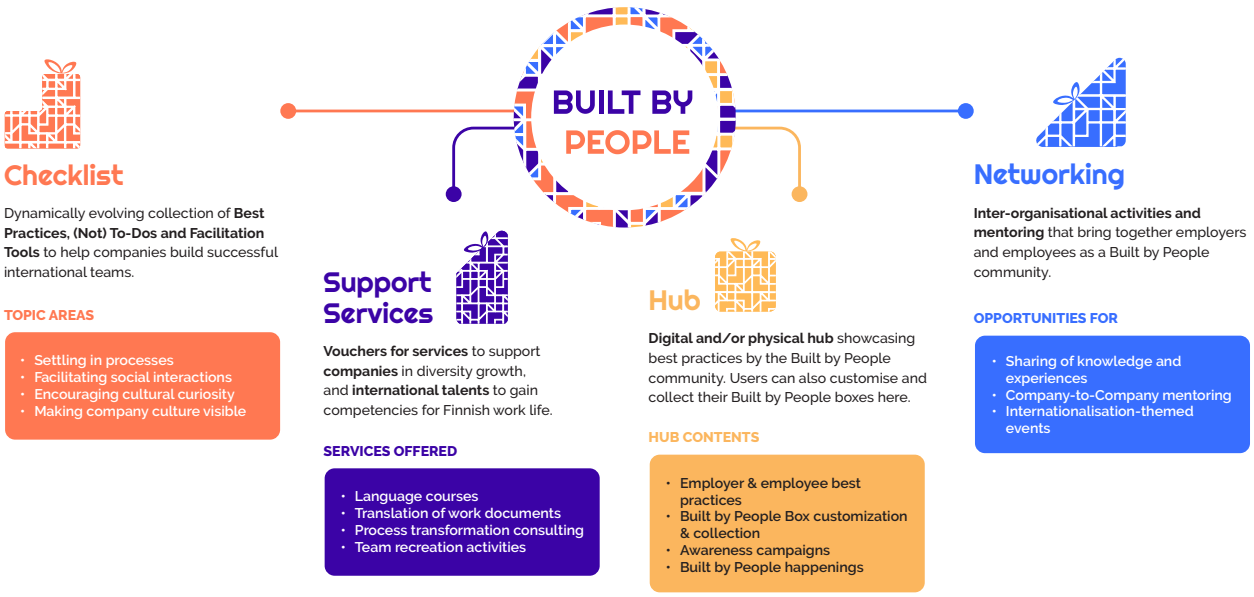
C) Principles. Authors: Katrina Hoffmann, Nicole Hußmann, Ninni Laaksonen, Bhuvana Sekar, Bartłomiej Rey. DfS 2022.

Appendix A-3. Example of tangible outputs (3): Representations of future service.

A) Touchpoints. Authors: Zhenzhen Gu, Maria Jaatinen, Veera Kolehmainen & Xiang Li. DfS 2016.



B) Visual narrations. Authors: Amandine Fong, Anna Tolonen, Bohan Sun, Mõtus Lõmaš Kama. DfS 2020.



C) Concept visualization. Authors: Jéssica Pinto, Jooeun Park, Taru Rastas, Zhiwen Yap. DfS 2020.

Appendix B. Overview of the 45 student projects analyzed, their proposed tangible and intangible outputs, as final deliverables, and their intended outcomes.

#	Year	Project code	Project name	Public service context	Intangible outputs	Tangible outputs	Citizens & Service Users outcomes	Public Service Partners outcomes
1	2023	DfS23_1	Trust-M - More accessible information about services that help with integration	Immigration services	**3. Organizational practices** a) Co-creation process	**1. Internal resources** a) Physical props **2. Operational and implementation guidelines** c) Principles	**4. Improved Customer Experience**	**4. Value Alignment & Network Orchestration**
2	2023	DfS23_2	Employment workshops for highly educated immigrants	Immigration services	**2. Service strategy** a) Value propositions **3. Organizational practices** a) Co-creation process b) Collaborative practices	**1. Internal resources** a) Physical props 3. Representations of the future service a) Touchpoints	**2. Reflexivity**	**2. Operational efficiency and Innovative service offerings**
3	2023	DfS23_3	Library of the Future	Economic development & Employment services	**2. Service strategy** b) Vision **3. Organizational practices** b) Collaborative practices	**2. Operational and implementation guidelines** c) Principles **3. Representations of future service** b) Visual narrations	**3. Culture of participation and civic engagement**	**1. Competence development and culture**
4	2023	DfS23_4	Job-matching for highly educated immigrants	Immigration services	**1. Ecosystem actors** b) Actions & Responsibilities **3. Organizational practices** b) Collaborative practices	**2. Operational and implementation guidelines** a) Maps and data visualizations b) Action plan **3. Representations of the future service** a) Touchpoints	**4. Improved Customer Experience**	**2. Operational efficiency and Innovative service offerings**
5	2023	DfS23_5	It's like riding a bicycle - Cycling courses for immigrants	Immigration services	**1. Ecosystem actors** a) Working groups **2. Service strategy** a) Value propositions **3. Organizational practices** a) Co-creation process	**3. Representations of future service** b) Visual narrations c) Concept visualizations	**4. Improved Customer Experience**	**5. New Service Ecosystem Partnerships**
6	2022	DfS22_1	TIES - Tools for Internationally Engaging Services for the City Theater	Immigration services	**3. Organizational practices** a) Co-creation process	**1. Internal resources** c) Service design manual **2. Operational and implementation guidelines** c) Principles	**4. Improved Customer Experience**	**1. Competence development and culture**
7	2022	DfS22_2	Meet Luotsi! - Designing an ambassador program for social inclusion among male senior citizens	Social services	**2. Service strategy** a) Value propositions	**2. Operational and implementation guidelines** a) Action plan **3. Representations of future service** c) Concept visualizations	**1. Sense of Community**	**5. New Service Ecosystem Partnerships**
8	2022	DfS22_3	Senioripaku - Towards the Co-Creation of Elderly City Services	Social services	**1. Ecosystem actors** a) Working groups **3. Organizational practices** a) Co-creation process	**1. Internal resources** a) Physical props **2. Operational and implementation guidelines** a) Maps and data visualizations b) Action plan	**1. Sense of Community**	**5. New Service Ecosystem Partnerships**
9	2022	DfS22_4	Participation Cookbook: A Future of the Participation Team - towards the resident-oriented decision-making culture	Economic development & Employment services	**1. Ecosystem actors** b) Action & Responsibilities **3. Organizational practices** a) Co-creation process	**1. Internal resources** c) Service design manual **2. Operational and implementation guidelines** c) Principles	**3. Culture of participation and civic engagement**	**1. Competence development and culture**

Appendix B. Overview of the 45 student projects analyzed, their proposed tangible and intangible outputs, as final deliverables, and their intended outcomes (continued).

#	Year	Project code	Project name	Public service context	Intangible outputs	Tangible outputs	Citizens & Service Users outcomes	Public Service Partners outcomes
10	2022	DfS22_5	How to reach and involve young and international residents in city development?	Immigration services	**1. Ecosystem actors** a) Working groups **3. Organizational practices** b) Collaborative practices	**2. Operational and implementation guidelines** a) Maps and data visualizations c) Principles	**3. Culture of participation and civic engagement**	**5. New Service Ecosystem Partnerships**
11	2021	DfS21_1	OmaEspoo Guide Engaging Foreign-Language Speakers in the Digital Services of the City	Immigration services	**2. Service strategy** a) Value propositions	**2. Operational and implementation guidelines** a) Maps and data visualizations c) Principles **3. Representations of the future service** a) Touchpoints	**3. Culture of participation and civic engagement**	**3. Visibility and Integrated communication**
12	2021	DfS21_2	MyEspoo - Designing better futures for public services with the OmaEspoo digital portal development project	Civic engagement & Accessibility	**1. Ecosystem actors** a) Working groups	**2. Operational and implementation guidelines** c) Principles **3. Representations of future service** b) Visual narrations c) Concept visualizations	**4. Improved Customer Experience**	**4. Value Alignment & Network Orchestration**
13	2021	DfS21_3	Reversed Mentorship Programme	Civic engagement & Accessibility	**1. Ecosystem actors** b) Actions & Responsibilities	**2. Operational and implementation guidelines** a) Maps and data visualizations b) Action plan c) Principles **3. Representations of future service** b) Visual narrations	**3. Culture of participation and civic engagement**	**2. Operational efficiency and Innovative service offerings**
14	2021	DfS21_4	Developing backstage practices and making better partnerships	Immigration services	**1. Ecosystem actors** a) Working groups **3. Organizational practices** a) Co-creation process	**1. Internal resources** c) Service design manual	**4. Improved Customer Experience**	**5. New Service Ecosystem Partnerships**
15	2021	DfS21_5	Co-learning - Helping international residents have better access to information and community	Immigration services	**1. Ecosystem actors** b) Actions & Responsibilities **3. Organizational practices** b) Collaborative practices	**2. Operational and implementation guidelines** a) Maps and data visualizations c) Principles **3. Representations of the future service** b) Visual narrations c) Concept visualizations	**1. Sense of Community**	**3. Visibility and Integrated communication**
16	2020	DfS20_1	Designing for Lagstad school museum–How can we reimagine the purpose of a traditional and local museum?	Economic development & Employment services	**1. Ecosystem actors** b) Actions & Responsibilities	**2. Operational and implementation guidelines** c) Principles **3. Representations of future service** c) Concept visualizations	**1. Sense of Community**	**5. New Service Ecosystem Partnerships**
17	2020	DfS20_2	Löydä Töitä [Find Work in Espoo] - Helping international employees get recruited and integrated into the workspace	Immigration services	**1. Ecosystem actors** b) Actions & Responsibilities **2. Service strategy** a) Value propositions	**2. Operational and implementation guidelines** c) Principles **3. Representations of the future service** a) Touchpoints b) Visual narrations	**2. Reflexivity**	**3. Visibility and Integrated communication**

Appendix B. Overview of the 45 student projects analyzed, their proposed tangible and intangible outputs, as final deliverables, and their intended outcomes (continued).

#	Year	Project code	Project name	Public service context	Intangible outputs	Tangible outputs	Citizens & Service Users outcomes	Public Service Partners outcomes
18	2020	DfS20_3	Talent Espoo–Built by people	Immigration services	**1. Ecosystem actors** b) Actions & Responsibilities **2. Service strategy** a) Value propositions	**2. Operational and implementation guidelines** c) Principles **3. Representations of future service** b) Visual narrations c) Concept visualizations	**4. Improved Customer Experience**	**4. Value Alignment & Network Orchestration**
19	2020	DfS20_4	CAREER Care for your career–Helping students find career opportunities	Economic development & Employment services	**1. Ecosystem actors** a) Working groups **2. Service strategy** b) Vision	**2. Operational and implementation guidelines** a) Maps and data visualizations **3. Representations of future service** c) Concept visualizations	**4. Improved Customer Experience**	**3. Visibility and Integrated communication**
20	2020	DfS20_5	Urban planning and participation–Engaging international citizens in urban planning	Civic engagement & Accessibility	**1. Ecosystem actors** a) Working groups 2. Service strategy a) Value propositions **3. Organizational practices** a) Co-creation process b) Collaborative practices	**1. Internal resources** a) Physical props **2. Operational and implementation guidelines** a) Maps and data visualizations c) Principles **3. Representations of the future service** a) Touchpoints	**3. Culture of participation and civic engagement**	**3. Visibility and Integrated communication**
21	2019	DfS19_1	Voice of the Youth–Service strategy for youth participation	Civic engagement & Accessibility	**1. Ecosystem actors** b) Actions & Responsibilities **2. Service strategy** a) Value propositions	**2. Operational and implementation guidelines** a) Maps and data visualizations b) Action plan **3. Representations of the future service** a) Touchpoints b) Visual narrations	**3. Culture of participation and civic engagement**	**4. Value Alignment & Network Orchestration**
22	2019	DfS19_2	Increasing the participation level of youth in Espoo in Art and Culture activities	Civic engagement & Accessibility	**1. Ecosystem actors** b) Actions & Responsibilities **2. Service strategy** a) Value propositions	**2. Operational and implementation guidelines** a) Maps and data visualizations **3. Representations of future service** b) Visual narrations	**3. Culture of participation and civic engagement**	**4. Value Alignment & Network Orchestration**
23	2019	DfS19_3	City of Espoo Sinfonietta - Resilience through Relationships	Economic development & Employment services	**3. Organizational practices** b) Collaborative practices	**1. Internal resources** c) Service design manual	**3. Culture of participation and civic engagement**	**1. Competence development and culture**
24	2019	DfS19_4	Designing for Citizen Participation in the City of Espoo	Social services	**3. Organizational practices** a) Co-creation process	**1. Internal resources** c) Service design manual	**4. Improved Customer Experience**	**4. Value Alignment & Network Orchestration**
25	2019	DfS19_5	Business Espoo: Improving community feeling of companies	Economic development & Employment services	**1. Ecosystem actors** b) Actions & Responsibilities	**1. Internal resources** b) Tools & Templates	**4. Improved Customer Experience**	**5. New Service Ecosystem Partnerships**

Appendix B. Overview of the 45 student projects analyzed, their proposed tangible and intangible outputs, as final deliverables, and their intended outcomes (continued).

#	Year	Project code	Project name	Public service context	Intangible outputs	Tangible outputs	Citizens & Service Users outcomes	Public Service Partners outcomes
26	2018	DfS18 Spring_1	Kyky Community–Improving the Kyky Experience	Education services	**1. Ecosystem actors** b) Actions & Responsibilities **2. Service strategy** a) Value propositions b) Vision	**2. Operational and implementation guidelines** b) Action plan **3. Representations of future service** b) Visual narrations c) Concept visualizations	**1. Sense of Community**	**2. Operational efficiency and Innovative service offerings**
27	2018	DfS18 Spring_2	Finnoo–A roadmap for engaging city	Economic development & Employment services	**1. Ecosystem actors** a) Working groups 2. Service strategy b) Vision **3. Organizational practices** a) Co-creation process	**2. Operational and implementation guidelines** b) Action plan **3. Representations of future service** b) Visual narrations c) Concept visualizations	**3. Culture of participation and civic engagement**	**5. New Service Ecosystem Partnerships**
28	2018	DfS18 Spring_3	Yhteispot–Rantaraitti as the heart of leisure activities	Economic development & Employment services	**1. Ecosystem actors** a) Working groups 2. Service strategy a) Value propositions	**2. Operational and implementation guidelines** a) Maps and data visualizations **3. Representations of the future service** a) Touchpoint c) Concept visualizations	**4. Improved Customer Experience**	**5. New Service Ecosystem Partnerships**
29	2018	DfS18 Spring_4	A Route as a Destination vision and service principles	Economic development & Employment services	**1. Ecosystem actors** b) Actions & Responsibilities **2. Service strategy** b) Vision	**2. Operational and implementation guidelines** b) Action plan c) Principles **3. Representations of future service** b) Visual narrations c) Concept visualizations	**4. Improved Customer Experience**	**1. Competence development and culture**
30	2018	DfS18 Spring_5	Espoo Business Services - Towards a client-centered service offering	Economic development & Employment services	**1. Ecosystem actors** b) Actions & Responsibilities **2. Service strategy** a) Value propositions	**2. Operational and implementation guidelines** a) Maps and data visualizations b) Action plan c) Principles **3. Representations of future service** c) Concept visualizations	**4. Improved Customer Experience**	**4. Value Alignment & Network Orchestration**
31	2018	DfS18 Autumn_1	Co-Design for immigrant participation	Immigration services	**1. Ecosystem actors** a) Working groups b) Actions & Responsibilities **3. Organizational practices** a) Co-creation process	**1. Internal resources** a) Physical props implementation guidelines b) Action plan	**3. Culture of participation and civic engagement**	**5. New Service Ecosystem Partnerships**
32	2018	DfS18 Autumn_2	Right Care. Right time Startups. - International startup's service journey	Economic development & Employment services	**2. Service strategy** a) Value propositions	**2. Operational and implementation guidelines** b) Action plan c) Principles **3. Representations of future service** c) Concept visualizations	**4. Improved Customer Experience**	**2. Operational efficiency and Innovative service offerings**

Appendix B. Overview of the 45 student projects analyzed, their proposed tangible and intangible outputs, as final deliverables, and their intended outcomes (continued).

#	Year	Project code	Project name	Public service context	Intangible outputs	Tangible outputs	Citizens & Service Users outcomes	Public Service Partners outcomes
33	2018	DfS18 Autumn_3	Future ride sharing in the City of Espoo	Transportation services	**1. Ecosystem actors** b) Working groups **2. Service strategy** a) Value propositions	**2. Operational and implementation guidelines** a) Maps and data visualizations c) Principles **3. Representations of future service** b) Visual narrations c) Concept visualizations	**4. Improved Customer Experience**	**1. Competence development and culture**
34	2018	DfS18 Autumn_4	Future of learning together and sharing resources at Aalto campus	Education services	**1. Ecosystem actors** a) Working groups **3. Organizational practices** a) Co-creation process	**1. Internal resources** a) Physical props b) Tools & Templates **2. Operational and implementation guidelines** b) Action plan **3. Representations of future service** b) Visual narrations	**4. Improved Customer Experience**	**4. Value Alignment & Network Orchestration**
35	2018	DfS18 Autumn_5	Experience Experts and the Social Services in Espoo	Social services	**1. Ecosystem actors** b) Actions & Responsibilities	**1. Internal resources** b) Tools & Templates **2. Operational and implementation guidelines** a) Maps and data visualizations b) Action plan	**2. Reflexivity**	**1. Competence development and culture**
36	2017	DfS17_1	Opportunities for Chinese unemployed citizens	Immigration services	**2. Service strategy** a) Value propositions	**3. Representations of future service** c) Concept visualizations	**1. Sense of Community**	**5. New Service Ecosystem Partnerships**
37	2017	DfS17_2	Stop over in Espoo–How can the City of Espoo better attract Chinese stop-over tourists?	Immigration services	**2. Service strategy** a) Value propositions	**2. Operational and implementation guidelines** a) Maps and data visualizations **3. Representations of future service** b) Visual narrations	**4. Improved Customer Experience**	**1. Competence development and culture**
38	2017	DfS17_3	Showroom: Pop-up space and its usage practices	Economic development & Employment services	**2. Service strategy** a) Value propositions	**2. Operational and implementation guidelines** c) Principles **3. Representations of future service** c) Concept visualizations	**4. Improved Customer Experience**	**1. Competence development and culture**
39	2017	DfS17_4	Think in Espoo–Supporting curiosity in Iso Omena to encourage local entrepreneurship	Economic development & Employment services	**1. Ecosystem actors** b) Actions & Responsibilities **2. Service strategy** a) Value propositions	**2. Operational and implementation guidelines** a) Maps and data visualizations **3. Representations of future service** c) Concept visualizations	**4. Improved Customer Experience**	**5. New Service Ecosystem Partnerships**
40	2017	DfS17_5	Active Rantaraitti–Designing a supporting model for organizing open participatory activities in Rantaraitti	Economic development & Employment services	**1. Ecosystem actors** b) Actions & Responsibilities **2. Service strategy** a) Value propositions	**1. Internal resources** b) Tools & Templates **3. Representations of future service** c) Concept visualizations	**3. Culture of participation and civic engagement**	**1. Competence development and culture**

Appendix B. Overview of the 45 student projects analyzed, their proposed tangible and intangible outputs, as final deliverables, and their intended outcomes (continued).

#	Year	Project code	Project name	Public service context	Intangible outputs	Tangible outputs	Citizens & Service Users outcomes	Public Service Partners outcomes
41	2016	DfS16_1	In Case of Developing e-services– Guidelines book	Healthcare services	**2. Service strategy** a) Value propositions **3. Organizational practices** a) Co-creation process	**1. Internal resources** a) Physical props **2. Operational and implementation guidelines** b) Action plan c) Principles	**4. Improved Customer Experience**	**2. Operational efficiency and Innovative service offerings**
42	2016	DfS16_2	Askeleet Design Game– Tool for collaborative development	Healthcare services	**1. Ecosystem actors** a) Working groups 3. Organizational practices a) Co-creation process	**1. Internal resources** a) Physical props	**3. Culture of participation and civic engagement**	**2. Operational efficiency and Innovative service offerings**
43	2016	DfS16_3	Nurse Café & Greeting Card from the nurse	Healthcare services	**1. Ecosystem actors** b) Actions & Responsibilities **2. Service strategy** a) Value propositions **3. Organizational practices** b) Collaborative practices	**3. Representations of the future service** a) Touchpoints c) Concept visualizations	**4. Improved Customer Experience**	**3. Visibility and Integrated communication**
44	2016	DfS16_4	Napero Naapurit– Service platform	Healthcare services	**1. Ecosystem actors** a) Working groups 2. Service strategy a) Value propositions **3. Organizational practices** a) Co-creation process	**3. Representations of the future service** a) Touchpoints	**2. Reflexivity**	**3. Visibility and Integrated communication**
45	2016	DfS16_5	VIVO–Optimizing service contact	Healthcare services	**2. Service strategy** a) Value propositions	**3. Representations of the future service** a) Touchpoints	**4. Improved Customer Experience**	**2. Operational efficiency and Innovative service offerings**