



AMMATTIKORKEAKOULU

University of Applied Sciences



Ministry of Education and Culture

LAUREA-JULKAISUT | LAUREA PUBLICATIONS | 143



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**Co-Creating and Orchestrating
Multistakeholder Innovation**

2. Systemic design addressing complexity in service ecosystems: Integrating empathic and systemic perspectives

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This paper examines the joining of empathic and systemic perspectives in the development of customer-centred wellbeing service ecosystems involving multi-stakeholder, cross-sectoral collaboration. We explore how experience-focused service design tools can be used to make sense of a complex service ecosystem from the customer's point-of-view and to build shared understanding of how collaboration across sectors and organisations can be developed. We draw on literature on service and empathic design to foreground sensitivities to human experience in ecosystemic collaboration as well as on systemic design to highlight ways of engaging with systemic complexity in co-creation. The paper contributes to an increased understanding of how methods can be selected and combined to foster the integration of perspectives of different scales and how cross-organisational collaboration in ecosystems settings can be facilitated.

INTRODUCTION

The challenges that social and healthcare systems worldwide face are growing in complexity. Big societal issues such as changing demographics, cost increases and technological advancements create an urgent need for a systemic transformation. At the same time, challenges to citizens' wellbeing are becoming ever more extensive and polarised and more difficult to solve by any single actor or service. The complex systemic challenges call for an interdisciplinary approach that brings together multiple stakeholders to co-create solutions for the transformation of wellbeing service ecosystems.

The service design approach has been successful in focusing attention on the customer and aligning design efforts with the customers' needs. However, it achingly struggles to combine empathic perspectives with systemic concerns. On the one hand, customers' evolving service needs and, on the other, service providers' needs to collaborate within the ecosystem, as well as decision-makers' or policy makers' informational needs must be considered. One answer is systemic design, which integrates systems thinking and design

thinking into a singular approach, thus combining ideas from open systems and complexity perspectives with design-oriented innovation.

In this article, we report how the empathic and systemic concerns were brought together and addressed in MORFEUS, a joint multidisciplinary research project of Laurea University of Applied Sciences and Aalto University that explored wellbeing service ecosystems. The project's focus was on mental health, child protection and substance-abuse-related services, and the service ecosystems were studied by looking into a collection of services that a fictional case example family would use. The project consisted of five intensive co-development cycles employing a participative approach and co-creation methods, in which the ecosystem actors and the actual service users closely participated. As the main result, the project developed an information modelling prototype through which all information required for the procurement, production and consumption of a service could be collected. Both the development process of the information modelling and the resulting prototype serve as an example of combining the empathic customer perspective with the systemic level of design.

COMPLEXITY OF SOCIAL AND HEALTHCARE SERVICE SYSTEMS

The success of the systems perspective and systems approaches can easily be observed in the sophistication of modern infrastructure. The viewpoint has merited not only efficient systems of physical infrastructure such as roads, railways and telecommunication networks but also elegant social ones, including competitive sports, educational programs, legal policy etc. In addition, the approach provides ways to plan and engineer complex socio-technical systems that integrate people, society and technicalities such as organisational structure and processes. The power of the systems perspective lies in its ability to provide handles for grasping complex entities such as the social and healthcare service systems that are the focus of attention in this article. The systems perspective enables the conceptual framing of the systems and allows observation of the interrelations with and influences of their parts within the whole, and with their environment (Lai and Lin, 2017).

The pitfall, however, for the human observer, and particularly for the designer who seeks to utilise a systemic approach in shaping social systems lies in the call to 'externalise', as pointed out by Hämäläinen and Saarinen (2006) and Luoma (2007) in their critiques of systems thinking approach. There is a temptation to examine the systems as if they were machines, with clear-cut goals, parts perfectly specified and assembled within a well-defined entity, and functions seamlessly aligned with the overall purpose. In dealing with social systems, overlooking the obligation to 'deeply empathise with stakeholders' and 'humanise(s) processes of change' (Ryan 2014, 3) may lead the designer astray. On the other hand, grounding the systemic design effort in human experience and promoting a co-creation approach with a pragmatic and reflective orientation facilitates the integration of empathic and systemic concerns.

Social and healthcare service systems are contexts characterised by high levels of structural and contextual complexity and contingency. They are multi-layered systems consisting of, e.g., primary, specialised and supplementary services, both cross-sectoral and cross-domain, and involve a diversity of different actors and stakeholders who often have conflicting needs. Furthermore, modern social and healthcare service contexts and systems are permeated by and heavily rely on technology. Evolving technologies provide a promise of ever-new forms of care but introduce, on one hand, a problem of prioritisation to the provider and, on the other hand, a difficulty of choice to the customer. These issues inevitably affect the customer's service experience and the experienced value. In addition to the global megatrends, the highlighted local service system aspects give rise to various challenges that call for a systemic orientation in solving them.

SYSTEMIC SERVICE DESIGN

The roots that link service design in human-centred design bring with them an interest towards empathy. Empathic design is an interpretive approach that focuses on the meanings people give to everyday life experiences, moods and activities, and turns them into inspiration in design (Mattelmäki et al. 2014). Systemic design, as a designerly approach, evolved more recently from a pragmatic need to expand designers' skills and competence to attentively engage with 'situations characterised by complexity, uniqueness, value conflict and ambiguity over objectives' (Ryan 2014, 4). Theoretically, systemic design seeks to integrate systems thinking and design thinking to outline an approach that brings together ideas from open systems and complexity perspectives and designerly way of innovation. Systemic design is an emerging field, and the early theoretical frameworks and methods need to be tested and developed further.

The reason why systems theory seems to fit rather nicely with the design thinking approach is that they 'both share a common orientation to the desired outcomes of complex problems, which is to effect highly-leveraged, well-reasoned and preferred changes in situations of concern' (Jones 2014, 24). At the heart of this juxtaposition is the famous idea of design as 'devising courses of action aimed at changing existing situations into preferred ones' (Simon 1996, 111). As a derivative of systems theory, the particular strand of systems thinking relevant to systemic design is highlighted as 'a way of looking at, modelling and intervening in the world as if it is composed of open, purposeful, complex wholes' and the systems are described as involving 'webs of reciprocal influence between parts of a greater whole and their environment' (Ryan 2014, 2). However, when paralleled, the characterisations of systems thinking of both Jones and Ryan hint at a fundamental difference between systemic and design thinking. Systems thinking tends to be analytic in its approach, viewing complex problem situations as independent of interventions, whereas design thinking leans towards an action-oriented approach (ibid.). Underlining the essential connection between intellectual inquiry and hands-on action design thinking approaches are often promoted as 'practical, real, concrete, entrepreneurial and agile, and most important of all "human-centred" or "user-centred"' (Blyth and Kimbell 2011, 7) The key message in this article is that the contrasts in these approaches focus the researchers' attention differently and may eventually lead to different choices of course of action. The authors of this article encourage a careful reading of these definitions and approaches and the ambition to combine both the analytic and action orientation.

Helkkula, Kowalkowski and Tronvoll (2018) propose a typology of four archetypes of service innovation: output-based, process-based, experiential and systemic. In our research, we are especially interested in the systemic archetype of service innovation. At the foundation of the systemic service innovation archetype are the social, living systems, and they focus on resource integration of the actors engaged in the service ecosystem. Service innovation is seen as a reconfiguration of the actors, their resources and the institutional arrangements that all enable service innovation within a given context. Further, according to Helkkula et al. (2018), the systemic service innovations approach value (co-)creation from the perspective of 'value-in-context'. Value is related to 'the improved viability of the whole service ecosystem' and 'the integration of available resources within the service ecosystem in a specific context'.

COMBINING EMPATHIC AND SYSTEMIC DESIGN IN THE MORFEUS CASE

In this article, we discuss how empathic and systemic concerns were brought together and addressed in MORFEUS, a joint multidisciplinary project of Laurea University of Applied Sciences and Aalto University

(01/2015–06/2017) that studied and developed wellbeing services' cross-sector, multi-actor ecosystems. In the citizen-centred project, the focus was on mental health, child protection and substance-abuse-related services. During the research and development process of MORFEUS, a participative approach and methods of co-creation were utilised, aiming at inclusion and empowerment. The project was citizen-centred by nature but focused on the whole service system around citizens with various service needs. The purpose was to address the value-creation dynamics among the ecosystem's multiple actors. Consequently, the service ecosystem was studied and developed by looking into the collection of services that a fictional case example family would use.

The research project consisted of five intensive co-development cycles in which the consortium partners and the actual service users closely participated either directly or through indirect representation. The co-development cycles are illustrated in Figure 1. The main research problem of the project was 'How can cross-organisational collaboration be facilitated when developing customer-centred wellbeing service ecosystems?' To answer this, empirical data was collected with several qualitative methods, such as interviews, video-recording and observations of collaborative workshops, photographing of co-created artefacts and user-testing of prototypes. As the main result, the project developed a service information modelling (SIM), through which all information required for the procurement and production of a service would be collected. It consisted of a metamodeling of the service ecosystem, as well as a service prototype involving a digital service interface mock-up that addressed the empathic concerns. The information modelling clarified roles, relationships and informational needs of the actors within the service ecosystem and strived to enable the development, production and procurement of more effective and cost-effective, and citizen-oriented services in the service ecosystem. Next, the five co-development cycles will be described together with the research and service design methods applied in each cycle.

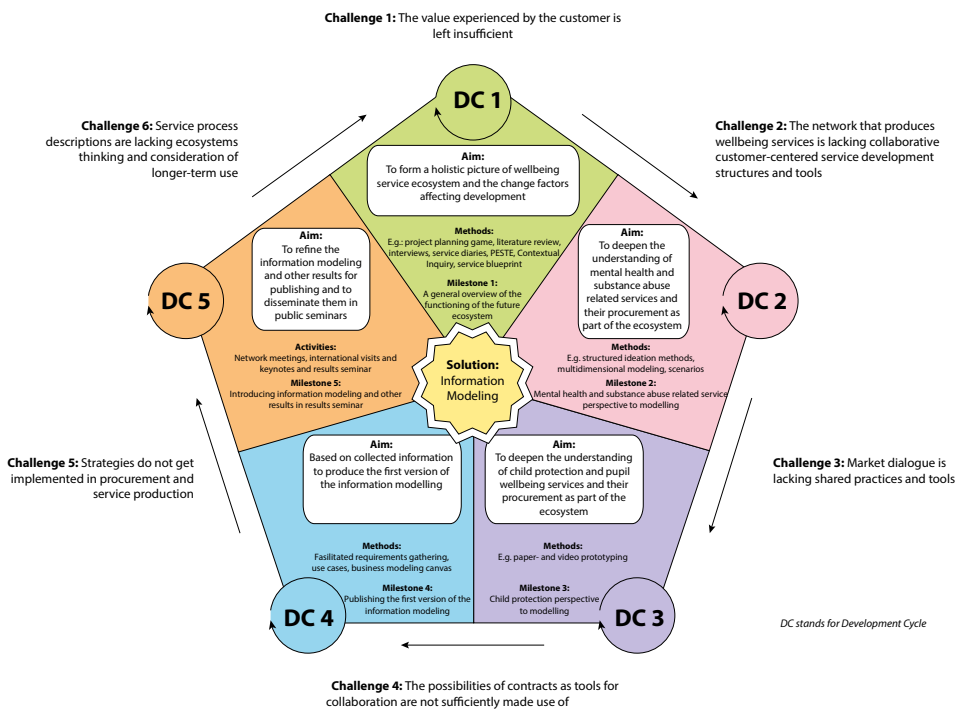


Figure 1. Five cycles of co-development in MORFEUS. (Figure Anna Salmi)

Cycle 1: Mapping the ecosystem actors

The project's first cycle of co-development set out to explore the challenge of creating customer-centred collaboration structures and tools (see Figure 1). It began with a mapping of the ecosystem actors in a stakeholder map. The companies, the public and third-sector organisations offering wellbeing services were first identified and mapped and the relations between them explored. The organisational partners involved in the project comprehensively represented wellbeing service actors in the Uusimaa region from the municipal sector, the other producers of wellbeing services and the producers of digital tools and consulting services. The citizens or the customers of the service were represented indirectly by experts by experience or directly; all of them participated in the project voluntarily, and their anonymity was ensured. The '*experts by experience*' are citizens with personal experience of a health or social challenge, and having recovered, they serve in a liaising role between health- and social care patients or customers and professionals. They are trained to express their service experiences and to act in the mediating role between patients and service provider organisations' experts and other staff.

The co-development cycle consisted of four main activities. First, the primary data collection method for ecosystem mapping was thematic interviewing. The ecosystem actors were interviewed to form a big picture of the actors and their roles in general and to understand the ecosystem dynamics and data flows between actors. The interviews represented systemic and organisational perspectives, and their content was analysed by the project researchers.

Second, at the same time, a description of a fictional case example family was created by Laurea social and healthcare master degree students who had extensive, real-life working experience in this field. The description was, hence, based on realistic customer cases that the master students had been working with. The case family consisted of several members with extensive challenges and service needs in several fields of health and social care, such as mental health and substance abuse, child protection and high risk of social marginalisation. The aim of the case description was to enable indirect participation of the service users and empathy, as it was not seen as ethically acceptable to involve a real case family in the research project. Further, the aim was to illustrate the complexity of the service needs and the service system from both the customer's and the service system's perspective. The purpose was to illustrate vividly the experiences of navigating the service ecosystem as well as the interconnections between the services and actors. This case family description remained the focus of the co-development throughout the project, and it was a central boundary object for the project team as well as for the steering group and other stakeholders.

In the third phase, a collaborative workshop for the project's steering group was organised to gain additional and deeper understanding of the service ecosystem. A stakeholder map (see, e.g., Stickdorn and Schneider 2012) was co-created utilising a gamified and designerly approach. The goal in this way of working was to enable the combining of both systemic and empathic views by making the complex whole of the service ecosystem tangible or graspable, ready for 'zooming in and out' (Sustar and Mattelmäki 2017), as well as making relations and distances visible and the information personally and emotionally relatable.

As the fourth step, a collaborative workshop was organised by the project researchers for the '*experts by experience*' in the fields of mental health and substance abuse. The goal of the workshop was to collect a deeper understanding of the customers' world, needs and wishes with regard to the services they have used. The workshop was facilitated by the researchers, and the participants created visual collages and service journey maps with the workshop materials provided to them, mainly photos that illustrated their hopes, fears and future dreams related to how they would want to be helped when facing challenges.

To sum up, the first co-development cycle combined systemic and empathic views in ecosystem mapping, and the researchers played a central role in bringing these two views together in terms of, e.g., method selection. The data collected during the first cycle served as the starting point for the next two cycles of co-development.

Cycle 2: Deep understanding of the services related to mental health and substance abuse

The goal of the second co-development cycle of MORFEUS was to dive deeper into a selected entity of services, namely mental health and substance abuse. Additionally, the second cycle took on the challenge of addressing service providers' and public procurers' points of view about the lack of shared practices and tools for market dialogue. The case family description produced in the first cycle served as a central tool for the research group when taking the customer's view and empathy into account. A specific customer group, namely young men at risk for marginalisation, was selected for this cycle, and close collaboration was done with a large organisation that provides mental health services. The practical goal of development was to enable customer-centric development of an accessible preventive service for this customer group.

The cycle consisted of three main activities that all aimed at a deep understanding of the customer's world and needs as a basis for service development. First, thematic interviews were implemented from both the customer and professional perspectives. The topics discussed in the interviews covered, e.g., how the customer needs would be met, the ideal model for a preventive service, and information flows between actors. The interviews also investigated public service procurement, i.e., challenges in drawing up customer-centred procurement notices, service providers' tendering and entering framework agreement, as well as contracting processes.

Next, as a second step, a design probes study (see, e.g., Mattelmäki 2004) was carried out to collect information from the customer's *'living world'* to address how the everyday lives of young people and what kind of help and support they might need. Probes as a design method are typically used in early phases of design to gain an empathic understanding of participants' lives and their living contexts, as well as to gather inspirational material for design (Sleeswijk Visser, Stappers and Van der Lugt 2005). The smartphone app WhatsApp was utilised for a week's time to collect messages, photos, videos and other materials from the male volunteers, aged 18–19. The participants sent WhatsApp messages to a nominated researcher according to specific instructions, and the focus was on both worrying and meaningful or empowering incidents that occurred each day of the week. After collecting and organising the material produced by probing, the participants were interviewed so that they could explain the meanings of their messages to the researchers. In addition, the mothers of the young men filled in a specific diary for the researchers during the probing week, aiming to produce a wider understanding of the young men's lives, social relationships and challenges. The mothers were prompted to recall and report, for example, what ideas, themes and issues they discussed with their sons, what they knew about whom their sons spent time with, what made them glad about their young men and also what worried them in regard to their son.

As a third step, after analysing the interviews and design-probes data, a collaborative workshop was organised at the service provider organisation for the mental health professionals to ideate and sketch the service. The probes data was brought into the workshop with the aim of sharing knowledge about the young men's experience and evoking emotional responses from the professionals. The materials were used in an envisioning exercise to create solutions for the young men's challenges that the researchers had identified for the workshop. The researchers facilitated the workshop for the professionals. Even though the presence of the original participants would have been desirable, preserving their anonymity was considered a priority.

Cycle 3: Deep understanding of the services related to child protection and pupil wellbeing

The goal of the third co-development cycle of MORFEUS was to dive deeper into a selected entity of services, namely child protection and pupil wellbeing, to add information to the emerging service information modelling. The case family description produced in the first cycle continued to serve as a central tool for the research group when taking the customer's view and empathy into account.

This cycle consisted of two main activities. First, a facilitated workshop series was implemented in close collaboration with a city that participated in the project. Service provider organisation representatives, municipal service professional and citizens in the role of experts by experience were invited to take part. In these workshops, child protection service clients played a key role in bringing in their experiences in service use and ideas for better service experience. Altogether, three workshops were organised, and each of them had a future orientation through envisioning and a distinct focus. The first workshop focused on the local ecosystem or stakeholder mapping, and the second workshop attempted to identify and explore the potential future scenarios. The third and final workshop focused on co-creating action plans for the identified future scenarios. Lastly, the results were once more sent back to the participants and steering group to be commented on and evaluated.

In the second phase, interviews and process modelling within pupil wellbeing services in a city participating in the MORFEUS project were carried out. The aim of the thematic interviews was to model the current service process and to identify the service ecosystem actors and information flows between the actors in educational support services that relate to the broader context of mental health services.

Cycle 4: Prototyping the ecosystem's information modelling

The goal of the fourth co-development cycle of MORFEUS was to define the various requirements of the ecosystem actors and customers for the service information modelling under development. Also, in the fourth cycle strategies, especially national policies for digitalisation in social- and healthcare were studied. The information modelling was prototyped iteratively, and the data collected and analysed in the three preceding cycles was integrated in this phase. For example, the understanding gathered in the interviews, the stakeholder and ecosystem mappings, customer personas and service process modelling were utilised for creating the prototypes. Further, the case family description continued to serve as a central tool for grounding the work in human experience and facilitating customer-centricity. The main activities included, among others, benchmarking of related governmental information systems nationally and internationally (e.g., Palveluväylä, X-road), analysing technical and legal requirements, defining and creating use cases, collaborative workshops for the researchers for creating visualisations and paper prototypes, etc. The working methods were visual and metaphorical in the sense that the complex model was referred to, e.g., as a 'multi-tiered cake plate' enabling vertical 'deep dives' (see Figure 2 and Figure 3) across information levels, with the customer level gathering information for the customer to help herself and provide information about her needs as a 'mirror' and the service offering level as a 'store'. The aim of this cycle was to integrate the different empathic and systemic perspectives through the prototype development. As a result, several versions of the information modelling prototype were developed, including distinct 'views to information' for three user groups, namely, decision-maker, social- and healthcare professional and the customer. In practice, the views were created as graphical user interface layouts of a web-based application.

SIM
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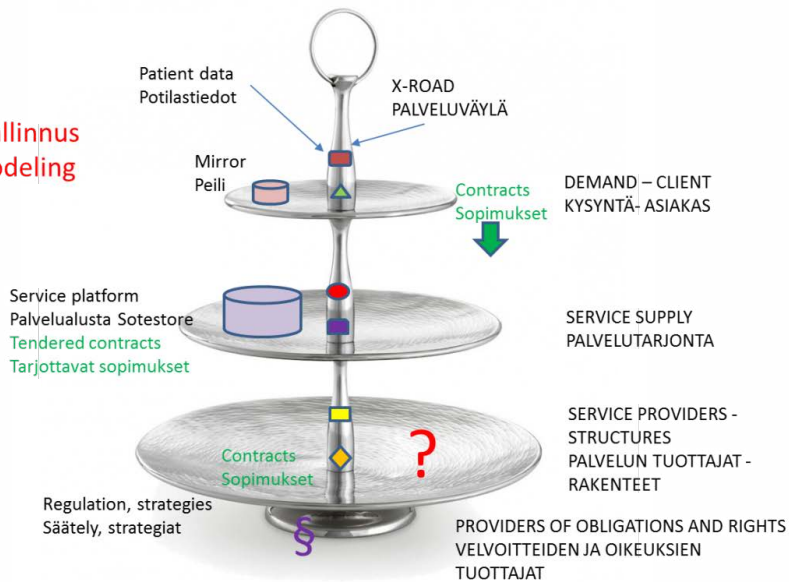


Figure 2. *Cake plate serving as a metaphor for the multi-layered service information model. (Figure: Soile Pohjonen and Marika Noso)*

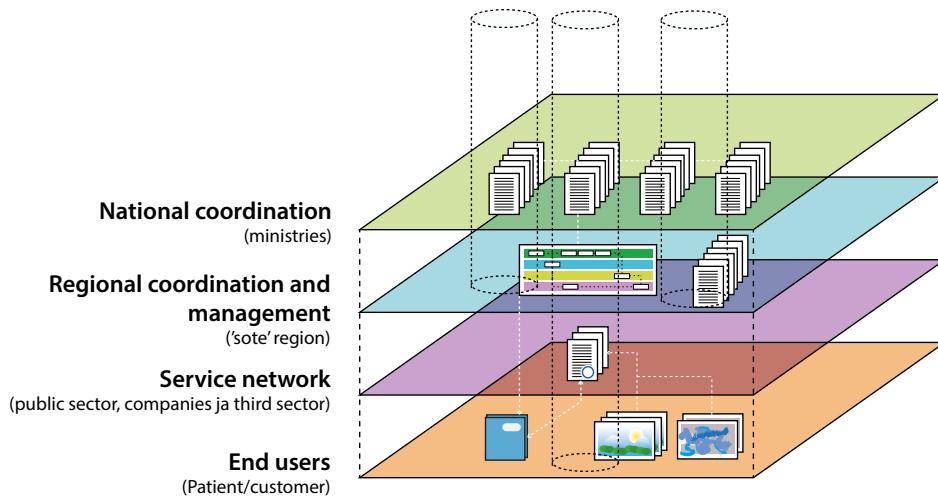


Figure 3. *Vertical deep dives across levels of service ecosystem-related information. (Figure: Anna Salmi)*

Cycle 5: Testing, refining and disseminating the ecosystem's information modelling.

The goal of the fifth and final co-development cycle of MORFEUS was to test and refine the information modelling prototype based on the feedback from the above-defined user groups. Testing was implemented according to a predefined task list that was accompanied by an interview focusing on the user experience and perceived usefulness of the prototype. The fifth and last cycle focused on the longer-term effects of the research by attending to results dissemination. Furthermore, the findings of the research project and the

developed information modelling was published in two open seminars, not only for the ecosystem but also for the wider audience.

RESULTS OF THE SYSTEMIC DESIGN PROJECT

The main result of the MORFEUS project is a service information modelling that includes an ecosystem metamodelling and a service prototype for case management and service system management and decision-making. They provide research-based understanding on how the systemic and empathic views can be combined in service design, specifically in the context of health and wellbeing services of citizens at a high risk of social exclusion. However, the knowledge created in the project is not only embedded in these particular products of research but is very much ingrained in the collaborative practices that gave rise to them. For this reason, this paper focused on carefully reporting the carried-out research activities and the related process to help the reader understand their emergence in context and in interaction between multiple actors in the ecosystem.

Regions as Ecosystems

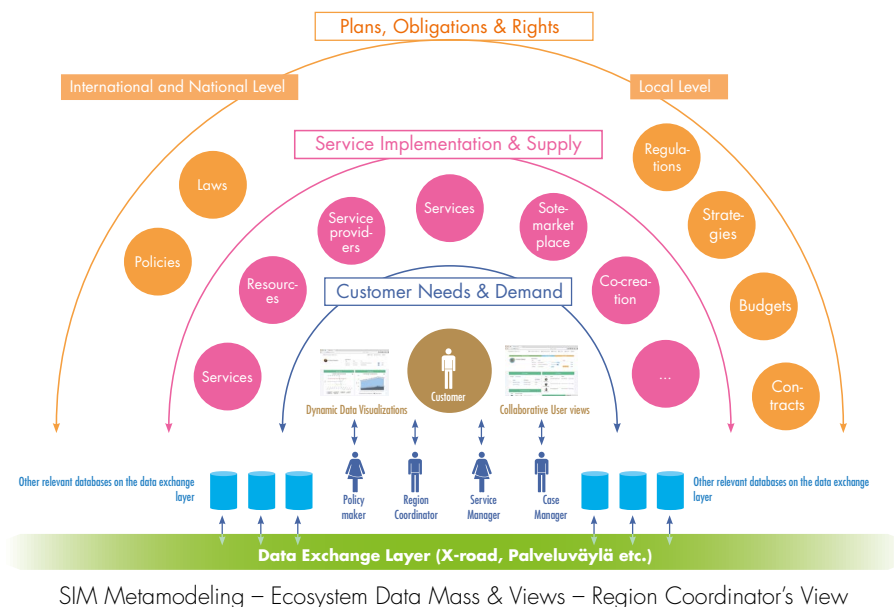


Figure 4. The ecosystem metamodelling produced in MORFEUS. (Figure: Anna Salmi)

The service ecosystem metamodelling (Figure 4) illustrates not only the various ecosystem actors and roles but also the layers of the ecosystem. At the centre of the ecosystem is the customer with his/her needs and the service demand. The next layer is formed by the service implementation and supply actors and activities, such as the service itself, resources, service providers, co-creation between actors, and platforms for encounters in terms of customer-centric service offering and selection. The third layer of the ecosystem metamodelling is formed by plans, obligations and rights at the local, national and international levels. These

include laws, policies, regulations, strategies, budgets and contracts, for instance. The data exchange layer connects all three layers by enabling data flows and integration into role-specific views through the information modelling tool. These roles include the customer, the social and health care professional, service coordinator, director and decision-maker.

The idea of information integration specifically for each role into 'views' is to enable provision of information relevant to that specific role in the particular situation of use. The aim is to create openings to information complexity that support 'situated knowledge and action', that is, action grounded on the prevailing circumstances (Suchman 1987, 35) for each role in the system. This approach steps back from rational abstraction of action, such as that promoted by the 'externalist' viewpoint in systems thinking (Hämäläinen and Saarinen 2006), in favour of contextual contingency. It calls for a perspective shift from 'the massive totality of the system', which is knowable only in abstraction, 'to the pathways of individual human experience' (Buchanan 2004, 62). This is well in line with the pragmatic approach of the 'systems thinker' in systemic design in particular, which 'emphasises the importance of analysing in context (rather than analysing parts in isolation) and of synthesising information across disciplines, scales and perspectives' (Ryan 2014, 3).

The information modelling service prototype that is the central result of the MORFEUS project (Figure 5) utilises information from several social- and healthcare repositories and customer/patient information systems, and this information is transmitted through the data exchange layer, as illustrated in the meta-modelling at the bottom layer (Figure 4). The information modelling prototype was developed for two user roles, namely, the customer and the service professional (case manager), and the director/decision-maker view was initially planned but not implemented in the final version of the prototype. The idea of the customer view, or interface was twofold: 1) to present the customer all information related to him/her, including the services used, the available service network and resources, contact persons relevant to this customer, status of social benefits or other applications, and other relevant information from the customer's point of view, and 2) to enable interaction between the customer and the professional, including communicating and guiding based on the customer's perceived experience of wellbeing. On the other hand, for the social- and healthcare professional's (case manager) role, a different view was created, integrating all relevant information about his/her customers and their situations into one view.

Further, the idea of the director's or decision-maker's view was to produce views for data that describes service use, budgets and predictive information in terms of expected service needs. With the help of the director's view, it would be possible to better manage the service system, such as by allocating resources in a timely manner as based on actual needs, monitoring quality indicators, planning, organising and balancing services, and understanding emerging patterns for continuous improvement of service offering as well as to gain ideas for new service designs.

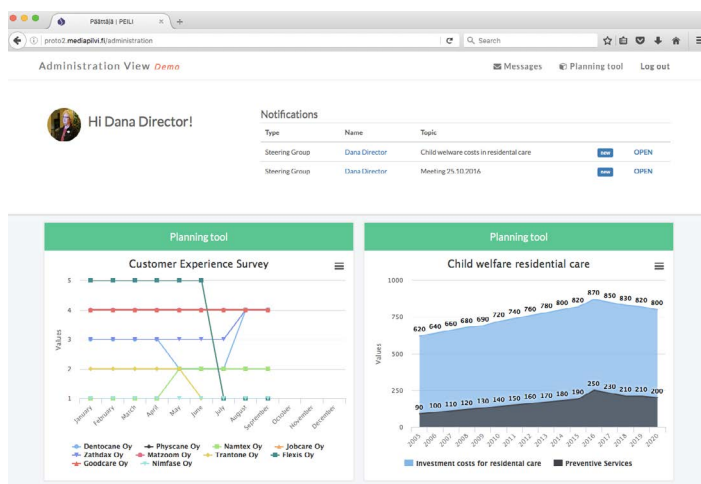
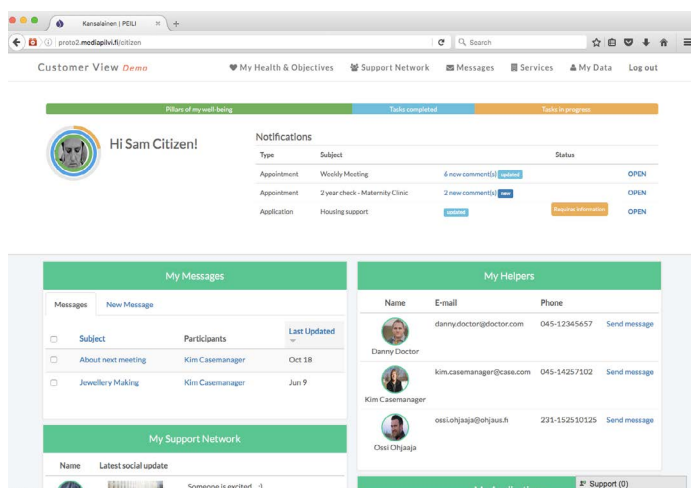


Figure 5. MORFEUS views to ecosystem information modelling prototype.

DISCUSSION AND CONCLUSIONS

Based on the relevant research literature on systemic and empathic design and the experiences gained from the research process that adopted a service design and co-creation approach, it is important to highlight that the integration of empathic and systemic views requires the careful selection and application of methods. In the MORFEUS project – in addition to basic qualitative research methods such as interviews – various narrative and visual methods were employed to create empathic understanding of the customers and their lives, challenges and future dreams, and to gain inspiration for envisioning new future solutions. Mapping techniques were utilised to lay out a view of the actors in the ecosystem of mental health, substance abuse and child protection services. In addition, process and information modelling was used to represent the key actors, elements and information flows in the service ecosystem and to provide a ‘view’ into the system to the key actors. We argue that there is a need to include a variety of methods from different research orientations and to combine them into a whole that supports both empathy or ‘stepping into another person’s life’ and a systemic viewpoint.

In order to gain new knowledge relevant to both research and the practical aim of design, the selection of participants in a complex process like the one presented is an issue that deserves some attention. This process raised questions about how to select the informants who have valuable information and experiences to be shared with the researchers and developers. Further, as the objects of research in the MORFEUS project were services involving sensitive issues such as use of child protection services or the stigma of marginalisation/ social exclusion, the recruitment process required sensitivity to participants' integrity and posed challenges in getting access to relevant participant groups. In some instances, it would also have been beneficial to the overall process of data collection and to the power balance between participants to have a stronger representation of the customers.

The representation of the collected information and means for communicating the customer's viewpoint to the professionals and directors is worth consideration. It was found that narrative approaches, such as the case family description – which was rich in detail, personal information and emotion – elicited empathy in participants. This was observed in the co-creation exercises in which they made plenty of references to the story and referred to the characters by name. The format of presenting the information has a significant influence on the participants' responses and on the ways they make use of the information in the exercises.

The role of the researchers as facilitators of the systemic design, as well as enablers of boundary-crossing between the different roles, actors and views, is crucial to a research process that includes a diversity of stakeholders from various levels of the service system. None of the cycles or the embedded activities as such provided the essential piece of information for building a holistic picture of the service ecosystem or did the trick of revealing how cross-organisational collaboration in the context of developing customer-centred wellbeing service ecosystems should best be facilitated. Most importantly, knowledge was gained as a result of researchers orchestrating ecosystemic co-creation concerning the integration of a diversity of needs of the multiple stakeholders over several development cycles in the process. Orchestration in the MORFEUS project entailed recognition of participants' different interests, identifying their varying needs and engaging them in appropriate phases and workshop setups to collaboratively reach solutions. After the project ended, the project partner organisations continued to utilise the research results in their own operations. Further research would be needed to follow and evaluate how the research results have been applied in practice, as well as what their effect and significance has been and how.

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Keywords:

- Systemic design
- Service ecosystem
- Health and social care services
- Co-creation
- Information modeling

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WE ARE LIVING in a world that is changing at a rapid pace. Globalization and technological development are bringing about many benefits. However, the challenges we meet are often complex, inter-connected and systemic, so-called *wicked problems*. The challenges are no longer local or one-dimensional.

Addressing wicked problems requires new rules and new ways of thinking that are determined by collaboration, inclusiveness and openness. These global challenges call for updated models that both help to enhance involvement of multiple stakeholders in *co-innovation* and *value co-creation*, and help stakeholders to benefit from them.

The set of articles within this book demonstrate how such concepts as *multi-stakeholder partnership*, *co-production of research* and *participatory Research, Development and Innovation* take place in practice. The articles epitomise how new collaborations, dialogues and partnerships are being formed among academic, public and private partners, and civic society. As the described collaboration is characterised by impactful interdisciplinary and creative methodological experimentation, this publication seeks to engage a wide audience of researchers, educators, policy-makers, practitioners and others with an interest in combining collaborative academic, business and public expertise.

These articles introduce research results, methodological considerations and practitioners' experiences on multi-stakeholder collaboration allowing for and benefiting from open research, innovation and educational processes. They make apparent the wide range of practices, tools and benefits of co-creation in the context of *Open innovation*, *Open science* and *higher education*. The articles shed light on the prerequisites of purposeful multi-stakeholder partnership and collaboration in different thematic and regional contexts.