Co-design and Co-creation in Digital Public Services: A Service Design Approach

Rejane Figueiredo, Glauco V. Pedrosa, John L. C. Gardenghi, Elaine Venson, Marcelo O. Judice, Andrea C. B. Judice, Flavio F. Costa, Wander M. P. da Silva, George Marsicano

[1]University of Brasilia (UnB), Brasilia-DF, Brazil

{rejanecosta, glauco.pedrosa, john.gardenghi, elainevenson}@unb.br

Abstract. *Digital Transformation (DT) requires governments to swiftly adapt to meet society's growing demands. In Brazil, the Startup Gov.BR program aims to speed up DT through the deployment of temporary multidisciplinary teams. This paper introduces a Service Design (SD) approach derived from experiences in supporting this governmental program, leveraging collaborative methodologies like co-design and co-creation to facilitate the redesign and creation of digital services. This work highlights the facilitators and hinderers of adopting the proposed SD approach. The findings underscore the critical role of SD adoption in aligning with citizen needs, thereby improving public services and promoting DT that delivers public value for stakeholders.*

1. Introduction

Technological advancements have wielded a significant influence over governments, shaping their endeavors in the digital transformation of public services, as well as in the conception and implementation of new services, all while meeting citizens' expectations [Dewi and Suardana 2023]. As citizens become increasingly connected and familiar with digital services such as UBER, AirBnB, and online banking, they now anticipate governments to provide effective digital services tailored to their needs [Hinings et al. 2018, Hong and Lee 2018].

In the digital and disruptive era, the evolution of public services has led governments to abandon bureaucratic structures and adopt more flexible governance, often integrating agile principles and values for agile governance [Mergel et al. 2021, Dewi and Suardana 2023, Luna et al. 2023]. The adoption of agile governance enables government units to exhibit a new organizational behavior oriented towards delivering higher value results [Mergel 2016, Mergel et al. 2021], responding swiftly to emerging changes and stakeholders' needs while fostering service innovation. Agile government draws inspiration from agile software development but in administrative jargon, it signifies efficiently responding to the constantly changing public needs.

In Brazil, one of the agile strategies implemented to drive strategic DT projects in federal agencies was the creation of the Startup Gov.BR Program[1], coordinated by the Digital Government Secretariat (SGD) of the Ministry of Management and Innovation in Public Services (MGI). Embracing Agile Governance, the SGD coordinates temporary government startups, which consist of multidisciplinary teams tasked with acting swiftly,

[1]https://www.gov.br/governodigital/pt-br/startupgovbr

aiming to employ agile methodologies, citizen-centric approaches, User Experience (UX), among others.

Aligned with Agile Governance, there is a growing use of Service Design (SD) for the development or transformation of citizen-centered digital public services, through codesign and co-creation approaches [Mergel et al. 2021]. SD is a holistic, human-centered, and iterative approach to creating new services, aiming to generate public value for all stakeholders, including various government agencies, citizens, and suppliers [Teixeira et al. 2012, Stickdorn et al. 2018, Patrício et al. 2019, Koskela-Huotari et al. 2021, Mergel et al. 2021]. SD enables and facilitates the participation of diverse stakeholders, providing organizations with an analysis of the services offered from the perspective of service consumers and other involved parties. This entails recognizing the interests, needs, and perceptions of multiple stakeholders in service ecosystems [Giraldo et al. 2024]. The initial work of service designers focuses on the *front-end* of SD, exploring the needs and desires of users and clients, as well as business opportunities and potential future services [Leinonen and Roto 2023].

This research seeks to explore and understand how SD can be employed, with a citizen-centered focus, to enhance the quality and effectiveness of public services, aiming for a digital transformation that generates public value and meets society's expectations. The central question driving this study is: *How can SD, with a focus on the citizen, be employed to promote the creation of value in digital public services?*

The objective of this paper is to present an SD approach that emerges from experiences employed in supporting the coordination and guidance of SGD's startups in the Startup Gov.BR program. The proposed approach is the result of a theoretical-practical study conducted over the past three years, involving different startups and adopting SD as the main research framework. Co-creation and codesign methods and techniques were employed, alongside adaptations such as Design Thinking, Canvas, Design Sprint, Lean Inception, as well as interviews, user journeys, personas, observation, prototyping sessions, and follow-up sessions.

This work presents as contributions: (1) the main facilitators and hinderers encountered in designing digital services within the context of the SD approach, and (2) how the principles inherent to SD influenced the startups in designing their digital services. Through this analysis, the aim is to contribute to the development of strategies and practices that promote a more citizen-centric approach to public management, resulting in services of higher added value for society as a whole.

This paper is structured as follows: Section 2 presents the literature on Service Design and the StartUp Gov.BR Program of the Brazilian federal government. Section 3 outlines the methodology based on Service Design. Section 4 presents the obtained results, along with a discussion on the lessons learned. Finally, Section 5 provides the conclusions and points to future work.

2. Background

2.1. Service Design

Service Design (SD), stemming from the literature of marketing and service management, is an interdisciplinary research area that encompasses operations, engineering, design,

management, marketing, and sociology [Stickdorn et al. 2018]. In recent literature, there has been a growing adoption of service design approaches in various fields: service design for innovation in healthcare [Patrício et al. 2019]; innovative digital solutions for water utilities [Cahn et al. 2023]; manufacturing in the context of Industry 4.0 [Iriarte et al. 2023]; knowledge transfer from SD to Agile UX [Leinonen and Roto 2023]; augmented reality for small ecotourism businesses [Giraldo et al. 2024]; among others. From this perspective, design not only adds value to a product, service, or business; design is value, and value is strategy [Neves et al. 2020].

The authors [Mergel et al. 2021] mention that: "*Service designers use ethnographic methods to understand the needs of users throughout the journey they make to access a public service. They interview process owners (to understand formal requirements based on the law) and internal and external users (to understand their experiences throughout the entire user journey). This process enables the identification of pain points, but also things that work well, which can lead to opportunities for designing a better public service from a user perspective*." According to [Mergel et al. 2021], the design stages emphasize inclusion and transparency—not only concerning citizens but also regarding public servants, who are central members of the project team, thus participating in decision-making processes.

In the field of Computer Science, there are studies employing Design Thinking, Lean Inception, and Design Sprint, involving user-centered approaches and UX. Some examples include: agile development using UCD and Lean startup [Zorzetti et al. 2022]; Agile and Design thinking, Lean startup, and Lean user experience [Lermen et al. 2023]; requirement elicitation based on Design thinking [Kahan et al. 2023]; Design thinking for eliciting government solution requirements [Macedo et al. 2022]; Design thinking in the context of HCI and Collaborative Systems [Correa et al. 2018]. However, Service Design offers a broader scope, allowing for the integration of various dynamics based on different methods, techniques, and tools throughout the design process of a product or service.

Among the rare studies on SD in the context of software development, the authors [Leinonen and Roto 2023] emphasize that *Service Design* enables organizations to ensure a user-centered perspective from the outset of developing new services. Even though the user journey is the focus, SD promotes the analysis of service providers' needs, aiming to create value for all involved parties. The authors also state that the agile software (service) development project should only commence after the service concept has been established, highlighting the need for knowledge transfer among all stakeholders from the beginning to the completion of the product and/or service development.

2.2. The Startup Gov.BR Program

The Digital Government Secretariat (SGD) of the Ministry of Management and Public Service Innovation (formerly Ministry of Economy) of the Brazilian federal government established the Startup Gov.BR Program through SGD/ME Ordinance No. 2,496 of 2021 [Ministério da Economia 2021] for Strategic Digital Transformation Projects. This program aims to support selected federal government projects aligned with the Digital Government Strategy. The Startup Gov.BR program seeks to support and accelerate strategic digital transformation projects of federal government agencies with the assistance of multidisciplinary digital service teams, referred to as "startups".

The multidisciplinary teams are composed of members from the government agencies, with one of them acting as the leader, and professionals with defined profiles hired by the SGD on a temporary basis and assigned to the agency for exclusive participation in digital transformation projects, as provided for in ME Ordinance No. 16,017 of 2020, with 350 hires [Ministério da Economia 2020]. The profiles include experts in Business Process Analysis, Data Science, Software Development, User Experience, Project Management, Communication Infrastructure and Information Technology, and Information Security and Data Protection. Currently, the new MGI Ordinance No. 6,726 of 2023 foresees an additional 200 temporary hires [Ministério da Gestão e da Inovação em Serviços Públicos 2023].

The startups are responsible for developing comprehensive solutions, conducting rapid testing cycles, and maintaining frequent contact with users. The SGD monitors the startups throughout the entire DT project through executive meetings, bi-weekly checkpoints, and analysis of indicators.

The project implementation process in the Startup Gov.BR program follows several stages. The first step involves prospecting, which includes a preliminary study of feasibility and citizen impact, followed by the Executive Summary and Executive Meeting, where initial goals are defined, and project inclusion approval is obtained. Next, there is the appointment of a leader and their presentation, followed by the definition and validation of the project scope. Finally, the process includes the signing of a Technical Cooperation Agreement and the elaboration of a Digital Transformation Plan, formalizing the startup in accordance with the guidelines established by SGD/ME Ordinance No. 2,496 [Ministério da Economia 2021], in addition to providing specialists from temporary contracts with SGD/MGI.

3. Methodology

This work explores the creation of value in public services through the use of an SD approach, aiming to foster innovation through activities that promote codesign, creativity, collaboration, and recognition of user/citizen experience for service co-creation. In this context, the principles of SD [Stickdorn et al. 2018] were applied in the Startup Gov.BR program to support the SGD in coordinating and guiding startups, from the redesign of existing services to the creation of new services.

A SD approach adopted is based on the works of [Stickdorn et al. 2018, Giraldo et al. 2024] and comprises four phases: Exploration, Creation, Reflection, and Implementation, as described in Figure 1. These phases are related to the stages of discovery, exploration, conception, insights (prototyping), and finally, the implementation of a public service.

The phases of the approach are defined as follows:

1. **Exploration**: In this phase, questions like “What is the problem?”; “What is the service?”; “For whom is this service created?”, among others, are addressed. Thus, it starts with an idea, and from there, research and idea generation activities are carried out to contribute to innovation.
2. **Creation**: This phase aims to define a scope for the service, validating with the user (citizen) their problems and needs. At this point, the goal is to refine what was defined earlier in the Exploration phase.

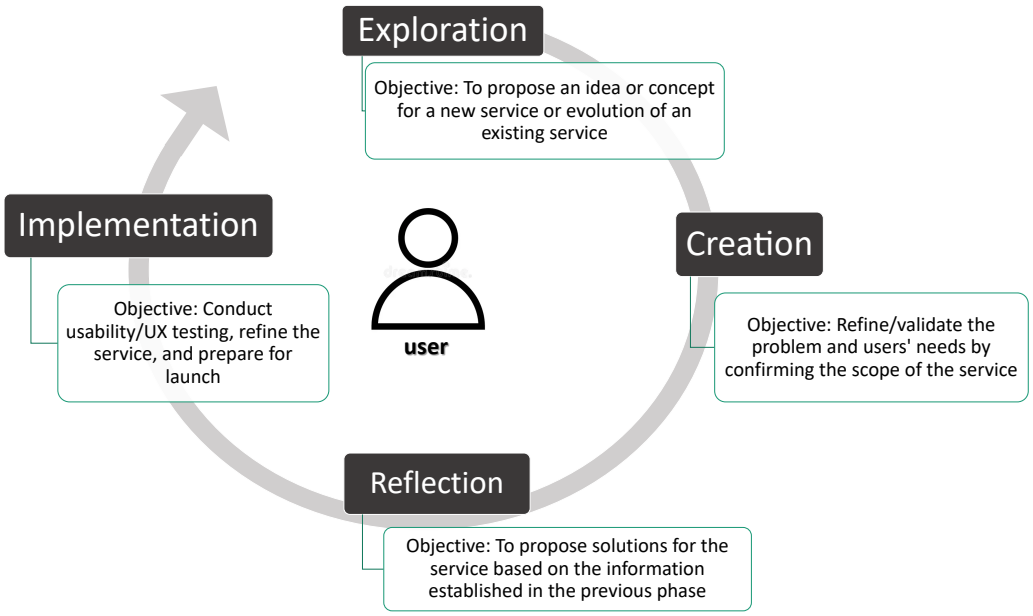

Figure 1. Phases of the proposed SD approach.

3. **Reflection**: This phase is the gateway to development. Here, the service begins to take shape, and the functionalities of the technological solutions to be built are determined.
4. **Implementation**: In this phase, the development of the established solution effectively takes place. Agile UX practices should occur in parallel with software development, enabling the user (citizen) to remain involved in the process, contributing to refinement and validation.

Each demand from the SGD is analyzed and addressed according to the phases of the approach. It is worth noting that the objective of the phased structure is not to establish or demonstrate hierarchy, nor the requirement of sequence between the phases, but rather a categorization thereof, with the division and identification of roles, responsibilities, sets of processes and products, methods, techniques, and tools that can support the dynamics to be carried out. In each phase, the approach envisages dynamics by selecting and even adapting processes, methods, techniques, and tools, such that the stages are not necessarily sequential, but that there is a well-established structure within and between the phases.

The service user is at the core of the proposed approach, indicating that all phases of the approach are guided by their problems and needs, as well as those of other stakeholders. The elements and techniques used in each of these phases are selected based on criteria that aim to effectively involve the user/citizen, as well as other stakeholders, in the service creation process.

Figure 2 shows the inputs and expected outputs for each phase, as well as the stakeholders involved and some possible codesign and co-creation techniques to be executed.

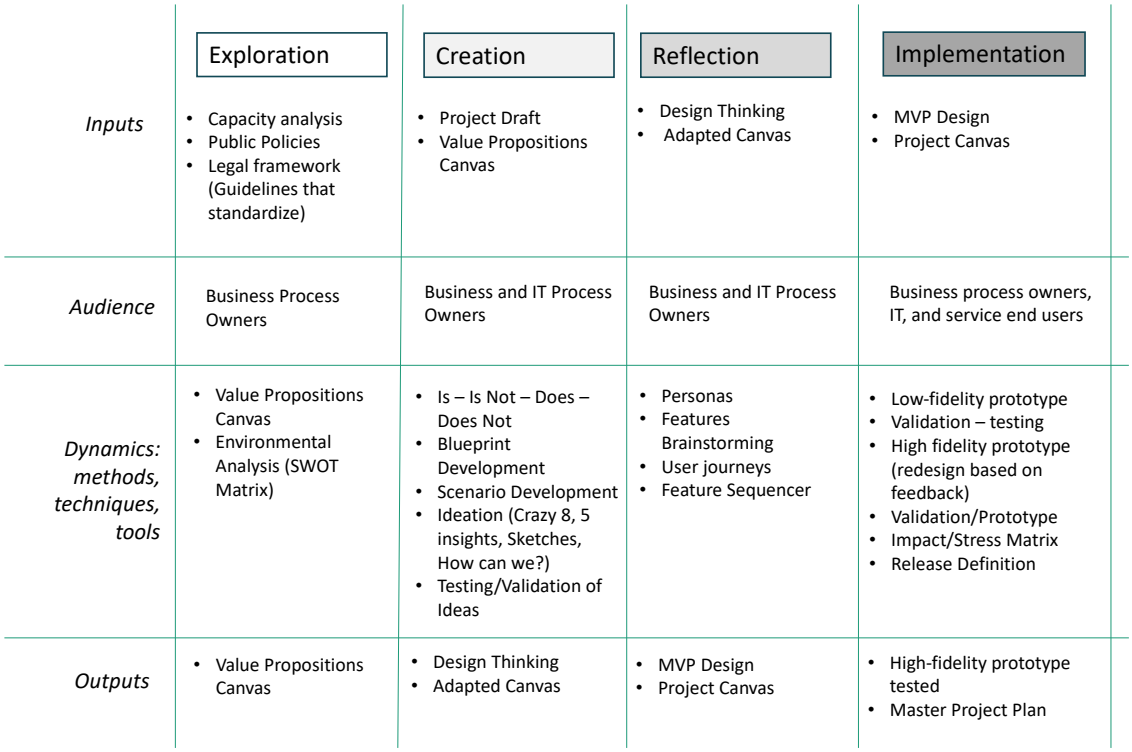

Figure 2. Inputs, Audience, Dynamics, and Outputs of the proposed SD approach.

4. Analysis of Results and Discussion

4.1. Workshops Conducted

Since 2021, the authors of this work have been supporting the SGD in conducting SD activities for the startups in the Startup Gov.BR program. For each demand from the SGD, we sought to study the project and plan workshops with the most appropriate dynamics, enabling the design of a *digital public service*. Table 1 presents a set of startups and/or projects from different agencies and how the demands of each were aligned with the phases of our approach and how methods, techniques, and/or tools were adopted.

4.2. Facilitators and Hinderers

Table 2 summarizes the main factors observed in the implementation of the SD approach within the Startup Gov.BR program.

The workshops conducted provide a conducive environment for collaboration and team engagement in defining organizational values. This not only promotes a shared understanding of values but also fosters a cohesive culture within the startup. Furthermore, these workshops serve as an effective tool for assessing the existing organizational culture, identifying discrepancies between stated values and actual culture, which can aid in implementing positive changes.

The discussion group formed during the workshops enables direct feedback from team members and other stakeholders. This exchange of information facilitates learning through past examples, both positive and negative, which helps reinforce organizational values. Additionally, by establishing a hierarchy of values and focusing on the most

Agency	Startup	Workshop Objective	Techniques	Phase
ANM	Strengthening public policies for mineral production and transformation	Development of the executive summary	Project Canvas and Lean Inception	Exploration
ANAC	Vôo Simples	Develop insights for the aircraft registration process	Design Thinking	Creation
INSS	RecuperaGOV	Delimiting a solution for the administrative billing flow of non-taxable credits of the Federal Government	Design Thinking	Creation
MGI	Login Único	Identify and prioritize opportunities for evolution of the Single Login	Design Thinking	Creation
ME	Mapas	Ideation/prototyping workshop	Design Sprint	Reflection
MinC	Editais da Cultura	Delimiting the scope of a possible solution for managing calls for proposals at MinC	Lean Inception	Reflection
ANA	ANA Digital	Organize and facilitate workshop for App development	Design Sprint	Reflection
MEC	Jornada do Estudante	Perform the First Release of the Student Journey App	Design Sprint	Reflection
OGU I and II	Conselho de Usuários 2.0	Reevaluate, update, and evolve the project's executive summary	Design Thinking	Reflection
Federal Police	Sigacrim	Identify barriers or limitations of interaction with the interfaces of the Operations Registry system, focusing on the experience of different user profiles (Curator and Analyst).	Usability Testing	Implementation
INCRA	Plataforma de Governança Territorial	Develop optimized solutions for the needs of PGT/INCRA users (Territorial Governance Platform), mapping the functionalities offered by the PGT system	Heuristic Analysis	Implementation

Table 1. Workshops conducted employing the SD approach to support the Startup Gov.BR program

Factor	Facilitator	Hinderer
Business understanding and strategy	Reduced scope of action of the Startup Gov.BR program facilitates understanding of how each agency will operate to create and deliver value to citizens	Failure to understand business needs, especially from the citizen's perspective, with the aim of aligning strategies, translating into a concise plan, and ensuring the involvement of senior management and stakeholders
Involvement of senior management	High prioritization of services to be transformed through formalized digital transformation plans with key agency managers	Difficulty in dealing with obstacles in the elaboration and presentation of project proposals for new services, investment, expected results, and identification of risks. Turnover of decision-makers and changes in policies and priorities.
User Experience	By considering the needs of various user groups, including those with physical, cognitive, or sensory disabilities, public services can become more accessible to all citizens, promoting inclusion and equity.	Difficulty in ensuring consistent user participation at all touchpoints - this is challenging in public services, in addition to the complexity of involving multiple departments or agencies, each with its own practices and procedures.
Co-creation	The diversity of perspectives brought by users and different stakeholders can lead to innovative and creative solutions	Difficulty in managing the co-creation process - this is challenging, especially when it involves access and presence of users and multiple stakeholders with diverse interests and objectives
Results	The agile process enables rapid results, allowing validation of these against user expectations	Difficulty in maintaining focus on rapid idea generation without loss of depth in the developed solutions.

Table 2. Facilitators and hinderers for implementing the SD approach in support of the Startup Gov.BR program

crucial ones, these discussion groups make the company's values clearer and more tangible, providing clear direction for all team members.

However, the workshops encountered a variety of challenges and negative aspects associated with different team working methods and innovation processes. Among the mentioned issues are lack of time and resources, process complexity, resistance to change from team members and stakeholders, dependence on competent facilitators, potential lack of alignment among involved parties, and the need for leadership support. Additionally, difficulties were noticed in maintaining engagement and active participation of participants, especially in remote environments where issues like technology, connectivity, and lack of non-verbal communication may pose additional limitations. Lack of committed leadership and sponsorship from senior management are also significant challenges.

4.3. Lessons Learned

An important lesson learned is the need to conduct a detailed preparatory study of the demand before designing the workshop dynamics. This involves clearly identifying the roles of demanders and decision-makers, as well as other relevant stakeholders. Additionally, it is essential to ensure proper alignment between the demand and the specific phase of the proposed approach, ensuring that the activities carried out are relevant and effective in achieving the defined objectives.

The importance of the team's profile for supporting SGD is emphasized: it is a multidisciplinary team comprising researchers from the computing field (Software Engineering, Data Science, Security, AI), management and governance, data science, optimization, psychology, and design. Furthermore, the significance of each workshop's dynamics is highlighted, emphasizing the need to understand and analyze the participants' profiles, manage time effectively, consider different viewpoints, and address potential conflicts that may arise.

The facilitators of the workshops are responsible for maintaining the group's engagement, gaining a deep understanding of the problem at hand, and ensuring a collaborative environment. Additionally, they should be flexible and empathetic to handle unexpected changes and communicate guidelines and instructions clearly and concisely for the workshop's success. They should create mechanisms to listen to others effectively.

The learnings also include the importance of practical validation of ideas through testing with real users and the significance of continuous iteration based on feedback to create effective solutions. Emphasizing a preference for practical and viable solutions over theoretical concepts, as well as the need to manage stakeholders' expectations, is essential. The team highlights the importance of identifying and managing risks throughout the process, along with the ability to adapt to changes and maintain focus on the end result.

With the use of Design Thinking, for example, participants learn the importance of both divergent and convergent thinking, as well as develop effective collaboration and communication skills. Workshop facilitators play a crucial role in guiding participants through the process steps, adapting to their needs, and maintaining focus on a deep understanding of the problem. Acceptance of failure as part of the innovation process is emphasized, along with a focus on clear and visual communication of ideas. Creating

adequate documentation to guide future development is highlighted as essential, as well as the need to collaboratively prioritize features and requirements during Lean Inception.

Another lesson learned was the importance of teaching participants about generating and filtering creative ideas, as well as developing active listening skills and empathy towards others. Workshop facilitators must be prepared to adapt dynamics during the workshop and ensure effective collaboration among participants. Design Thinking, for example, encourages a mindset that accepts failure as part of the innovation process, promoting a deep understanding of the problem before seeking quick solutions. Additionally, there is an emphasis on clear and visual communication of ideas, as well as creating prototypes to effectively communicate solutions, requiring adequate support from workshop facilitators.

5. Conclusion

Implementing a culture of creative and human-centered collaboration in public organizations is a process that requires significant time and resources. Service Design (SD) in the public sector is an emerging and constantly expanding area. Therefore, promoting insights and sharing knowledge through participatory research is crucial to support public managers in adopting a more receptive mindset, recognizing the citizens' perspective.

This work presented a citizen-centered Service Design approach to promote digital transformation and enhance Brazilian public services through the Startup Gov.BR program, coordinated by the SGD (Secretariat of Digital Government). Through the analysis of the experiences employed in supporting startups, this work highlighted the main facilitators and barriers encountered in the process of designing digital services. Additionally, some lessons learned were also presented regarding how the principles of Service Design influenced startups in the creation and/or redesign of digital services.

Based on the Service Design approach proposed, co-design and co-creation practices were implemented. This entailed active and participatory collaboration among various stakeholders, such as temporary multidisciplinary teams, startup leaders, SGD focal points, and the Strategic Plan Committee. Through these collaborative efforts, the objective was to foster the redesign and development of digital services that better cater to the needs and expectations of citizens, ultimately leading to a more user-centered approach and enhanced user experience.

The results underscore the importance of adopting Service Design to align public services with citizens' needs. Through a citizen-centered approach, incorporating co-design and co-creation practices, the aim was to foster the redesign and creation of more fitting digital services. This collaborative approach facilitated a deeper understanding of users' demands and expectations.

It is expected that the obtained results can contribute to public management, through the development of strategies and practices that promote co-design and the creation of public services oriented to society, not only "for" the citizen, but "with" the citizen, resulting in services of greater added value for all.

6. Acknowledgements

This research is part of a cooperation agreement between the Information Technology Research and Application Center (ITRAC) at the University of Brasilia (UnB) and the Ministry of Management and Innovation in Public Services (MGI).

References

Cahn, A., Katz, D., Ghermandi, A., and Prevos, P. (2023). Initiating data-as-a-service adoption in water utilities: A service design approach. *Utilities Policy*, 84:101656.

Correa, L., Marczak, S., and Conte, T. (2018). Entendendo o Uso de Design Thinking no Apoio ao Desenvolvimento de Software a‘ luz das Areas de IHC e Sistemas Colaborativos. In *Anais Estendidos do XVII Simpósio Brasileiro de Fatores Humanos em Sistemas Computacionais (IHC)*. Sociedade Brasileira de Computação (SBC).

Dewi, L. P. R. S. and Suardana, I. B. R. (2023). Reflections of agile governance in public services in the digital age. *Publisia: Jurnal Ilmu Administrasi Publik*, 8(1):84–90.

Giraldo, M., Rodríguez, O., Del Guidice, O.-N., and Betts, M.-M. (2024). Facilitators and hinderers for designing augmented reality for ecotourism SME's experiences: A service Design approach. *Heliyon*, 10(2):e24124.

Hinings, B., Gegenhuber, T., and Greenwood, R. (2018). Digital innovation and transformation: An institutional perspective. *Information and Organization*, 28(1):52–61.

Hong, S. and Lee, S. (2018). Adaptive governance and decentralization: Evidence from regulation of the sharing economy in multi-level governance. *Government Information Quarterly*, 35(2):299–305.

Iriarte, I., Hoveskog, M., Nguyen Ngoc, H., Legarda, I., Uranga, M., Nazabal, M., and Atxa, A. (2023). Service design for digital servitization: Facilitating manufacturers' advanced services value proposition design in the context of Industry 4.0. *Industrial Marketing Management*, 110:96–116.

Kahan, E., Genero, M., and Oliveros, A. (2023). Refinamiento de un proceso de elicitación de requisitos basado en Design Thinking. In *Anais do XXVI Congresso Ibero-Americano em Engenharia de Software (CIbSE 2023)*, pages 214–228, Uruguay. Sociedade Brasileira de Computação.

Koskela-Huotari, K., Patrício, L., Zhang, J., Karpen, I. O., Sangiorgi, D., Anderson, L., and Bogicevic, V. (2021). Service system transformation through service design: Linking analytical dimensions and service design approaches. *Journal of Business Research*, 136:343–355.

Leinonen, A. and Roto, V. (2023). Service Design Handover to user experience design – a systematic literature review. *Information and Software Technology*, 154:107087.

Lermen, F. H., de Moura, P. K., Bertoni, V. B., Graciano, P., and Tortorella, G. L. (2023). Does maturity level influence the use of Agile UX methods by digital startups? Evaluating design thinking, lean startup, and lean user experience. *Information and Software Technology*, 154:107107.

Luna, A., Riccio, E. L., Moura, H., and Marinho, M. (2023). Agile Governance Manifesto contemporary reading: Unveiling an Appreciative Agenda. *Journal of Information Systems and Technology Management*, 20:e202320006.

Macedo, L. G. D., Oliveira, F. E. D., and Araujo, R. M. D. (2022). Elicitação de requisitos de Sistemas e Design Thinking no âmbito público: Um estudo de caso na Universidade Federal de Lavras. In *Anais do X Workshop de Computação Aplicada em Governo Eletrônico (WCGE 2022)*, pages 1–12, Brasil. Sociedade Brasileira da Computação.

Mergel, I. (2016). Agile innovation management in government: A research agenda. *Government Information Quarterly*, 33(3):516–523.

Mergel, I., Ganapati, S., and Whitford, A. B. (2021). Agile: A New Way of Governing. *Public Administration Review*, 81(1):161–165.

Ministério da Economia (2020). Portaria nº 16.017, de 6 de julho de 2020. *Diário Oficial [da] República Federativa do Brasil*.

Ministério da Economia (2021). Portaria SGD/ME nº 2.496, de 2 de março de 2021. *Diário Oficial [da] República Federativa do Brasil*.

Ministério da Gestão e da Inovação em Serviços Públicos (2023). Portaria nº 6.726, de 30 de outubro de 2023. *Diário Oficial [da] República Federativa do Brasil*.

Neves, A., Meira, S., Medeiros, L., Ferraz, M., Soter, C., Cavalcanti, S., Cavalcanti, P., and Heimann, V. (2020). Strateegia.digital: A platform that assumes design as a strategic tool. In Marcus, A. and Rosenzweig, E., editors, *Design, User Experience, and Usability. Interaction Design*, pages 209–223, Cham. Springer International Publishing.

Patrício, L., Grenha Teixeira, J., and Vink, J. (2019). A service design approach to healthcare innovation: from decision-making to sense-making and institutional change. *AMS Review*, 9(1-2):115–120.

Stickdorn, M., Hormess, M., Lawrence, A., and Schneider, J. (2018). *This Is Service Design Doing: Applying Service Design Thinking in the Real World*. O'Reilly Media, 1ª edição edition.

Teixeira, J., Patrício, L., Nunes, N. J., Nóbrega, L., Fisk, R. P., and Constantine, L. (2012). Customer experience modeling: from customer experience to service design. *Journal of Service Management*, 23(3):362–376.

Zorzetti, M., Signoretti, I., Salerno, L., Marczak, S., and Bastos, R. (2022). Improving Agile Software Development using User-Centered Design and Lean Startup. *Information and Software Technology*, 141:106718.