

Jun 23rd, 9:00 AM - Jun 28th, 5:00 PM

Shaping Public Sector Digital Transformation through Design. Translation approaches on training programs as multi-stakeholder ecosystems

Ilaria Mariani
Politecnico di Milano, Italy

Giulia D'Aleo
Politecnico di Milano, Italy

Marzia Mortati
Politecnico di Milano, Italy

Francesca Rizzo
Politecnico di Milano, Italy

Follow this and additional works at: <https://dl.designresearchsociety.org/drs-conference-papers>



Part of the [Art and Design Commons](#)

Citation

Mariani, I., D'Aleo, G., Mortati, M., and Rizzo, F. (2024) Shaping Public Sector Digital Transformation through Design. Translation approaches on training programs as multi-stakeholder ecosystems, in Gray, C., Hekkert, P., Forlano, L., Ciuccarelli, P. (eds.), *DRS2024: Boston*, 23–28 June, Boston, USA.
<https://doi.org/10.21606/drs.2024.1048>

This Research Paper is brought to you for free and open access by the DRS Conference Proceedings at DRS Digital Library. It has been accepted for inclusion in DRS Biennial Conference Series by an authorized administrator of DRS Digital Library. For more information, please contact dl@designresearchsociety.org.

Shaping Public Sector Digital Transformation through Design. Translation approaches on training programs as multi-stakeholder ecosystems

Ilaria Mariani*, Giulia D'Aleo, Marzia Mortati, Francesca Rizzo

Politecnico di Milano, Department of Design

*Corresponding author e-mail: ilaria1.mariani@polimi.it

<https://doi.org/10.21606/drs.2024.XXX>

Abstract: In the evolving landscape of public sector digital transformation, the integration of design thinking and stakeholder engagement presents a pressing challenge and a valuable opportunity. As a response to this challenge, there is a growing interest in the implementation of training programs within the theoretical framework of translational practices. This study adopts an organisational lens and an analytical framework to look into three instances of design translation in multi-stakeholder ecosystems. Drawing insights from a three-year exploration, it examines the dynamics within two ecosystems: the multidisciplinary and multi-operational partners responsible for designing and executing the training program, and the program participants. By investigating these instances, this study sheds light on favourable or hindering circumstances in the transition of design to the public sector digital transformation within collaborative, multi-stakeholder environments.

Keywords: Design thinking; Stakeholder engagement; Public sector innovation; Digital transformation; Multi-stakeholder ecosystems; Training programs

1. Introduction

Over the past two decades, digital transformation has emerged as a key driver for modernising and revitalising the public sector. This integration of digital technologies and innovative approaches is underpinned by the goal of improving government services, optimising administrative efficiency, and streamlining overall governance (C. Gong & Ribiere, 2021). One of the guiding principles of digital transformation is the facilitation of data-driven decision-making and knowledge management in the public sector (Alvarenga et al., 2020), allowing governments to more effectively address citizens' needs and allocate resources efficiently. As a result, various e-government functions have been introduced, from online tax filing and payment systems to smart city initiatives and open data platforms. As the COVID-19 pandemic took stage in recent years, it served as a catalyst that accelerated governments' digitalisation



This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International Licence.

processes (Amankwah-Amoah et al., 2021). It has led to boosting the adoption and integration of digital tools and platforms, resulting in the simplification of processes, reduction of bureaucratic barriers, and the augmentation of public service accessibility (Gabryelczyk, 2020).

Throughout this transformative process, it becomes evident that governments are grappling with several challenges pertaining to their capacity to adapt to evolving scenarios and to cultivate dynamic capabilities (Datta et al., 2020). At times, these capabilities and capacity are found to be lacking. These challenges point out the need to shift towards a more adaptive mindset (Y. Gong et al., 2020), one that places increased emphasis on nurturing learning capacity, alignment of public services with citizen needs, governance of resilient systems, and governance of data and digital platforms (Mazzucato & Kattel, 2020). While addressing persisting challenges related to interoperability, usability, ethics, security, and regulatory concerns (Kouroubali & Katehakis, 2019; Wimmer et al., 2018) and the attempt to implement the once-only principle (Krimmer et al., 2017), growing attention is placed on empowering citizens to engage with government agencies, access information, and participate in the policymaking process, albeit with various extents of success (Khan & Krishnan, 2021).

Although there is extensive and diverse literature on the topic, digital transformation remains a phenomenon still in the process of being defined (Warner & Wäger, 2019; Wessel et al., 2021). At the heart of the current debate is the impact of the proliferation of digital technologies on organisations, demanding their constant adaptation in response to the ever-evolving landscape (Correani et al., 2020; Verhoef et al., 2021). In their systematic literature review on digital transformation, Hanelt and colleagues (2020) clearly link the phenomenon to the broader concept of organisational change, understood as the modification over time of an organisational entity in the form, quality, or state that is both triggered and shaped by the widespread diffusion of digital technologies and innovation (Poole & Van de Ven, 2004). Additionally, they delineate two thematic patterns. First, digital transformation is steering organisations towards flexible designs that facilitate continuous adjustments and adaptation. Secondly, this transition is deeply rooted in digital business ecosystems. Depending on the scope of change, whether narrow or broad in context, and the emphasis on internal processes, four distinct perspectives on digital transformation emerge: technology impact, compartmentalised adaptation, systemic shift, and holistic co-evolution (Figure 1).

fosters innovation that tackles real-world problems faced by citizens and government agencies (Mergel et al., 2022). The literature review attributes design thinking tactical and strategic value, reporting insights on how design thinking user-centeredness and stakeholder engagement drive impactful organisational strategy by fostering empathy, broadening perspectives, and mitigating cognitive biases (Graf, 2021; Knight et al., 2020, p. 20; Martin, 2009). The strategic contribution is also underpinned by Vendraminelli and colleagues (2023) who demonstrates it facilitates the digital transformation by steering actionable and executed strategies, underscoring not only the role in enhancing competitive advantage but also in aligning technological capabilities with human-centred needs and organisational goals, thus improving the quality of life. This contribution is, however, approached with a critical understanding that its universal application must be justified against organisational readiness and cultural fit to avoid pitfalls. Schweitzer and colleagues (2016) caution against the assumption that an universal application is unequivocally good. In-depth interviews with innovation managers revealed that the efficacy of design thinking mindsets is contingent upon the organisational readiness and the ability of leadership to foster an environment where these mindsets can translate into behaviours. Consequently, the strategic and widespread adoption of design thinking should be pondered upon the context, recognising eventual systemic organisational barriers that can impede its application and operationalisation.

The literature highlights how introducing a design thinking and stakeholder engagement within organisations often implies substantial changes to established norms and practices (Lehtinen & Aaltonen, 2020; Mastio et al., 2019). In particular, effectively involving external stakeholders to contribute significant value has been a considerable challenge (Eskerod & Huemann, 2016). The extent of these changes is related to the prevailing organisational culture. Scholarly research has emphasised that a flexible organisational culture not only enhances an organisation's capacity for creativity and innovation (Mbeba, 2014) but also typically eases the seamless integration of stakeholder engagement practices. Organisations characterised by flexibility and relatively flat hierarchies exhibit greater receptivity to adopting novel processes, methodologies, and techniques (Rishipal, 2014), rendering them more amenable to incorporating design thinking and stakeholder engagement practices. Conversely, organisations less attuned to the principles of design thinking and characterised by less flexible governance are more prone to resist change (Huang & Hands, 2022; Deserti & Rizzo, 2014). The integration of stakeholder engagement and bottom-up initiatives into their culture typically demands a considerable investment of time, effort, and adaptability.

Scholarly discussions emphasise that digital transformation requires public sector organisations to revise their activities and technology environments (Skog, 2019). Simultaneously, governments necessitate the creation of diverse ecosystems involving businesses and relevant stakeholders in collaborative partnerships (Zapata, 2021), addressing challenges in emerging policy areas while simultaneously enhancing efficiency, accountability, and trust among the diverse stakeholders involved (Filer, 2019). In this discourse, stakeholder engagement is considered a strategic approach, supported by the European Union, promoting the establishment of multi-stakeholder innovation ecosystems that brings together actors from

the quadruple helix (Carayannis & Campbell, 2010). These ecosystems serve as fertile grounds where stakeholders share their knowledge and assets, including technologies, to develop comprehensive solutions that not only align with the rapidly evolving market but more importantly with user needs (Granstrand & Holgersson, 2020; Walrave et al., 2018).

Within these initiatives, there is a growing interest in implementing training programs that integrate design thinking and stakeholder engagement practices across the entire development of innovative solutions. Within such programs, the design intervention is aimed at going beyond setting up tools and methodologies for demonstrating the value of technology before entering the development phase (Fisher & Gamman, 2018). It aims to lead participants to understand the motives for engaging diverse user groups, prompting more proficuous interactions to collectively address specific challenges (Hornbuckle, 2022).

This scenario highlights the interaction between two ecosystems engaged with the application of design thinking: the ecosystem of multidisciplinary, multi-operational partners responsible for the training program, and the ecosystem of participants, composed of a diverse array of multi-stakeholder organisations, including start-ups, scale-ups, public administration representatives, and governmental actors. This condition provides a unique setting for addressing the challenge of effectively and meaningfully instilling the design thinking mindset and methodologies within training programs aimed at digital transformation. These programs operate as complex multi-stakeholder ecosystems, with actors driven by varied motivations and objectives and subject to specific governance and practices.

This challenge opens two nested research questions:

- What are the key contextual factors that influence the adoption and integration of a design thinking approach to support public sector organisations in their digital transformation?
- How do these factors influence the mechanisms and methods through which design thinking is translated and operationalised within multi-stakeholder ecosystems, as the ones involved in these training programs?

To answer them, this study adopts an organisational lens that explores the multifaceted implications and benefits of translating design thinking methodologies from the design domain to the wider multi-stakeholder ecosystem involved in public sector digital transformation. Specific attention is drawn on the challenges associated with the translation into quadruple helix ecosystems and the resulting organisational-level transformation. Finally, this study reflects upon the possibility to move from a transactional to a strategic role.

2. Methodology

To address the gaps identified in the literature, this study capitalises on knowledge gathered over a span of three years, acquired through the design and implementation of three training programs aimed at supporting digital innovation and transformation in the public sector (

Table 1). As such, it relies on first-hand experience related to integrating design thinking into such training programs as multi-stakeholder ecosystems.

Table 1. The three training programs and their features

Case	Case 1: Master in AI for Public Services	Case 2: Executive masters on public sector innovation	Case 3: Training program for GovTech ecosystem
Context	1 year master program in AI for Public Services	2 executive masters on public sector innovation at POLIMI GSoM	3 boot camps with GovTech ecosystem actors and players
Partner ecosystem composition	Academia (2 organisations)	Academia (1 organisation, multiple departments)	Consultancy (2 organisations), academia, think tank
Governance	Flat. Features horizontal governance with multidisciplinary teams collaboratively shaping the curriculum, promoting an inclusive approach where various competencies contribute to defining course content and delivery methods.	Flat. Adopts horizontal governance within the module, facilitating dynamic curriculum adjustments from multidisciplinary teams contributing with their knowledge, ensuring the course content is relevant and comprehensive.	Vertical. Utilises vertical governance where a central team outlines the program and incorporates external contributions, focusing on strategic goals without a co-design process for the curriculum.
Design thinking role	Strategic	Strategic	Operational
Degree of design thinking penetration in the partner ecosystem	Co-leading. The design thinking team is co-shaping the program's content, management, and execution, with leadership roles.	Co-leading. The design thinking team is co-shaping the program's content, management, and execution, with leadership roles.	Siloed. Design thinking knowledge pertains to a specific team not provided with a co-leadership role.
Participants ecosystem composition	Participants with different backgrounds such as political science, engineering, law, and other areas of specialisation, working in multiple sectors such as consultancy, project management, public administration, and international organisations.	Participants are professionals working at various levels of public administration. Their background encompasses a diverse range of fields, from government administration to law enforcement, education, healthcare, and more.	Participants coming from the start-up sector, includes individuals with experience in entrepreneurship and backgrounds in engineering, management, political science, law, and a wide array of other specialised domains.
Training activities	Frontal lectures + multiple project works. Blend of theoretical courses and hands-on projects. It includes foundational courses on AI, human-centric service design, and ethics, complemented by group-based projects that emphasise real-world application of AI in public services. After more theoretical courses, participants are engaged in hands-on experimentation aimed at operationalising theory into practice. Specifically, participants engage in multidisciplinary teams, guided by mentors, to design AI solutions addressing diverse public sector challenges. During the experimentation, participants engage in review and critical discussion.	Frontal lectures + specific hands-on activities. The course addresses Service Design and Design Thinking methodologies to design user-centred public services and more effective public policies. It intertwines theory and practise through exercises and applied case studies, including hands-on practical activities for applying acquired knowledge, case study analysis and group presentations to demonstrate competence in developing a citizen engagement plan throughout different stages of the design process. The plan is the object of review and critical discussion.	Frontal lectures + specific hands-on activities. The bootcamp focuses on introducing user-centred design and Design Thinking in SMEs and startups for improving service design and delivery. The curriculum includes lectures, case studies, hands-on class activities, and homework, for applying these principles practically. It introduces principles of stakeholder engagement. It is structured to highlight planning, engaging, and assessing engagement activities, opening to hands-on experimentation of various tools and the overall delivery of a complete Engagement Plan. The plan is the object of review and critical discussion.
Learning method	Project-based learning that emphasises the application of theoretical knowledge through practical, real-world projects and encourages critical discussion and review.	Experiential learning that integrates theoretical instruction with practical application, encouraging participants to apply knowledge through exercises and case studies, fostering hands-on experience and critical analysis.	Experiential learning focused on applying user-centred design and stakeholder engagement principles through a mix of theoretical lectures and practical activities, enabling participants to develop and implement Engagement Plans.

In every training program, the primary aim was to instil a design-oriented mindset among participants from various organisations – including start-ups, SMEs, and representatives from public organisations – to address the challenges of digital transformation in the public

sector. The programs combined traditional lectures with multiple project works to support project-based learning or specific hands-on activities to spur experiential learning.

The approach involved introducing fundamental principles of design thinking and stakeholder engagement, followed by direct experimentation with a diverse set of tools, methods, and approaches aiming at enhancing participants' ability to effectively engage with citizens, stakeholders, and end-users in practical scenarios.

In the design and implementation of each training program, two ecosystems can be identified, providing the context for this study:

- i. The ecosystem of multidisciplinary and multi-operational partners responsible for designing and executing the training program.
- ii. The ecosystem of the learners participating in the program.

These two ecosystems serve as relevant settings in which to examine the implications of translating and integrating design thinking in the multi-stakeholder context of public sector digital transformation. Table 2 describes the features of both the partner and learners ecosystems, detailing the study's methodology from ecosystem descriptions to the collection and analysis of data, and summarising the key insights obtained.

Table 2. Study methodology: ecosystem description, data gathered and insights derived.

	Partner ecosystem	Participant ecosystem
Description	The partner ecosystem consists of a multidisciplinary and multi-operational group of collaborators responsible for designing and executing the training program. These partners collectively form a multidisciplinary and multi-operational ecosystem actively involved in shaping the program's content and management.	The participant ecosystem is constituted by the learners of the training programs, including a range of stakeholders such as start-ups, scale-ups, representatives from the public administration, and governmental actors. These learners, engaged in these training programs, collectively establish multi-stakeholder ecosystems in which translational design activities are put in place.
Research technique	Participant observation with complete participation: The researchers are fully integrated into the population studied being part of the partner ecosystem. The risk of losing objectivity is overcome through the engagement of multiple researchers.	Participant observation with moderate participation: The researchers maintain a balance between insider and outsider roles, allowing a combination of involvement and necessary detachment to remain objective.
Collection method	Primary data collection. Data is collected through direct involvement in the project as a member of the partner ecosystem. Data gathered with observations are translated into insights and are documented in research notes.	Primary data collection. Data is directly collected from direct interactions with the members of the learners ecosystem, with findings and observations systematically noted by the researchers, in the shape of research notes.
Source of data	<ol style="list-style-type: none"> 1. Discussion and collective participation during the design and delivery of the training programme 2. Direct observations of partner meetings, interactions, and collaborative activities can provide insights into the governance models and the roles of design thinking within the partner ecosystem 3. Analysis of organisational structure, hierarchy, and procedures observed by the group 	<ol style="list-style-type: none"> 1. Active participation and discussion in lectures, outcomes of hands-on activities as proofs of successful knowledge transfer 2. Insights from these different sessions 3. Feedback and critical elaborations collected through direct interaction or/and evaluation modules
Insights from data	Effectiveness of collaboration, governance models, roles of design thinking, the extent of design thinking integration, challenges, and success factors within the partner ecosystem influence the success of the training program and its potential for transferring design methodologies to other domains.	Extent to which the training provided turned into graspable and actionable learning, proving the absorption and ability to put in place and replicate the approach proposed. It provides valuable insights to feed current reflection on effective transitions of design thinking in other fields design methodologies transferability.

To address the outlined research questions, this study applies an analytical framework consisting of four core dimensions derived from the literature review (Table 3). The data obtained from both ecosystems are triangulated with existing knowledge, enabling the exploration of significant connections, patterns, and insights in this domain, exploring the nuanced dynamics and potential impacts nurtured within the multi-stakeholder interactions in the two different ecosystems. The first involves interactions among partners responsible for conceiving, designing and delivering the training program. The second category delves into the dynamics among participants in the training itself.

Table 3. Study analytical framework: domains, descriptors, relation to RQs and alignment with relevant literature references.

Domain	Descriptor	Relation to RQ	Reference
1 Governance models	The different governance models adopted within the two typologies of ecosystems. It seeks to identify how governance structures impact the implementation and success of design thinking in training programs. This includes understanding which governance models are more conducive to fostering innovation and effective learning.	RQ1: This domain explores how different governance models affect the adoption and implementation of design thinking and stakeholder engagement strategies, thus informing effective translation into digital transformation. Additionally, it sheds light on how governance structures facilitate or hinder the operationalisation of design thinking in complex multi-stakeholder ecosystems.	Carayannis & Campbell, 2010; Rishipal, 2014; Alvarenga et al., 2020; Gong & Ribiere, 2021; Kouroubali & Katehakis, 2019; Mazzucato & Kattel, 2020; Ramaswamy 2009; Mastio et al., 2019; Deserti and Rizzo 2014
2 Mindsets and attitudes toward design thinking	The mindset and attitudes of stakeholders within each ecosystem regarding design thinking. It observes how the perception of design thinking affects its integration into training programs and its influence on the development of innovative solutions.	RQ1: This domain investigates the critical contextual factors of stakeholders' mindsets and attitudes towards design thinking and their effect on its adoption and integration. RQ2: This domain aids in understanding the approaches, mechanisms, and strategies required for effective translation into digital transformation and operationalisation in multi-stakeholder ecosystems, being aligned with public sector goals.	Schweitzer et al. 2015; Fisher & Gamman, 2018; Lewis et al., 2020; Lehtinen & Aaltonen, 2020; Deserti & Rizzo, 2014; Norman et al., 2021; Verhoef et al., 2021
3 Roles of design thinking	The roles that design thinking assumes within the ecosystems. This includes identifying whether design thinking is primarily seen as a tool for problem-solving, a mindset shift, or a comprehensive approach to public sector digital transformation.	RQ2: This domain assists in identifying the various roles design thinking assumes within ecosystems, providing insights into transitioning it from a transactional to a strategic role.	Lewis et al., 2020; Norman et al., 2021; Fisher & Gamman, 2018; Hornbuckle, 2022, Huang & Hands, 2022; Ramaswamy 2009; Sanders & Stappers, 2008
4 Degree of design thinking penetration	The extent to which design thinking is integrated into the partner ecosystems. It observes how the degree of penetration, such as whether design thinking is deeply embedded in the organisational culture or used on a more superficial level.	RQ1: This domain observes how the depth of design thinking integration/penetration in ecosystems aligns with strategies to ensure effective translation into the organisation practices.	Beckman & Barry, 2007; Dzombak & Beckman, 2020; Gruber et al., 2015; Ramlau, 2010; Verhoef et al., 2021; Kouroubali et al., 2019; Kuziemski et al., 2022

3. Results

Under the premise that translational research presents ongoing challenges in its operationalisation (Norman et al., 2021), this section delves into the dynamics emerging from the integration of design thinking and stakeholder engagement within multi-stakeholder ecosys-

tems, catalysed by the complexity of moving in a quadruple-helix contexts. Across the identified analytical dimensions, this section explores how the different ecosystem analysed reacted to the attempt of overcoming organisational and disciplinary boundaries to foster effective collaboration among stakeholders.

3.1 Governance models

This domain explores how different governance models facilitate or hinder the integration of design thinking and stakeholder engagement strategies, thus influencing their effective translation into public sector digital transformation. The adoption of design thinking requires indeed a strategic shift that goes beyond conventional organisational boundaries, fostering more dynamic collaborations among stakeholders from academia, industry, government, and civil society.

In **partner ecosystems**, governance models play a pivotal role in shaping the reception and integration of design thinking methodologies for steering digital transformation. When the design research team takes on a co-leadership role within the partner ecosystem, design thinking becomes the central approach for delivering program content. This approach extends its impact throughout various dimensions of the program, including strategic alignment, content management, and pedagogical methods. It not only informs the theoretical content but also guides the approach to experimentation, embedding design thinking principles into the knowledge imparted, the methodologies applied, and the overall approach to public sector digital transformation. Design thinking is seen as a pervasive thinking methodology woven throughout the entire program, nurturing a transformative mindset shift among participants.

Ecosystems characterised by flat governance structures, as observed in the leading board of the Master in AI for Public Services (Case 1) and the coordination teams of the two masters at POLIMI GSoM (Case 2), demonstrate a higher receptiveness to and alignment with design thinking. These structures, inclined towards flexibility and adaptability, have a more favourable and open mindset to cross-disciplinary collaboration and experimentation. Such ecosystems demonstrate an attitude to strategically include design thinking in their planning, tailoring it to specific needs rather than just translating it to their context. Consequently, the design input becomes evident in the articulation of specific program objectives, the definition of trainees' expected knowledge and competencies, and the framework for tracking outcomes and assessing the fulfilment of program objectives and competency requirements. This integration transforms how digital transformation is approached: embracing more human-centred perspectives. Moreover, fluid exchanges of knowledge among diverse stakeholders emerge as a valuable asset, essential for effectively incorporating design thinking into other settings.

Conversely, partner ecosystems with vertical governance show a more vertical implementation of the approach and methodology. In Case 3, the program is established by a central team that outlines the curriculum and incorporates external contributions for the specific topics to address. In this case, the team responsible for establishing the program lacked a

background in design thinking and outlined the program by incorporating very localised design thinking contributions. Driven by strategic goals, the ecosystem is not engaged in co-designing the curriculum but rather is attributed with the responsibility of specific activities in a siloed manner. The limits of this approach was evident when participants noted a disconnect between the design thinking modules and the rest of the curriculum, as reflected in post-program feedback sessions where they expressed a desire for more integrated and holistic application of design thinking principles. This experience proves that resistance increases when design thinking is perceived as a distinct subject rather than being seamlessly integrated as a pervasive methodology throughout the entire program. It is noted that partners with more rigid mindsets are more challenged to recognise the value of revising established paradigms. A similar barrier emerged in the initial stages of Case 1 but has been promptly addressed and overcome through joint modules aimed to bridge the gap between traditional approaches and the potential of design thinking.

Consequently, contextual factors clearly influence the operationalisation of design thinking in multi-stakeholder ecosystems. Flat governance structures facilitate a more integrated and strategic use of design thinking by promoting collaborative, cross-disciplinary engagement and tailored application. While ecosystem partners in flat governance structures actively engage in a co-evolution process to identify innovative curriculum design approaches. Conversely, ecosystems characterised by more compartmentalised and siloed approaches tend to reflect a similar mindset in structuring the program. In such instances, there is a convergence with design thinking, but a significant lack of comprehensive integration is observed, therefore impacting the way in which digital transformation is addressed in the programmes.

In the context of the **participant ecosystem**, the cases show how governance models within the organisations in which participants operate significantly influence their capacity to adopt design thinking. Notably, differences emerged based on whether the participant organisations are businesses, public sector administrations, or NGOs. The study showed that, apart from some exceptions, business entities with vertical governance structure are observed to constrain the organisation's openness to design thinking and stakeholder engagement, echoing challenges in knowledge sharing attributed to entrenched power dynamics and bureaucratic constraints. Differently, most NGOs demonstrated a more horizontal and flexible governance model, which supported a more adaptable and open mindset towards design thinking practices. Other patterns are observed in startups. Despite their agile structures, the technology focus often distanced them from design thinking and stakeholder engagement practices, requiring a more longitudinal approach to prove the benefits of embedding design thinking practices. Interestingly, the public sector administrations from the cases presented mixed governance structures, with varying degrees of verticality. An accurate analysis of their behaviours, revealed that they already apply design thinking and stakeholder engagement, even though with limitations and without labelling them as such.

The case studies underscores a clear dichotomy: participants from organisations featuring siloed mentalities encounter significant barriers in adopting design thinking and stakeholder

engagement practices. This was particularly evident in the absence of pre-existing collaborative norms that could facilitate interactions among stakeholders across the triple or quintuple helix model. On the other hand, organisations with a history of participatory practices exhibited a readiness and openness to adopt design thinking more seamlessly. Particularly organisations with inherently flexible and horizontal governance structures demonstrated to require minimal adaptation in their mindset to effectively implement design thinking, being already prone to collaboration. Ultimately, more flat and strategic-oriented governance models tend to favour a successful integration of design thinking in their activities, fostering innovation and organisational learning (Elliott, 2020; Hallensleben et al., 2015). To various extents, the governance also affects the knowledge-sharing culture, significantly influencing how information and expertise are disseminated. In flat organisational structures, open communication is often fostered, promoting the sharing of knowledge among employees of different levels (Rishipal, 2014, p. 58).

The contrast in the impact of governance models underlines the fundamental role of governance structures in influencing readiness and adaptability to design thinking methodologies.

3.2 Mindsets and attitudes toward design thinking

The mindset and attitudes of stakeholders within each ecosystem significantly influence their perception of design thinking and, consequently, its integration into training programs and its impact on innovative solution development.

Within **partner ecosystems** where design thinking and stakeholder engagement methodologies are highly valued, these approaches seamlessly integrate into partners' operational methods, forming the foundation of their collaborative approach. The Master in AI for Public Services (Case 1) and of the Executive masters on public sector innovation (Case 2) were explicitly conceived through a co-creation and co-design approach, showcasing a shared understanding and effective multi-stakeholder collaboration within the ecosystem (Deserti et al., 2022). Additional actors are engaged to broaden possibilities and bring relevant experiences into the ecosystem. Conversely, the absence of design expertise in the program development team of the training program for GovTech ecosystem (Case 3) caused preconceived and sometimes biased views about design thinking, confining its application to specific sections or moments of the learning program. This leads to structured and linear implementation, reminiscent of other efficiency-focused methodologies deeply rooted in their mindset. This rigidity hinders the comprehensive integration of design thinking and its impact on the program's objectives.

A similar pattern emerged within the **participant ecosystem**, where existing mindsets and attitudes to collaboration significantly influenced the understanding and application of design thinking. Participants with limited or no prior exposure to this approach often struggled to grasp the benefits of an open-ended, divergent approach that later converges. . For instance, in Cases 1 and 2, hands-on experimentations are put in place to allow participants to directly experience the benefits of participatory practices. They frequently exhibited apprehension about encountering and facing failure, which limits experimentation and hampers

the stakeholder engagement process. These participants typically enforced a rigid and linear application of design thinking, hindering its benefits. To address this, all the training programs had to put in place specific moments for discussing with participants about their first-hand benefits derived from the application of participatory practices. This paved the way for discussing how to better and more broadly integrate design thinking in the overall process. On the contrary, the familiarity with informal, open-ended, and adaptable approaches seems a discriminate in facilitating the rapid adoption of design thinking principles and stakeholder engagement practices. This condition is often more prominent in organisations such as NGOs and public sector representatives who are used to varying degrees of interaction with social actors. NGOs often value and prioritise community engagement and collaborative practices, while public sector representatives may be more attuned to nuances of stakeholder engagement depending on exposure from their work setting. These previous conditions significantly contribute to the readiness and openness toward adopting design thinking and stakeholder engagement, enhancing the effective implementation of digital transformation processes. In these cases, no significant mindset adjustments are necessary. Instead, there is often a tendency to shift towards more formalised and integrated approaches. These participants frequently share knowledge and methodologies from their respective disciplines, recognising the broader value of contributing to the ecosystem's cultural, social, and economic growth.

3.3 Roles of design thinking

The role that design thinking assumes within the ecosystems. This includes identifying whether design thinking is primarily seen as a tool for problem-solving, a mindset shift, or a comprehensive approach to public sector digital transformation. The specific manner in which design thinking is perceived and operationalized within an ecosystem profoundly influences its integration into training curriculum and its conveyance to participants, subsequently shaping their perceptions and understanding of design thinking.

The framing of design thinking and the agency given in the partner ecosystem significantly influences both its inclusion in the training curriculum and how it is presented to participants. In **partner ecosystems** two approaches to incorporating design thinking and stakeholder engagement in the training program emerge: one is strategic, the other is operational. When design thinking is given a **strategic role**, it deeply influences curriculum design, pedagogical approaches, and participant engagement. In Cases 1 and 2, the training programs envisioned by the mixed leading teams led to a blend of pedagogical dimensions featuring a combination of frontal lectures and project-based activities that encompass all four dimensions of learning: theoretical, experiential, active, and observational.

This integration of design thinking within the partner ecosystem, produces a specific translation into the **participant ecosystem**. Design becomes the overall approach to complex issues, and is implemented strategically, being translated by the learners across the two dimensions of how to address a challenge and extends into the operational aspects of their work. Here, the recognition of such a role positions design thinking as a critical component

throughout the entire process of driving public sector digital transformation, emphasising a human-centred approach and stakeholder involvement at every stage, from analysing the context and stakeholder needs to solution development and testing. Design thinking tools, such as the AI4GOV toolkit (miro.com/miroverse/ai4gov-toolkit) and the GovTech reusable portfolio (miro.com/miroverse/govtech-reusable-portfolio-template), are developed and employed to aid participants in operationalising theoretical principles during their hands-on activities. These tools aid participants to adopt a human-centred and systemic perspective, operationalising theoretical principles when developing solutions for the digitalization of public services and enhancing service delivery. In Cases 1 and 2 as instances where design thinking is strategically embedded and there is more extensive exposure to its practices, participants demonstrated a greater capacity for applying these principles and tools to complex public sector challenges, indicating a deeper, more systemic integration of design thinking into their activities and planning. Although limited, evidence has been gathered regarding the impact of transparent and synergic strategy at the partner ecosystem level, demonstrating to recognise and value the contribution of the design integration. When this ecosystem showcases a deep appreciation for design thinking and stakeholder engagement for addressing digital transformation, the study suggests the potential activation of a mimetic effect within the participant ecosystem. Here, participants observe positive interactions and integration in the higher ecosystem and seek to translate these behaviours within their own ecosystem.

Conversely, in **partner ecosystems** where design thinking is assigned a primarily **operational role**, as in Case 3, its application winds up compartmentalised within specific slots of the training program. Despite presenting its benefits in developing digital solutions, emphasising the advantages of a user-centric approach with awareness of the cultural context and stakeholder engagement, the limited experimentation hinders understanding, its influence is limited to specific aspects of the training, often viewed by participants as a tool rather than an overarching approach, also reserved for particular occasions. This often results in the limited application of design thinking on the **participant ecosystem** side as a mere problem-solving and solution-development tool, rather than a comprehensive approach. In this case, participants tend to approach it with a narrower perspective than its full potential allows. The variation in how design thinking is positioned and practised within these ecosystems significantly impacts its role and ability to influence public sector digital transformation.

This strategic vs. operational dichotomy in design thinking's role within ecosystems significantly impacts its effectiveness in driving public sector digital transformation. When integrated as a core strategy, it fosters a more profound, systemic application, influencing the extent to which the solutions developed meet real needs and are perceived as desirable rather than imposed. In contrast, when its role is limited or segmented, the opportunity to leverage design thinking as a transformative force is diminished, affecting the depth and breadth of its application in addressing public sector challenges and hence orienting how digital transformation is conceived and digital services are delivered.

3.4 Degree of design thinking penetration

The degree of design thinking penetration is linked to the depth of its integration within an organisation, reflecting the extent to which design thinking is ingrained in the organisational culture and its application within partner ecosystems. The spectrum of design thinking penetration spans from absence to profound embedment across the multiple levels of the organisation. Namely, from management strategies, encompassing stages of contributing to the functional and aesthetic aspects of products or services, advancing into problem-solving, and generating innovative solutions.

The degree of design thinking penetration within **partner ecosystems** depends largely on the roles attributed to design. When it is recognised as a co-leading role in the ecosystem, its involvement and influence are significant. In the cases of the Master in AI for Public Services (Case 1) and of the Executive masters on public sector innovation (Case 2), Design thinking becomes an intrinsic part of the ecosystem's mindset, penetrating deeply into its structure and being translated into its overall behaviours. Within the training program, this level of penetration is a result of the active role design researchers play in shaping the overall curricula and in particular its activities, course content organisation, and teaching methods, including a mix of project-based and hands-on experimentation. This is a holistic integration that influences the program at all levels and demonstrates the comprehensive integration of design thinking principles. As such, the role of design thinking extends beyond mere tools and methods, shaping the mindset and culture of the ecosystem as a whole, fostering a design-centric approach to innovation. This strategic integration results in a robust and harmonised learning environment. On the contrary, when design is relegated to a siloed partner status, the degree of design thinking penetration is limited. Feedback and outputs of the Training program for GovTech ecosystem (Case 3) reveal it is perceived more as a separate entity, not fundamentally influencing the core aspects of the program. This limited penetration stems from a lack of influence on program decisions and a lack of authority in shaping its direction.

In the **participant ecosystem**, the degree of design thinking penetration refers to the extent to which participants internalise and apply design thinking principles and practices. It regards how deeply they integrate design thinking into their mindset and approach. This manifestation varies among participants based on their initial mindsets and attitudes toward design thinking. The observation shows that participants with an open and adaptable mindset towards experimentation, or those already familiar with participatory practices and user consultations, tend to be more receptive to design thinking. For them, design thinking naturally integrates into their daily lexicon, shaping their approach to both challenges and opportunities. Conversely, participants with pre-existing rigid mindsets, often stemming from a vertically oriented focus in their background activities and a closed-off attitude towards interdisciplinary collaboration, typically demonstrate a more limited penetration of design thinking concepts. Design thinking was perceived as a tool or approach, not fundamentally altering their way of thinking to bring more desirable innovation in the public sector. Their

application of design thinking remains superficial, hindering the potential transformative impact of its core principles. Overall, the penetration level is contingent on participant's initial attitudes, openness to change, and willingness to embrace design thinking as a comprehensive approach to digital transformation.

4. Discussion

The findings so far elaborated present several crucial insights regarding the translation and integration of design thinking in the context of public sector digital transformation, which is influenced by various factors, notably governance models, mindsets and attitudes, and the specific roles assigned to design thinking within ecosystems. These elements are pivotal in shaping strategies for effective translation into digital transformation, addressing the article's primary research questions.

The governance model adopted within multi-stakeholder ecosystems plays a crucial role in shaping a successful translation of design thinking to inform and orient in digital transformation. Ecosystems with flat governance models demonstrate a propensity for a strategic application of design thinking, viewing it as an indispensable methodology in the innovation process. In these contexts, the integration process often nurtures a collaborative, co-evolutionary journey, built upon a holistic and systemic approach. In this context, principles, methodologies, and tools of design thinking are swiftly adopted and incorporated. Conversely, more vertically structured ecosystems tend to confine design thinking scope to specific segments, relegating it to an operational role. Such a compartmentalised approach hinders the translational practice and limits its transformative potential. Moreover, the mindset and attitudes of stakeholders within these ecosystems largely influence their perception of design thinking and, subsequently, its translation and integration into different contexts. The way design thinking is perceived within multi-stakeholder ecosystems profoundly impacts its role, whether as a problem-solving tool, a mindset shift, or a comprehensive approach to digital transformation for the public sector. In ecosystems where it is strategically and horizontally integrated, it becomes a central approach to addressing complex issues, starting from the problem-setting, conducted with an human-centred approach and stakeholder engagement, and then being integrated in the overall design process when needed. Conversely, when design thinking is relegated to an operational role, its application is limited to specific moments of the development and is often reconducted to the use of specific tools and methods, without however embracing its fundamental principles. This distinction highlights the need to consider design thinking as a strategic approach to public sector digital transformation rather than a mere solution-development approach.

Beyond the complexities posed by governance models, mindsets, and the roles of design thinking in multi-stakeholder ecosystems, especially participants with a technical and hard-science background demonstrated challenges and resistance in fully grasping the benefits of an open, iterative approach and in engaging with stakeholders as experts of their needs. This situation was worsened by different terminologies and the inclination towards technology-driven methods for crafting innovative digital solutions, often under the misconception that

digital advancements should primarily be technology-led. This highlighted a need within the training programs to actively work towards breaking down existing rigid mental models and fostering openness to user and stakeholder input. Considerable effort was expended across the training programs to break down entrenched mindsets and encourage openness towards considering users and stakeholders as experts. Especially experimental sessions demonstrated that iteration and the refinement of ideas and prototypes is essential, underscoring their function in achieving digital solutions that are not just technologically advanced but also relevant, user-friendly, and desirable for their final users. Moreover, language barriers have emerged as a pervasive challenge, contributing to misunderstandings and complicating an effective adoption of the approach. The main issue regards the presence of different and non-shared vocabularies. The different stakeholders in the ecosystem joined the activities with their unique backgrounds, expertise, and experiences. These diverse perspectives often come with the use of specific terminologies and jargon that tend not to be universally understood. As a result, individuals with different backgrounds adopt the same terminology but assign different meanings to it, leading to confusion, misinterpretation, and often frictions in communications, which can be particularly detrimental in collaborative environments. The consequences of such dynamics extend beyond the communication dimension. If not promptly identified and addressed, discrepancies in terminology and meanings can lead to confusion, disagreement and even conflicts among stakeholders, eroding trust and cooperation within the ecosystem.

Additionally, interactions within different actors of the multi-stakeholder ecosystems revealed that certain design thinking and stakeholder engagement practices organically found their way into the processes of such organisations. However, these practices were not initially recognised as such. They unfolded naturally, often informally, driven by insights of individuals. Just upon closer examination and explorations these practices could be attributed to design thinking principles and terminology. This retrospective recognition highlights the latent potential within these ecosystems and underscores the need for greater awareness and education regarding design thinking and stakeholder engagement, as it opens the door to unlocking valuable insights and innovation through intentional application of these approaches.

The translational approach on training programs presented in this study aligns seamlessly with Hanelt and colleagues (2020) typology of digital transformation perspectives, extending the relevance of design thinking support and stakeholder engagement benefits as a supportive approach for digital transformation and innovation across its four quadrants – compartmentalised adaptation, holistic co-evolution, technology impact, and systemic shift.

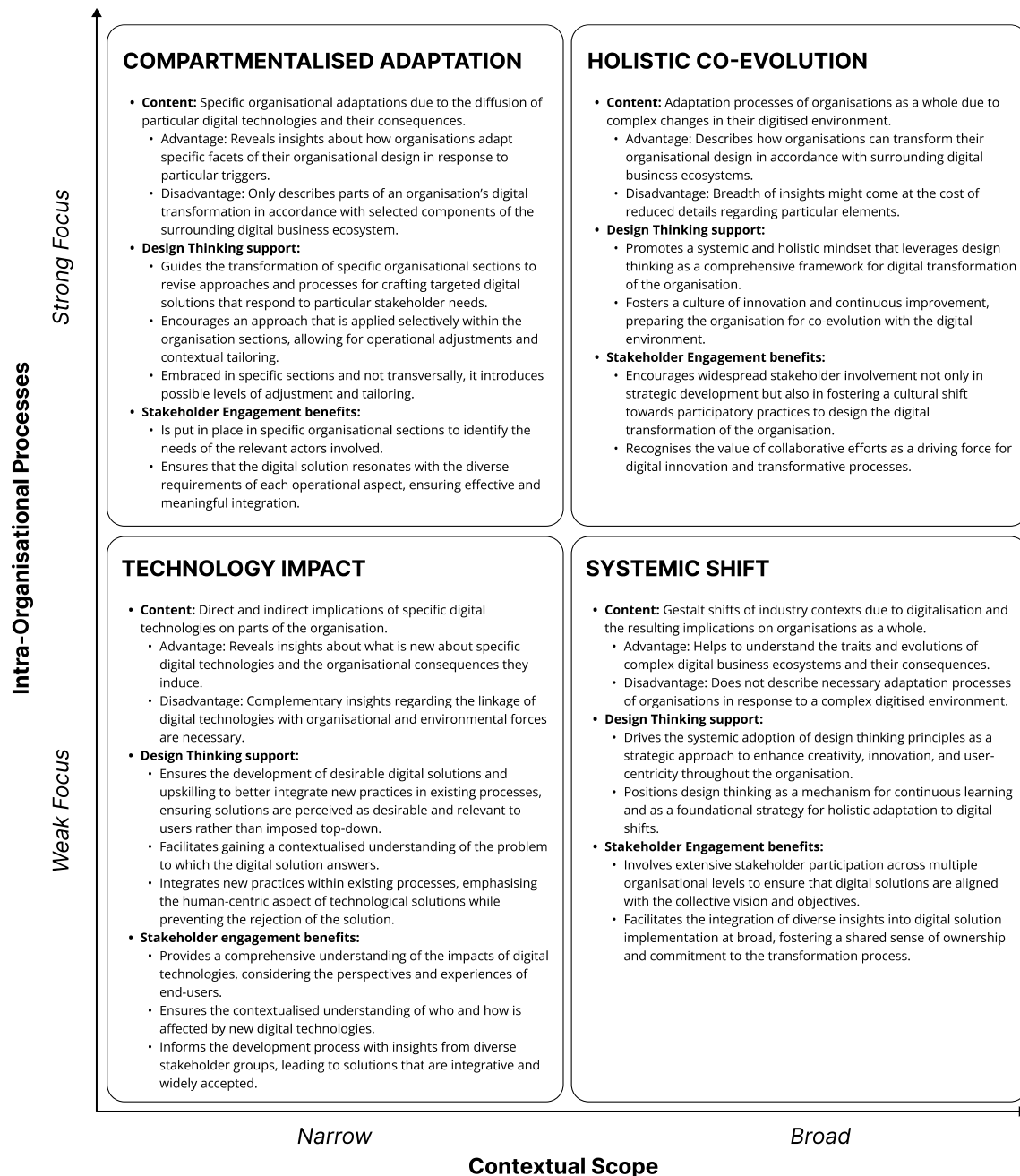


Figure 2. Elaboration of typology of digital transformation perspectives by Hanelt and colleagues (2020, p. 1174), integrating the role of design thinking support and stakeholder engagement benefits across its four quadrants.

By grounding digital transformation initiatives in design thinking and stakeholder engagement practices, this paper encourages an innovation pathway that is inherently user-centred and inclusive of the pluralistic view of stakeholders. This approach ensures that digital transformation evolves embedding real needs and expectations in its processes, fostering innovation that resonates with users, thus mitigating the risk of digital initiatives being perceived as

top-down impositions. Thus, the translation of design thinking aligns with the idea that innovation must be both integrative and responsive, ensuring that digital transformation is not only technologically advanced but also socio-culturally desirable and adopted as a natural progression rather than an enforced change.

5. Conclusions

In the landscape of public sector digital transformation, the interplay between design thinking and multi-stakeholder, multi-disciplinary ecosystems reveals both great potential and challenges to drive innovation and enhance efficiency while keeping citizens at the centre. This study has uncovered a range of insights, shedding light on various facets of this complex interplay.

A significant finding regards the advantages of applying a co-evolution logic, which prioritises a holistic and systemic translation of design within the training program to steer more desirable and effective digital innovation for the public sector. Limited yet valuable evidence suggests that a transparent and synergic orientation to design thinking within partner ecosystems can trigger a mimetic effect within the participant ecosystem. This effect unfolds with participants observing and adopting positive behaviours and integration patterns from the higher ecosystem. Still, further exploration is needed to understand the influence of this observation.

The integration of design thinking, particularly through practical experimentation, has proven crucial in reinforcing or transforming the perspectives of partners and participants within the training program. Especially protracted practical experimentation – such as in training programs with multiple project works – has largely contributed to breaking down silos and hierarchical barriers, facilitating productive interdisciplinary collaboration. It has also generated innovative approaches that combine traditionally disparate perspectives, leading to more systematic strategies. Furthermore, whether stakeholders and citizens engage in project works brings significant benefits such as firsthand understanding of multifaceted needs, it also introduces complexities due to including additional competencies, languages, and viewpoints.

Then, translating design thinking into non-design organisations with established mindsets carries significant implications. For instance, business actors are required to shift from rooted technology-driven or market-pull orientations to embrace value-based and designed innovation. Similarly, government entities are asked to substantial process revision to better adhere with the such approach to innovation. But resistance to change can hinder these shifts.

To conclude, the study acknowledges that the evidence collected is still limited, relying on data from three training programs, with the longest in place for three years. This limitation implies that while some insights have been gained, there is still a need for more extensive data and research. Future steps concern developing a comprehensive assessment framework for gathering specific data on the results of the translational intervention, beyond the

current assessments that mainly looks into topic assimilation and training activities relevance.

6. References

- Alvarenga, A., Matos, F., Godina, R., & C. O. Matias, J. (2020). Digital Transformation and Knowledge Management in the Public Sector. *Sustainability*, 12(14). <https://doi.org/10.3390/su12145824>
- Amankwah-Amoah, J., Khan, Z., Wood, G., & Knight, G. (2021). COVID-19 and digitalization: The great acceleration. *Journal of Business Research*, 136, 602–611. <https://doi.org/10.1016/j.jbusres.2021.08.011>
- Beckman, S. L., & Barry, M. (2007). Innovation as a Learning Process: Embedding Design Thinking. *California Management Review*, 50(1), 25–56. <https://doi.org/10.2307/41166415>
- Bharosa, N. (2022). The rise of GovTech: Trojan horse or blessing in disguise? A research agenda. *Government Information Quarterly*, 39(3), 101692. <https://doi.org/10.1016/j.giq.2022.101692>
- Carayannis, E. G., & Campbell, D. F. J. (2010). Triple Helix, Quadruple Helix and Quintuple Helix and How Do Knowledge, Innovation and the Environment Relate To Each Other?: A Proposed Framework for a Trans-disciplinary Analysis of Sustainable Development and Social Ecology. *International Journal of Social Ecology and Sustainable Development (IJESD)*, 1(1), 41–69. <https://Econ-Papers.repec.org/RePEc:igg:jised0:v:1:y:2010:i:1:p:41-69>
- Correani, A., De Massis, A., Frattini, F., Petruzzelli, A. M., & Natalicchio, A. (2020). Implementing a Digital Strategy: Learning from the Experience of Three Digital Transformation Projects. *California Management Review*, 62(4), 37–56. <https://doi.org/10.1177/0008125620934864>
- Datta, P., Walker, L., & Amarilli, F. (2020). Digital transformation: Learning from Italy's public administration. *Journal of Information Technology Teaching Cases*, 10(2), 54–71. <https://doi.org/10.1177/2043886920910437>
- Deserti, A., Real, M., & Schmittinger, F. (2022). Co-creation for Responsible Research and Innovation: Experimenting with Design Methods and Tools. *Springer Nature*. <https://doi.org/10.1007/978-3-030-78733-2>
- Deserti, A., & Rizzo, F. (2014). Design and Organizational Change in the Public Sector. *Design Management Journal*, 9(1), 85–97. <https://doi.org/10.1111/dmj.12013>
- Dzombak, R., & Beckman, S. (2020). Unpacking capabilities underlying design (thinking) process. *International Journal of Engineering Education*, 36(2), 574–585. <https://escholarship.org/uc/item/2jr445h8>
- Elliott, I. C. (2020). Organisational learning and change in a public sector context. *Teaching Public Administration*, 38(3), 270–283. <https://doi.org/10.1177/0144739420903783>
- Eskerod, P., & Huemann, M. (2016). Managing for stakeholders. In R. Turner (Ed.), *Gower handbook of project management* (pp. 247–262). Routledge.
- Filer, T. (2019). Thinking about GovTech A Brief Guide for Policymakers. Bennett Institute for Public Policy. University of Cambridge. https://www.bennettinstitute.cam.ac.uk/wp-content/uploads/2020/12/Thinking_about_Govtech_Jan_2019_online-1.pdf
- Fisher, T., & Gamman, L. (2018). *Tricky Design: The Ethics of Things*. Bloomsbury Publishing.
- Gabryelczyk, R. (2020). Has COVID-19 Accelerated Digital Transformation? Initial Lessons Learned for Public Administrations. *Information Systems Management*, 37(4), 303–309. <https://doi.org/10.1080/10580530.2020.1820633>
- Gong, C., & Ribiere, V. (2021). Developing a unified definition of digital transformation. *Technovation*, 102, 102217. <https://doi.org/10.1016/j.technovation.2020.102217>

- Gong, Y., Yang, J., & Shi, X. (2020). Towards a comprehensive understanding of digital transformation in government: Analysis of flexibility and enterprise architecture. *Government Information Quarterly*, 37(3), 101487. <https://doi.org/10.1016/j.giq.2020.101487>
- Granstrand, O., & Holgersson, M. (2020). Innovation ecosystems: A conceptual review and a new definition. *Technovation*, 90–91, 102098. <https://doi.org/10.1016/j.technovation.2019.102098>
- Gruber, M., de Leon, N., George, G., & Thompson, P. (2015). Managing by Design. *Academy of Management Journal*, 58(1), 1–7. <https://doi.org/10.5465/amj.2015.4001>
- Hallensleben, T., Wörlén, M., & Moldaschl, M. (2015). Institutional and personal reflexivity in processes of organisational learning. *International Journal of Work Innovation*, 1(2), 185–207. <https://doi.org/10.1504/IJWI.2015.071192>
- Hanelt, A., Bohnsack, R., Marz, D., & Antunes Marante, C. (2020). A Systematic Review of the Literature on Digital Transformation: Insights and Implications for Strategy and Organizational Change. *Journal of Management Studies*, 58(5), 1159–1197. <https://doi.org/10.1111/joms.12639>
- Hornbuckle, R. (2022). Project proximities: A meta review of how design addresses distance in complex collaborations. In D. Lockton, S. Lenzi, P. Hekkert, A. Oak, J. Sádaba, & P. Lloyd (Eds.), *DRS 2022*. Design Research Society. <https://doi.org/10.21606/drs.2022.677>
- Huang, Y., & Hands, D. (2022). Organisational Complexity and Change by Design. In Y. Huang & D. Hands (Eds.), *Design Thinking for New Business Contexts: A Critical Analysis through Theory and Practice* (pp. 53–76). Springer International Publishing. https://doi.org/10.1007/978-3-030-94206-9_4
- Khan, A., & Krishnan, S. (2021). Citizen engagement in co-creation of e-government services: A process theory view from a meta-synthesis approach. *Internet Research*, 31(4), 1318–1375. <https://doi.org/10.1108/INTR-03-2020-0116>
- Kouroubali, A., & Katehakis, D. G. (2019). The new European interoperability framework as a facilitator of digital transformation for citizen empowerment. *Journal of Biomedical Informatics*, 94, 103166. <https://doi.org/10.1016/j.jbi.2019.103166>
- Krimmer, R., Kalvet, T., Toots, M., Cepilovs, A., & Tambouris, E. (2017). Exploring and Demonstrating the Once-Only Principle: A European Perspective. *Proceedings of the 18th Annual International Conference on Digital Government Research*, 546–551. <https://doi.org/10.1145/3085228.3085235>
- Kuziemski, M., Ulrich, P., Mergel, I., & Martinez, A. (2022). *GovTech Practices in the EU* (JRC Research Reports JRC128247). Publications Office of the European Union. <https://doi.org/10.2760/700544>
- Lehtinen, J., & Aaltonen, K. (2020). Organizing external stakeholder engagement in inter-organizational projects: Opening the black box. *International Journal of Project Management*, 38(2), 85–98. <https://doi.org/10.1016/j.ijproman.2019.12.001>
- Lewis, J. M., McGann, M., & Blomkamp, E. (2020). When design meets power: Design thinking, public sector innovation and the politics of policymaking. *Policy & Politics*, 48(1), 111–130. <https://doi.org/10.1332/030557319X15579230420081>
- Mastio, E., Chew, E., & Dovey, K. A. (2019). The learning organization as a context for value co-creation. *The Learning Organization*, 27(4), 291–303. <https://doi.org/10.1108/TLO-12-2018-0219>
- Mazzucato, M., & Kattel, R. (2020). COVID-19 and public-sector capacity. *Oxford Review of Economic Policy*, 36(Supplement_1), S256–S269. <https://doi.org/10.1093/oxrep/graa031>
- Mbeba, R. D. (2014). Essence of a Flexible Organisational Culture to Influence Change in the 21st Century Organisation. *Mediterranean Journal of Social Sciences*, 5(7), 663. <https://www.richtmann.org/journal/index.php/mjss/article/view/2527>

- Mergel, I., Ulrich, P., Kuziemski, M., & Martinez, A. (2022). Scoping GovTech dynamics in the EU (JRC128093; JRC Research Reports). Joint Research Centre. <https://publications.jrc.ec.europa.eu/repository/handle/JRC128093>
- Norman, M. K., Hamm, M. E., Schenker, Y., Mayowski, C. A., Hierholzer, W., Rubio, D. M., & Reis, S. E. (2021). Assessing the application of human-centered design to translational research. *Journal of Clinical and Translational Science*, 5(1), e130. Cambridge Core. <https://doi.org/10.1017/cts.2021.794>
- Poole, M. S., & Van de Ven, A. H. (2004). *Handbook of organizational change and innovation*. Oxford University Press.
- Public. (2021). The State of European GovTech. Key Themes and Players in the European GovTech Ecosystem. <https://www.public.io/report-post/the-state-of-european-govtech>
- Ramaswamy, V. (2009). Leading the transformation to co-creation of value. *Strategy & Leadership*, 37(2), 32–37. <https://doi.org/10.1108/10878570910941208>
- Rishipal, D. (2014). Analytical comparison of flat and vertical organizational structures. *European Journal of Business and Management*, 6(36), 56–65.
- Sanders, E. B.-N., & Stappers, P. J. (2008). Co-creation and the new landscapes of design. *CoDesign*, 4(1), 5–18. <https://doi.org/10.1080/15710880701875068>
- Schweitzer, J., Groeger, L., & Sobel, L. (2016). The Design Thinking Mindset: An Assessment of What We Know and What We See in Practice. In *Journal of Design, Business & Society* (Vol. 2, Issue 1, pp. 71–94). Intellect. https://doi.org/10.1386/dbs.2.1.71_1
- Skog, D. A. (2019). The Dynamics of Digital Transformation: The Role of Digital Innovation, Ecosystems and Logics in Fundamental Organizational Change [Doctoral thesis, comprehensive summary, Umeå Universitet]. In *Research reports in informatics* (1–RR-19.01). DiVA. <http://urn.kb.se/resolve?urn=urn:nbn:se:umu:diva-155437>
- Verhoef, P. C., Broekhuizen, T., Bart, Y., Bhattacharya, A., Qi Dong, J., Fabian, N., & Haenlein, M. (2021). Digital transformation: A multidisciplinary reflection and research agenda. *Journal of Business Research*, 122, 889–901. <https://doi.org/10.1016/j.jbusres.2019.09.022>
- Walrave, B., Talmar, M., Podoyntitsyna, K. S., Romme, A. G. L., & Verbong, G. P. J. (2018). A multi-level perspective on innovation ecosystems for path-breaking innovation. *Technological Forecasting and Social Change*, 136, 103–113. <https://doi.org/10.1016/j.techfore.2017.04.011>
- Warner, K. S. R., & Wäger, M. (2019). Building dynamic capabilities for digital transformation: An ongoing process of strategic renewal. *Long Range Planning*, 52(3), 326–349. <https://doi.org/10.1016/j.lrp.2018.12.001>
- Wessel, L., Baiyere, A., Ologeanu-Taddei, R., Cha, J., & Jensen, T. B. (2021). Unpacking the Difference Between Digital Transformation and IT-Enabled Organizational Transformation. *Journal of the Association for Information Systems*, 22(1), 102–129. <https://doi.org/10.17705/1jais.00655>
- Wimmer, M. A., Boneva, R., & di Giacomo, D. (2018). Interoperability Governance: A Definition and Insights from Case Studies in Europe. *Proceedings of the 19th Annual International Conference on Digital Government Research: Governance in the Data Age*. <https://doi.org/10.1145/3209281.3209306>
- Yoshida, M., & Thammetar, T. (2021). Education Between GovTech and Civic Tech. *International Journal of Emerging Technologies in Learning (IJET)*, 16(04), 52–68. <https://doi.org/10.3991/ijet.v16i04.18769>
- Zapata, E. (2021). *Govtech Readiness Assessment Guide*. CAF – Development Bank of Latin America.

About the Authors:

Ilaria Mariani. Ph.D. in Design, Researcher at the Department of Design, Politecnico di Milano. Her background intertwines communication, interaction, and service design. Her research addresses complex interactive systems for communication and design-driven social innovation in the public sector, investigating the ability of design to support processes of digital transformation.

Giulia D'Aleo. Master's degree in Digital & Interaction Design, is a teaching assistant and independent researcher at Politecnico di Milano. Her research interests focus on Digital Transformation processes, Strategic Design and Design for the Public sector.

Marzia Mortati. Ph.D in Design, Associate Professor at Politecnico di Milano, Department of Design. She teaches Service Design, Innovation, and their connection with Artificial Intelligence and the public sector. She is also one of the Executive Directors of the European Academy of Design, and Deputy Director of the International Master in AI for Public Services.

Francesca Rizzo. Ph.D. in Computer Science, Full Professor in Interaction Design and Users Studies, and Rector's delegate for European Research Projects. She researches on the application of Design Thinking in public sector innovation and how co-design triggers organisational changes. She coordinated and partook in many EU projects and authored several national and international publications on the topic.