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Abstract: Digital transformation within local public administration is often conceived as the result of technological advancements, with scarce attention being paid to framing these processes within multi-level organisational settings. Against this background, this article introduces a framework for exploring the different dimensions of digital innovation in the public sector at the urban scale. It proposes conceptual categories that capture digital transformation drivers and mechanisms, encouraging reflections about their capacity to resonate in specific (urban) contexts. After examining frameworks seeking to deconstruct digital transformation in its multiple dimensions, the study proposes a conceptual model and validates it against the result of the literature review. By identifying conceptual categories and their interactions, the study seeks to support a more comprehensive understanding of transformation processes, specifically focusing on public service provision and delivery and their relationship with endogenous and exogenous innovation drivers. At the same time, the study aims to support local public authorities in gaining awareness of their transformative potential and helping them “steer” local digital transformation dynamics.

Keywords: digital transformation; public sector innovation; multi-dimensional framework; organisational change; urban scale



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1. Introduction

1.1. Digital Innovation in the Public Sector

Public sector innovation is essential to cities’ ability to adapt to changing social, political, and technological circumstances [1–3], as it regards “generating new ideas, and implementing them to create value for society either through new or improved processes or services” [4]. At the same time, innovation concerns the ability to face a wide spectrum of challenges. Innovation readiness affects the extent to which local governments act as drivers of change and play an active role in urban transition processes, e.g., in terms of digital transformation, sustainability, and social inclusion. This is certainly salient in times of turmoil characterised by highly mutable and unpredictable interactions with organisational agencies [5]. To shift towards greener, healthier, and more sustainable societies, innovation is increasingly asked to adopt a mission-oriented approach [6]. The concept of “sustainability” has been growingly intertwined with that of “missions”, gaining attention in academic and policy discourse [7,8]. The latter invites a critical reflection on the shared ambition to reinforce the public capacity to embrace a systemic perspective and adaptively respond to fundamental policy challenges related to the three pillars of sustainability: social, economic, and environmental. This perspective is explored through the lens of digital transformation as a comprehensive concept that embeds the three sustainability pillars in a cross-cutting manner. Digital transformation—defined as the “combined effects of several digital innovations bringing about novel actors (and actor constellations), structures, practices, values, and beliefs that change, threaten, replace or complement existing rules

of the game within organizations and fields” [9]—has had a significant impact on the performance and functioning of public organisations, sparking the development of groundbreaking theories on public sector restructuring [10]. For public sector innovation to take place, a mere shift towards digital technologies is not sufficient in the absence of related organisational change. At this historical time, the digital transformation of infrastructures and processes and the change they trigger in the organisation constitute part of a broader condition. As such, digital transformation acts as one of the multiple vectors for digital innovation, contributing to overall public sector innovation.

In this context, several studies have investigated the conditions for innovation in public organisations [1,11–14]. Nevertheless, open questions remain concerning (i) the conceptualisation and specificity of digital innovation in relation to various types of public sector innovation, (ii) the identification of digital innovation determinants [15], and (iii) the role of public services within digital transformation processes. To explore these questions, the study addresses some major challenges framed in the current public sector innovation literature, broadening the unit of analysis beyond the common technological focus.

First, while there is growing consensus that transformation is not determined by technological drivers alone but is highly affected by social and cultural aspects, the conceptualisation of digital transformation in Public Administrations (PAs) often suffers a hyper-tech bias [16]. To partially respond to this limitation, the authors consider organisational and cultural factors impacting on trajectories of digital transformation in cities. Second, despite some exceptions [17], digital transformation is rarely explored in its complexity; nor is its multi-dimensional nature and the critical role of its interrelations with contextual factors in shaping the direction of innovation pathways often acknowledged [18]. This gap also has repercussions on the public sector itself, as it limits self-reflection and the evaluation capacity of public sectors’ performances, being a fundamental premise to enable cities to develop more informed and aware decision-making on digital strategies. Last, a third gap concerns the scale of observation of the digital transformation phenomena. Existing initiatives from large-scale bodies (e.g., OECD, EUROSTAT, JRC, OPSI, and others) represent a national scale, highlighting a comprehensive scarcity of understanding of processes and mechanisms at the local level. In this landscape, citizens’ expectations of governments’ capacity to provide high-value, real-time digital services are advancing, which is also due to digital strategies implemented outside the public sector and by supranational and national agreements. In response to this demand-pull innovation [15], local governments are improving their service delivery to meet the goals of effectiveness, efficiency, transparency, interoperability, and user satisfaction. Consequently, the need has arisen to adopt models able to look at the public sector innovation processes and governance at a different granularity, that of local public administrations. Accordingly, identifying tendencies, continuities, and discontinuities in the process of innovation can serve as a lens for understanding the degree of PAs digital maturity, and their proneness to support innovation strategies and practices. In this respect, this study responds to the need for conceptual and analytical models able to identify digital transformation drivers and mechanisms, as well as to capture their capacity to resonate in specific (urban) contexts.

To answer these gaps, this article zeroes in on public services innovation at the city level, assuming that it can serve as a proxy to analyse the maturity of public digital transformation. In doing so, it looks at both public service provision and delivery. This study contributes to the academic and policy debate by illustrating a conceptual model that identifies conceptual dimensions and specific “objects of observation”. The ambition of the model, developed under the umbrella of the ESPON Project “DIGISER. Digital Innovation in Governance and Public Service Provision”, is fostering a better understanding of the innovation mechanisms of public services, as well as of the gaps affecting their capacity to generate social value in their contexts of reference, setting the conceptual ground for the definition of a consequent coherent analytical framework.

1.2. Digital Transformation in the Public Sector: Existing Frameworks in the Grey and Scientific Literature

Before examining the different attributes associated with digital transformation, it is first necessary to trace the boundaries of the concept. The digital transformation of European industry, societies, and governments is fundamentally reconfiguring the rules of the game from how services are delivered to how knowledge and value are created towards reducing cost and increasing quality, proactiveness, and citizen-centricity [19]. The initial waves that considered the digitisation of services—namely the transition from analogue to digital services—are forerunners of attempts to seek smart, inclusive, and sustainable innovation-led growth [20]. With the intent of impacting the innovation capacity of public organisations in the face of societal challenges [21,22], the dimension of public policy becomes central [23,24]. This study first examines the literature conceptualising digital transformation in the public sector [25], embracing the extensive definition of digital transformation provided by Mergel, Edelmann, and Haug [26] articulated in five propositions, highlighting that it is a continuous process affected by external technological needs and barriers, and shaped in its relationship with stakeholders, requiring frequent adjustments. Alongside this process, a key role is played by iterative learning, which is essential to detect errors and correct them by restructuring organisational practices [27]. Learning opens up a reflection in- and on-action [28], potentially allowing continuous transformation [29] towards better policy making. Among others, learning can contribute to make the institution more flexible, transparent, collaborative, and prone to experiment [30–32] while becoming more aware of the maturity of its digital transformation.

This study examined the most relevant multi-dimensional frameworks in the grey and scientific literature (Table 1) to capture the complex phenomenon of public sector digital transformation in terms of current state, challenges, and opportunities. Recent frameworks with thematic relevance to the research questions were selected. In particular, studies were chosen that explicitly attempted to identify conceptual dimensions capable of conveying the complexity of digital transformation processes.

Table 1. Overview of selected prior research on public sector digital transformation.

ID	Lit.	Ref.	Framework Conceptualisation	Dimensions
01	Grey	[33]	<p>The framework behind the eGovernment Benchmark is meant to assess the performance of online public services. The identification of measurable and comparable dimensions relies on four top-level dimensions comprising multiple sub-indicators that delve into how services are provided online, the transparency and clarity of the public service delivery, the technological enablers exploited, and cross-border accessibility. From the four dimensions, the derived indicators are then aggregated and measured to form the eGovernment Benchmark Index.</p> <p>The sub-dimensions have slightly evolved over the years, showing the progressive attention towards user-centricity.</p>	<p>4 dimensions with sub-dimensions:</p> <ol style="list-style-type: none"> 1. User Centricity <ol style="list-style-type: none"> a. Online availability b. Usability (2020)/User support (2021 onwards) c. Mobile friendliness 2. Transparency <ol style="list-style-type: none"> a. Service delivery b. Public organisations (since 2020) c. Personal data d. Service design (2021 onwards) 3. Key Enablers <ol style="list-style-type: none"> a. eID b. eDocuments c. Authentic sources d. Digital post 4. Cross-Border Mobility (2020) <ol style="list-style-type: none"> a. Cross-border online availability b. Cross-border usability (2020)/Cross-border user support (2021 onwards) c. Cross-border eID d. Cross-border eDocuments

Table 1. Cont.

ID	Lit.	Ref.	Framework Conceptualisation	Dimensions
02	Scientific	[34]	The authors build a holistic framework aimed at assessing the performance of public institutions at different digital transformation stages. The assessment is based on 9 parameters which are used to capture digital transformation by assessing the public institution performances along four Digital Transformation Transition Stages—(i) Silo, (ii) Engaged, (iii) Optimised, (iv) Transformed.	<p>9 dimensions:</p> <ol style="list-style-type: none"> 1. Digital leadership and governance 2. Digital transformation/ICT strategic plan 3. Digital transformation capabilities (Enablers) 4. Institutional reforms and change management 5. Digital infrastructure and applications 6. Compliance with national IT legislation, standards, regulation, and best practices 7. Data infrastructure and strategies 8. Online presence and government digital service 9. Information security and data privacy
03	Grey	[35]	The analytical framework behind the World Bank's Digital Government Readiness Assessment (DGRA) captures the current status and aspirations in digital development and public sector transformation of a country. It measures readiness with regard to the enabling environment through a view that integrates the legal, regulatory, human capital, technology, and safety dimensions of government digitalisation.	<p>8 dimensions:</p> <ol style="list-style-type: none"> 1. Leadership and governance 2. User-centred design 3. Public administration and change management 4. Capabilities, culture, and skills 5. Technology infrastructure 6. Data infrastructure, strategies, and governance 7. Cybersecurity, privacy and resilience 8. Legislation and regulation
04	Grey	[36]	The framework behind the OECD Digital Government Index (DGI) measures the maturity of digital government with a focus on six dimensions as key aspects and four transversal facets which then contribute to composing a composite analytical framework.	<p>6 dimensions:</p> <ol style="list-style-type: none"> 1. Digital by design 2. Data-driven public sector 3. Government as a platform 4. Open by default 5. User-driven approach 6. Proactiveness <p>4 transversal facets:</p> <ol style="list-style-type: none"> 1. Strategic approach 2. Policy levers 3. Implementation 4. Monitoring
05	Grey	[37]	The framework behind the UN e-Government Development Index (EGDI) captures the scope and quality of online public services and their delivery, assessing comprehensive aspects such as the telecommunication infrastructure status and the existing human capacity.	<p>3 indexes and sub-indexes:</p> <ol style="list-style-type: none"> 1. The scope and quality of online services as the Online Service Index (OSI) <ol style="list-style-type: none"> a. Institutional framework b. Service provision c. Content provision d. Technology e. E-participation 2. The status of the development of telecommunication infrastructure or the Telecommunication Infrastructure Index (TII) <ol style="list-style-type: none"> a. Mobile-cellular subscriptions per 100 inhabitants b. Fixed broadband subscriptions per 100 inhabitants c. Active mobile-broadband subscriptions per 100 inhabitants 3. The inherent human capital or the Human Capital Index (HCI) <ol style="list-style-type: none"> a. Gross enrolment ratio b. Expected years of schooling c. Mean years of schooling d. Adult literacy

Table 1. Cont.

ID	Lit.	Ref.	Framework Conceptualisation	Dimensions
				4 Indexes as dimensions:
06	Grey	[38]	The framework of the GovTech Maturity Index assesses progress in four GovTech focus areas: (i) supporting core government systems; (ii) Enhancing public service delivery; (iii) Mainstreaming citizen engagement; (iv) fostering GovTech enablers. Overall, the framework explores “the state of online services, telecommunications infrastructure, human capital, citizen participation, research infrastructure, innovation, government regulations and institutions, and private sector involvement in GovTech programs”.	<ol style="list-style-type: none"> 1. Core Government Systems Index (CGSI) <ol style="list-style-type: none"> a. Government cloud b. Government enterprise architecture c. Government interoperability framework (GIF) or government service bus (GSB) d. Financial management information system (FMIS) e. Treasury single account (TSA) for automating government payments f. Tax management system g. Customs system h. Human resource management information system (HRMIS) i. Payroll system j. E-procurement system k. Debt management system l. Public investment management system m. Open-source software in public sector n. United Nations (UN) Telecommunication Infrastructure Index (TII) o. Disruptive technologies 2. Public Service Delivery Index (PSDI) <ol style="list-style-type: none"> a. UN Online Service Index (2020) (information available; existence of a feature; ability to do something) b. Online public service delivery portal c. Tax online service portal d. E-filing e. E-payment f. Customs online service portal 3. Citizen Engagement Index (CEI) <ol style="list-style-type: none"> a. Inclusive participation <ol style="list-style-type: none"> i. UN e-Participation Index (2020) [e-information; e-consultation, e-decision-making] ii. Open-government portal iii. Open-data portal b. Participation and feedback <ol style="list-style-type: none"> i. National website for citizen participation ii. National website for citizen and business feedback iii. Public information iv. Universal accessibility c. Government responsiveness 4. GovTech Enablers Index (GTEI) <ol style="list-style-type: none"> a. GovTech institutions b. Data governance institutions c. Digital government or GovTech strategy d. Whole-of-government e. Right-to-information laws f. Data protection or privacy laws g. Data protection agency h. National identification (ID) i. Digital ID j. Digital signature k. Cybersecurity l. UN Human Capital Index (HCI) m. Digital skills in the public sector n. Digital skills and innovation o. Public sector innovation

Table 1. Cont.

ID	Lit.	Ref.	Framework Conceptualisation	Dimensions
07	Scientific	[39]	The high-level conceptual framework represents the different attributes of public sector transformation, identifying 4 high-level dimensions: (i) networked governance through inter-organisational principles; (ii) top-down governance through neo-Weberian principles; (iii) networked governance through politics; (iv) governance through use of ICT. Limitations to capture the complex and wider landscape of public sector transformation are then identified.	<p>4 dimensions with sub-dimensions</p> <ol style="list-style-type: none"> 1. New public governance <ol style="list-style-type: none"> a. Plural and pluralist b. Inter-organisational c. Outcome control d. Ongoing relationship (agents) e. Trust and relational contracts f. Neo-corporatist 2. Neo-Weberian State <ol style="list-style-type: none"> a. External orientation towards citizens b. Direct citizen involvement c. Result orientation d. Management professionalism 3. Public Value Management <ol style="list-style-type: none"> a. Public value b. Legitimacy of stakeholders c. Long relationship approach d. Continuous adjustment 4. Digital-era governance <ol style="list-style-type: none"> a. Reintegration b. Needs-based holism c. Digitisation processes
08	Scientific	[40]	The framework for a smart city design captures the governance and sustainability of smart city initiatives. It comprises 4 dimensions: (i) strategy, (ii) technology, (iii) governance, (iv) stakeholders. Each dimension is complemented by sub-dimensions.	<p>4 dimensions with sub-dimensions</p> <ol style="list-style-type: none"> 1. Strategy <ol style="list-style-type: none"> a. Capabilities 2. Technology <ol style="list-style-type: none"> a. Digital technologies b. Data c. Technology experimentations in smart cities d. Security and privacy e. Vertical and horizontal scope 3. Governance <ol style="list-style-type: none"> a. Funding and metrics 4. Stakeholder <ol style="list-style-type: none"> a. Stakeholder value

The study was carried out under the umbrella of the ESPON Project DIGISER (2020–2021). Consequently, most of the frameworks in the table date up to 2021, with the exception of ID 02 (Idowu Lamid et al., 2022 [34]). When available, novel versions of the analysed frameworks were compared with the ones mapped in the study. ID 01 has two new reports with slight changes in the titles of the dimensions, confirming the previous structure. ID 05 has a 2022 version that uses the same methodology. ID 06 has a 2022 version that uses a revised approach impacting the dataset but confirms the previous structure.

Most of the digital transformation frameworks analysed are a conceptual premise for constructing analytical frameworks aimed at building indexes for mapping or monitoring the progress of digital government initiatives and performances. The dimensions and subdimensions identified are often related to as many exploratory measurement tools—IDs 01 [33], 03 [35], 04 [36], and 05 [37].

The analysis shows the co-presence of terms such as e-government, digital government, GovTech and transformational government. Although Dener and colleagues [38] identify how these refer to different maturity states of public sector digital transformation, in literature, they are still often used in combination, sometimes interchangeably, thereby conflating the meaning of their different approaches. Most of the time, e.g., in ID 01 [33], such concepts are interrelated and share a common technological ground, concurring to examine how the public sector uses and exploits IT and ICT to improve service delivery with the citizen at the centre of reforms and actions. Only a few frameworks attempt to go beyond a technology-enabled or technology-driven innovation, considering its socioeconomic and political factors—IDs 02 [34], 03 [35], 04 [36], and 05 [37]. A number of relevant frameworks

associate the tech dimension with complementary perspectives, such as how digital transformation impacts value creation, human capital, citizen engagement, research infrastructure, legislation, and regulations—IDs 02 [34], 04 [36], 05 [37], 06 [38], and 07 [39]. However, few delve into how it changes organisational processes and culture [26], e.g., ID 03 [35].

To various extents, the frameworks analysed encompass macro-forces in integrated frameworks, considering the political, economic, sociocultural, and technological dimensions and adding, to a lesser extent, the legal and environmental ones. Overall, the analysis portrays a general lack of awareness about the opportunities of digital government and GovTech, a lack of capacity and knowledge to build digital government and exploit resources to improve the service provision, and ultimately, a lack of information about the policy and regulatory frameworks for enabling ICT environments. Switching the perspective to the object of observation, what emerges from the analysis is a high-level scale of observation that, especially in the frameworks supporting analytical indexes, does not go beyond the country level. This reports an average condition while failing to provide more contextual information, which may result in it being more useful for PAs to build and revise their digital strategies and behaviours.

1.3. What Is Missing? Problematising Digital Transformation

The analysis of the frameworks, combined with a broader analysis of the literature on digital transformation processes in the public sector, identified some recurring gaps. The problematisation of the phenomena and of associated processes concerns conceptual, analytical, and operational dimensions. As mentioned in the introductory section, this regards how the relationship between (i) technological drivers and (ii) social and organisational structures is conceived, as well as the underlying definitions of “innovation”. The identified gaps are briefly explored in the following sections.

1.3.1. The Hyper-Tech Bias

The literature exploring the role of technology in government presents two opposing viewpoints, which have technological determinism [41,42] and social construction of technology (SCOT) as their poles. While the first recognises the prominence of technology in driving change, the second pivots around actors and highlights an idiosyncratic adoption of technology as evolving with broader societal structures. The lack of recognition of the multi-dimensionality of the digital transformation processes that develop within complex and open systems—such as public administrations—leads to a flattening of the interpretation of the related innovation phenomena on the first pole. While taking advantage of the technological opportunities, digital transformation in the public sector goes beyond the use of digital technology and applications. On the one hand, the progressive adoption of advanced technological solutions can support public bodies in addressing urgent societal demands, making public services and procedures more efficient and effective [43] and shifting from analogue to digital processes (digitisation and digitalisation) [44]. On the other hand, digital transformation entails practices of redesigning and re-engineering to fulfil internal and external needs that are constantly evolving, which also implies altering the structure and mechanisms of public organisations [45]. Aiming at opening beyond governmental boundaries towards more collaborative practices, digital transformation entails radical and incremental changes in government operations, processes, and structures. It describes the shift from digitisation to a complete revision of policies, processes and procedures, and services. As such, it has been a key driver of public sector innovation, and services, in particular, with the intention of improving the user experience for citizens and frontline employees.

Given this premise, this study considers organisational and contextual variables which explore how digital transformation affects and is shaped by the public sector, i.e., in terms of organisational routines, governance arrangements, and modes of engagement of local stakeholders.

1.3.2. The Complexity and Multi-Dimensionality Issue

The presence of a broad set of definitions of innovation in the public sector [46,47] portrayed in the literature mirrors the multifaceted nature of this concept. In defining innovation, two main dimensions are stressed: novelty [48] and the adoption of an idea by a given organisation [49], sometimes highlighting how a discontinuity with the past differentiates continuous change from innovation [50]. Moreover, to understand innovation and organisations' innovative behaviours, past studies [22,51] underline the need to distinguish different typologies of innovation [46]. In their systematic review of the innovation literature, Bekkers and Tummers [52] classified four meta-dimensions of innovation (see Table 2).

Table 2. Public sector innovation types, adapted from [22].

Innovation Type	Focus	Ref.
Process innovation	Improvement of quality and efficiency of internal and external processes	[24]
Administrative process innovation	Creation of new organisational forms, the introduction of new management methods and techniques and new working methods	[53]
Technological process innovation	Creation or use of new technologies, introduced in an organisation to render services to users and citizens	[54]
Product or service innovation	Creation of new public services or products	[21]
Governance innovation	Development of new forms and processes to address specific societal problems	[55]
Conceptual innovation	Introduction of new concepts, frames of reference or new paradigms that help to reframe the nature of specific problems as well as their possible solutions	[56]

These conceptual meta-categories of innovation also apply to the study of digital transformation processes, shedding light on the need to consider such meta-dimensions in shaping the conceptual model. Based on this reasoning, digital transformation features a holistic, transformative approach that embraces services, government bureaucratic and organisational culture [25], and their relationship to the urban ecosystem of actors [26], requiring a radical reframing of its technological infrastructure, organisational culture, and interaction with the socio-cultural context to create value. This multifold nature not only characterises public sector innovation as a whole, but it also affects public service provision, which has long been interpreted as a driver of innovation itself through the emergence and rooting of principles such as data sharing and interoperability [57], transparency, sustainability and inclusivity [58], openness and collaboration, and having relevant organisational and policy implications [57]. Within PAs, this leads to a significant change of paradigm: from designing and delivering public services purely based on PAs internal, policy-driven logic to an external, open, and co-creative logic of co-designing public services [59–62]. Such a slow yet steady process has significantly contributed to reflections on the extent to which governments effectively have competencies and their ability to take policy actions in a responsive and appropriate manner to cope with digital transformation.

In line with a multi-dimensional understanding of digital transformation processes, this study is framed within the broader discourse on public sector innovation, from which it derives its foundational reasoning of dimensions.

1.3.3. The Scale of Observation

In analysing the diffusion of public eServices in European cities, Cepparulo and Zanfei [10] identify two limitations that emerge from the empirical literature: first, a lack of understanding of the effects of ongoing public sector digital transformation on the delivery of services across its domains; second, a tendency to analyse the state-of-the-art at the national level, while failing to grasp subnational and sector-specific differences. This condition fuels the need to (i) create increased attention on how governments are considering and

responding to users' needs across the different service domains; (ii) adopt the subnational granular scale, gaining an understanding of what occurs at the city level. In the urgent and pressing transition, cities should play the role of protagonists, pushing for a strategic and effective leverage not only of the potentials offered by the ICT and disruptive technology's fast advancements but also for co-design and co-creation, collaborative service delivery models, and the embracing of an entrepreneurial and experimental attitude [4]. In order to reach the greatest gains in terms of quality, accountability, efficiency, and transparency, such an attitude should extend the perimeter of the single public administration, being mainstreamed throughout the entire ecosystem of public sector actors.

To answer these challenges, this study analyses the role of public-service-related digital innovation, framing the phenomenon in a more complex and long-lasting process of technology-enabled innovation and reform [63]. Such a perspective allows for capturing how service creation and provision can contribute to responding to global societal challenges [21].

The ambition is not limited to systematising the dimensions of innovation. Filling this gap would provide a more granular lens to observe the phenomena, also enabling reflective practices within the public administrations, e.g., triggering reflections about the scopes and modes of ongoing digital transformation and supporting self-assessment practices.

In light of this reasoning, the following research questions emerge: How can we capture the multi-dimensional nature of digital transformation in the public sector, including a systemic, long-term, cross-sector, and mission-oriented approach [64]? What conceptual framework can support cities in strategically navigating towards a more effective, sustainable, and inclusive digital transformation?

This study explores the conceptual dimensions of digital transformation and its specific 'objects of observation', with the aim of fostering a better understanding of public service innovation at the city level, as well as of the factors affecting their capacity to generate social value in their contexts.

2. Materials and Methods

The framework development was carried out as an iterative process from September 2020 to March 2021, covering a third of the entire ESPON Project duration. It involved an interdisciplinary team of researchers from the Department of Architecture and Urban Studies and the Department of Design of the Politecnico di Milano. The development consisted of 4 main phases (Table 3) and was subject to periodic reviews by the ESPON DIGISER coordination team.

Table 3. Methodological phases and their outputs.

Phase	Period	Methodology	Output
1	Sept 2020–Nov 2020 + follow up until project end	Literature review (grey and scientific) Initial scoping	Definition of exploratory interrogatives and identification of conceptual dimensions
2	Nov 2020–Jan 2021	Focus groups (internal and external to the research group)	Identification of conceptual subdimensions and key interactions through scaling mechanisms
3	Dec 2020–Feb 2021	Brainstorming sessions (design thinking process)	Unpacking of the features of each conceptual subdimension
4	Feb 2021–Mar 2021	Expert feedback (ESPON Strategic Advisory Group) and comparison with literature	Validation of the conceptual framework

First, the study relies on a thoughtful cross-disciplinary analysis of the scientific and grey literature on public sector innovation and digital transformation, e.g., [47,64–70]. The choice to explore grey literature and to also validate the conceptual categories against strategic and policy documents is in line with the scope of the research, in particular, (i) with the focus on public policies and organisational change; and (ii) with the underlying objective to support awareness of digital transformation dynamics. Based on the results, it

was decided to rely on a transition perspective rooted in studies on innovation processes in socio-technical systems [71–74]. This choice resonates with the need to adopt an analytical and interpretative approach coherent with the premises defined in paragraph 2. The literature review conducted in Phase I identified relevant frameworks, which captured the different perspectives that other studies had established. Such dimensions (in brackets) were aggregated according to topic resonance, resulting in 12 thematic clusters: attitude to experiment (5), change management (9), data management (10), digital maturity and strategies (12), digital strategies and governance (23), human capital (4), institutional capacity (2), partnership (4), service delivery and provision (7), stakeholder engagement (8), technological innovation (30), and user-centricity (3). In addition, Phase I defined 3 main exploratory interrogatives (What, How, Why) as lenses used to define conceptual dimensions as cores of digital transformation processes. Phases II and III were conducted using an online visual collaboration platform. Specifically, Phase II consisted of 6 focus groups that involved the research group and external experts and resulted in a twofold output: (i) the identification of 4 conceptual subdimensions related to the main processes affecting digital transformation at the urban scale, and (ii) their interpretation through 3 scaling mechanisms [75], bringing in the organisational, relational, and local context perspectives. In Phase III, 4 brainstorming sessions fuelled the unpacking of the conceptual subdimensions investigating their features (objects of investigation) (Figure 1). Ultimately, in Phase IV, the conceptual framework underwent validation: on the one hand, it was subjected to feedback from the experts of the ESPON Strategic Advisory Group; on the other, it was validated against literature. In particular, thematic clusters derived from the analysis of the conceptual frameworks (see Table 1) were used to cross-check the correspondence with DIGISER dimensions and subdimensions.

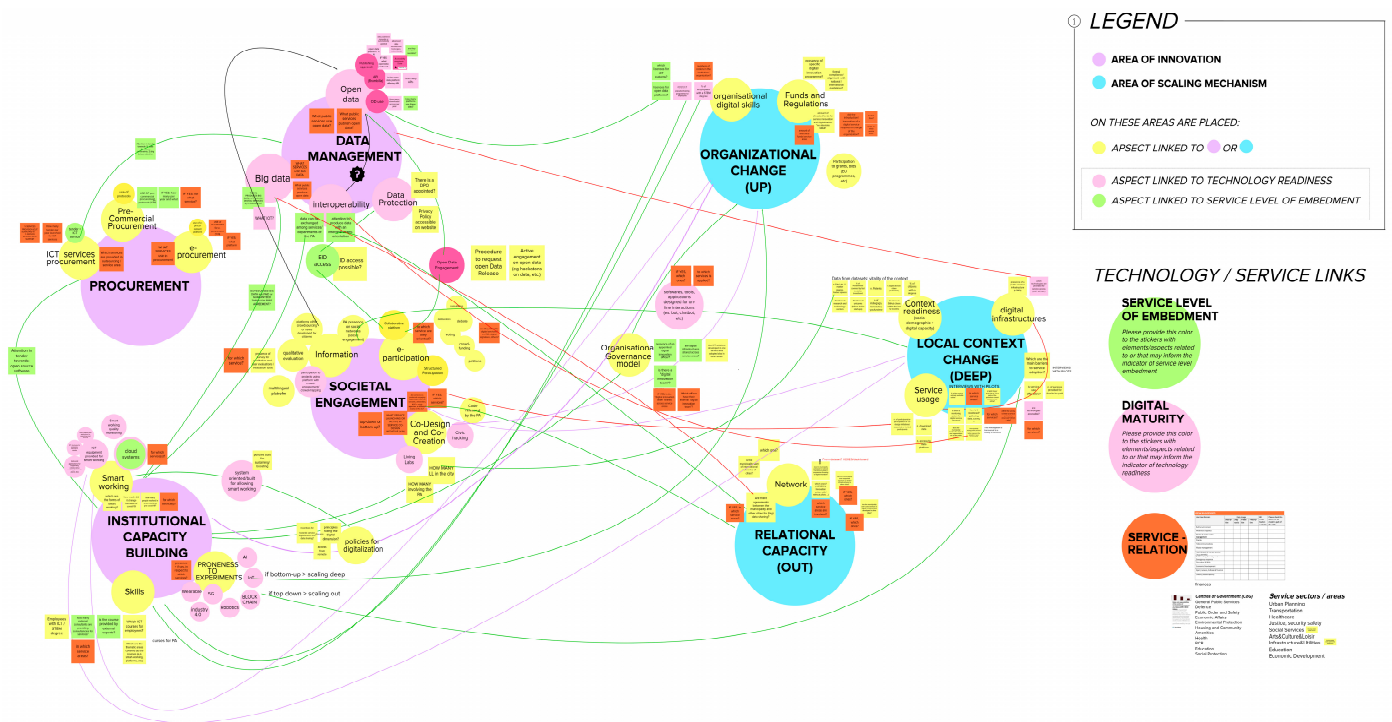


Figure 1. Results of the brainstorming that unpacked the subdimension of Innovation Governance (Phase III), identifying its features and interplays with the scaling mechanisms and other subdimensions (Source: own elaboration).

The definition of the conceptual framework followed a design-thinking approach [76,77] and was subject to iterative cycles aimed at refining and fine-tuning the concept.

3. Results

3.1. Towards a Conceptual Framework

The literature review results mirrored the complex nature of the public sector. Acknowledging the infeasibility of reducing information about its multilevel, multi-dimensional, and cross-sector activities to single operational measures, this study reports the development of a framework seeking to capture factors affecting digital transformation in public administrations. This section briefly reports the main results obtained through the steps illustrated in the methodology (see Table 3). Figure 2 provides a representation of the conceptual framework, with its conceptual dimensions and subdimensions and their intersection with the scaling mechanisms.

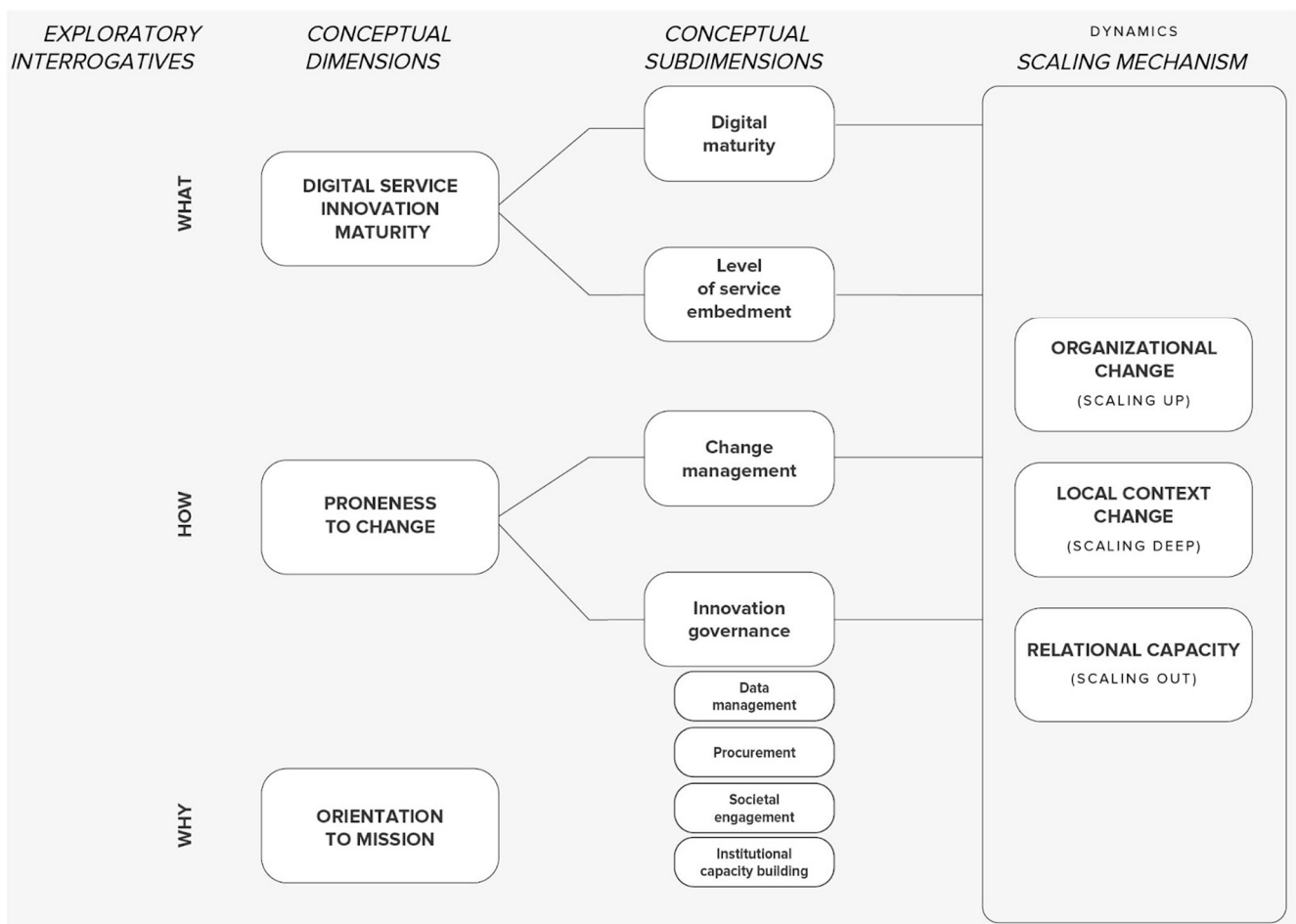


Figure 2. The conceptual frameworks: from the exploratory interrogatives to the multi-dimensions and subdimensions and their relation to the scaling mechanisms (Source: own elaboration).

3.2. Conceptual Dimensions and Subdimensions

The starting point for the integrated conceptual framework is the definition of the digital transformation dimensions. A comprehensive analysis of the literature and the existing frameworks (see Section 2) highlights the presence of four areas to consider: (1) the PA's maturity towards digital technologies and innovation, (2) digital innovation in public service delivery and provision, (3) change in the transition perspective, and (4) impact on the governance. The identification of the conceptual dimensions is inspired by the review of innovation literature (see Section 1.2) and the loop-learning theory [27], which draw attention towards both the action and the reflection spheres. Currently elaborated as a triple-loop learning [78,79], this theory presents three levels of reflection framed as learning loops (single, double, triple), that reflect on the “what”, the “how”, and the

“why”. Building on such a holistic approach to transformation, the identified conceptual dimensions captured are:

WHAT, constituting the objects of analysis, is framed in the dimension of “Digital service innovation maturity” (see Figure 2). This dimension stems from how digital technologies affect people’s lives and interactions with public infrastructures. It considers the increasing availability and performance of technology, the exponential use of data, the growing offer of services, and the advancement in technological infrastructures, acknowledging that such innovation requires new service models and interactions. Accordingly, this dimension focuses on the degree of penetration and maturity of technical and organisational innovations in public service delivery, looking at how the advancement in technological infrastructure affects the PA’s structures, practices, values and culture [80]. Within this framework, “Digital service innovation maturity” branches into two subdimensions: the “Digital maturity” of a public administration and its “Level of service embedment”.

- “Digital maturity” explores how PAs embrace digital technologies and deliver innovative public services, distinguishing between mature and emerging technologies and whether they influence the development of new services. In the literature, the term refers to a state of having progressed in the development of the system that makes it ready and complete, describing the extent and efforts performed to achieve transformation and to systematically adapt to the digital environment and its progress [81]. It is regarded as the degree of digitisation an entity achieves (status quo) by structuring its digitised processes in an adequate and integrated manner [82]. To a minor extent, existing studies and models include in the reasoning the role of organisational structure and culture as enablers and drivers of digital transformation—or barriers when inappropriate [11,83]—which constitutes a potential development path. As a consequence, by not systematically incorporating cultural attributes in measuring the degree of digital maturity, existing models tend to provide an incomplete picture of the matter; in parallel, the perspective adopted often leaves out and under-represents the domain of services [81]. Considering such a condition and the need to overcome the hyper-tech bias portrayed in the literature, the subdimension of “Digital maturity” goes beyond the PA level of digitisation and its shift towards digital technologies (digitalisation), also encompassing the organisational dimension. Therefore, besides a purely technological interpretation of how well and efficiently IT is adopted, “Digital maturity” embeds a managerial interpretation of the changes, efforts, and achievements reached to perform digital transformation. As such, it embraces a holistic and systemic perspective that explores the coexistence of a solid digital foundation and a good understanding of how to leverage it for strategic advantage, looking at multiple categories in which maturity can unfold and showing mastery of change processes: products and services, processes and skills, mindset and culture.
- “Level of service embedment” describes the pervasiveness of digital innovation in public service models and solutions. First, it considers the PA’s willingness and capacity to adopt innovations in public service delivery and provision, and to support the internal organisational restructuring needed to take them forward [84]. In addition, it refers to PA’s ability to drive innovation at the city level, thus fostering changes in the local context. Besides the actions carried out to replicate successful experiences across sectors and contexts, this subdimension considers the capacity of the digital innovation models and solutions to resonate with the activities carried out by the actors in the local ecosystem. Such dynamics can be detected by looking, for example, at data use and reuse by stakeholders, citizen participation in data initiatives, or at the extent to which the design of digital services takes into account users’ technical ability and accessibility obstacles [85]. Finally, the “level of service embedment” also refers to the capacity to recognise and exploit the innovative potential for service development at a wider scale, e.g., by exchanging ideas and solutions across public authorities. In this perspective, a key role is played by city networks and multi-level institutional

arrangements, facilitating the dialogue among actors with different knowledge and experience, thus supporting mutual learning and collaboration.

HOW, representing how PAs guarantee both an innovation process and effective exploitation of the growing beneficial potentials of digital transformation, is framed in the dimension “Proneness to change”. It is defined as a function of the PA’s capacity to manage change in order to engage in digital innovation processes and shape them [86], supporting innovation pathways through transitional scaling dynamics (see 4.2). In digital governments, digital technologies are embedded in modernisation and innovation strategies, creating public value through engaging a broad ecosystem of stakeholders [87,88]. This dimension assumes that the transition from e-government to digital government is only possible with a strong orientation to change, e.g., materialised in terms of low internal resistance, strong competencies, and availability to learn [89]. Consequently, this dimension enters the conceptual framework as “Proneness to change” and encompasses two subdimensions: “Change management” and “Innovation governance”:

- “Change management” refers to the capacity of PAs to put in play a set of actions, norms, policies, and tools either to proactively support innovation in digital service development and provision or to increase its capacity to detect and adopt innovation dynamics developed in different contexts. It recognises that cultural change constitutes a prerequisite to digital transformation, which can become a bottleneck if not adequately supported and nurtured [11]. Building on this reasoning and following a transition management perspective [90,91], “Change management” includes three main levels: strategic (problem structuring, strategic envisioning, and coordination), tactical (agenda-setting, partnership development, and networking), and operational (experimentation and implementation of innovative policies, practices and tools). It relies upon the capacity of the organisation to adapt its procedures to internal and external circumstances and to create spaces for other agents to engage in processes of governance innovation. Moreover, it relates to the capacity to include and implement innovative bottom-up initiatives, considering and coordinating different levels of governance that nurtures new interactions and cycles of learning. At the same time, it is affected by the degree of awareness PAs have about their role and transitional potential and by their commitment to change and capacity to act, e.g., with respect to adopting adequate tools and procedures.
- “Innovation governance” refers to the way in which the public authority uses transversal administrative processes as leverage to promote cross-sectoral digital innovation. The dimension is unpacked in four spheres reflecting the key challenging opportunities being faced by the PA, as widely discussed in the public sector innovation literature:
- “Societal engagement” considers how PAs entail and encourage the active participation of different stakeholders (co-creation and co-design) in public decision-making processes [67,92,93]. It mirrors the PA’s commitment to implement bottom-up initiatives and to encourage the inclusion of society in developing innovation.
- “Institutional capacity” relates to transformation drivers that influence the adoption and management of digital technologies and that affect the capacity of PA to enhance and mobilise their organisational and technological resources through the adoption of ICT technologies or the modification of internal rules and procedures. This sphere entails innovation strategies; proneness to experiment; skills and competencies related to digital management and information; and communication technology [94,95].
- “Procurement” refers to techniques, structured methods, and means used to streamline an organisation’s procurement process and achieve desired results while saving cost, reducing time, and building win–win supplier relationships. It is one of the main demand-side innovation policies to adopt innovative goods and services [96,97].
- “Data management” is increasingly regarded as a requirement towards better public service delivery and provision [17,98]. The fast evolution of technologies continuously offers novel opportunities towards digital government, as well as towards transparency and openness [99–102]. The production and access to data, services,

and content play a relevant role in digital transformation and maturity processes. For example, they are enabled and facilitated by the presence of data platforms, the adoption of data use and reuse strategies, and the presence of open-data principles common to several governmental institutions.

WHY, representing the purpose of any public action, is described in the words of Mazzucato as “orientation to mission” [103]. The mission-oriented approach strives to build integrated policies and initiatives aligned towards a clearly defined mission. As such, it should inform the overall strategic and development framework and regulatory and organisational provisions, affecting the prioritisation of societal targets while creating conditions for more sustainable and responsible solutions [64,104]. The “orientation to mission” represents the overarching perspective on the innovation of public services, becoming an umbrella portion of the conceptual framework. It is employed as a high-level notion to observe if and how cities are committing to systemic change to address one or more societal challenges local authorities are asked to face.

3.3. Scaling Mechanisms

Besides the dimensions and subdimensions illustrated in the previous section, the conceptual framework includes a cross-cutting categorisation of those mechanisms affecting transformative dynamics in the public sector, which are interpreted as “scaling mechanisms” [75]. These transversal interpretative categories allow the exploration of dynamics that may emerge in the spread of innovation from the interplay across multiple levels of socio-technical systems [73,74]. In this case, scaling mechanisms capture the transition pathways that may emerge along service innovation processes within three dynamics:

- **Organisational Change and Performance (Scaling up).** This concerns the role of digital transformation in long-term organisational change within the public sector. It explores how digitalisation processes—in particular, those related to service design and provision—affect organisational restructuring and innovation [105–107]. In addition, it investigates how digital transformation can open up opportunities for reflection and learning at the institutional level, possibly contributing to increasing the flexibility and openness of PAs internal settings and procedures, organisational routines, decision-making processes, methods, and tools. The capacity to support scaling-up dynamics mainly depends on their “proneness to change” and specifically on their capacity to “manage change” (see Figure 2). This includes the acquisition of skills and competencies, the redefinition of funding and legal schemes, and the restructuring of internal governance. Thus, the question: How can digital transformation generate long-term innovation in public sector organisations?
- **Local Context Change and Performance (Scaling deep).** This investigates how the digital innovation of services affects public value generation at the urban scale, e.g., impacting everyday practices and behaviours of different stakeholders [108,109]. In line with a transitional perspective, this direction explores how public service innovation can be rooted in specific contexts, benefiting citizens and city users across the public, private, and civic realms [110]. Thus, the question: How does public sector organisational innovation generate public value in local contexts?
- **Relational capacity: Replication and Transfer (Scaling out).** This investigates the paths through which (digital) innovation practices can be replicated across sectors, contexts, and levels. Starting from the idea that single public administrations or their units do not necessarily need “to accomplish all public innovations themselves, but rather to facilitate and align constellations of diverse actors to address various societal challenges” [111], scaling-out dynamics look at the capacity of public administrations to generate and spread innovation within the network in which they are embedded. This exploration assumes that public administrations are affected by several factors, such as market logic, experiences of other public bodies, and their belonging to national or international networks, which enable exchange and collaboration possibilities [112]. In these dynamics, the interplay is bidirectional: (i) cities represent sources and drivers

of (new) practices replication and diffusion, and (ii) they can act as replicants or active adopters of (new) practices developed by other cities. Thus, the question: What paths and key enablers can make best innovation practices replicable and scalable?

3.4. Framework Validation

The validation of the DIGISER conceptual framework was articulated in two moments. First, preliminary versions of the conceptual framework were shared with ESPON Expert Advisory Board Members within DIGISER Projects meeting and bilateral agreements with the Politecnico di Milano Team. The feedback provided was the basis for the decision to focus on the previously mentioned interrogatives (what, how, and why) while exploring innovation dynamics related to specific service areas as embedded into PAs' degree of digital service innovation maturity, proneness to change, and—at least conceptually—orientation to mission. ESPON experts' comments on a draft version of the conceptual framework also referred to the importance of focusing on proactive citizen's engagement in the local digital innovation process. Second, DIGISER conceptual framework has been tested against the theoretical frameworks analysed in the scientific and grey literature (see Table 1).

Figure 3 shows the level of correspondence between the dimensions and subdimensions (when present) of the previously analysed conceptual frameworks (on the left), the thematic clusters (in the centre), and DIGISER conceptual elements (on the right). Overall, the mapping of the DIGISER categories on the existing conceptual frameworks demonstrates a good level of correspondence, with the inclusion of all the main factors considered relevant for the understanding of the digital transformation processes of the public administrations.

First, the analysis of the correspondences between the various elements shows that only three dimensions from the literature are not expressly attributable to the conceptual framework: human capital, user-centricity, and technology innovation. "Human capital" is defined by the framework ID 05 [37] in terms of four components: (i) adult literacy rate, (ii) combined enrolment ratio, (iii) expected years, and (iv) average years of schooling. This dimension does not find direct correspondence in DIGISER, even if references to the "skills and expertise" of public sector employees are included as part of the innovation governance dimension. In addition, literacy is listed among the contextual factors affecting service innovation implementation. "User-centricity" and "Technology innovation" items can be considered cross-cutting categories, embedded to such an extent in the approach underlying the design of the DIGISER conceptual framework to be implicitly present in every dimension, with "user-centricity" being captured, in particular, through the analysis of sub-dimensions of the category "innovation governance". Second, the validation also allowed the identification of DIGISER conceptual dimensions that had not been included in the analysed conceptual frameworks. One of them is "Orientation to mission", whose intrinsically strategic nature does not combine well with the predominantly techno-centric approach of most of the frameworks analysed but which has the potential to support reflexive practices and guide self-assessment and evaluation. Nonetheless, compared with other frameworks, DIGISER shows greater attention towards organisational change. On the one hand, it emphasises aspects related to procurement that are barely included in the other conceptualisations analysed (see only the reference to e-procurement systems as a subdimension of Framework ID06; Table 1). On the other hand, while the analysed frameworks mainly refer to organisational change in broad terms (e.g., under the "leadership and governance" label) and often as sub-categories of technical transformation processes, DIGISER explicitly identifies conceptual categories to read not only internal restructuring taking place within the PA but also local context change and multi-level dynamics unfolding alongside digital transformation processes. In this respect, a third difference related to the assumptions underlying the understanding of organisational change can be identified. While other conceptual and policy frameworks are inclined to read these dynamics in "static" terms, DIGISER conceptualisation attempts to explore them as part of a dialectic interaction among organisational change and digital transformation processes.

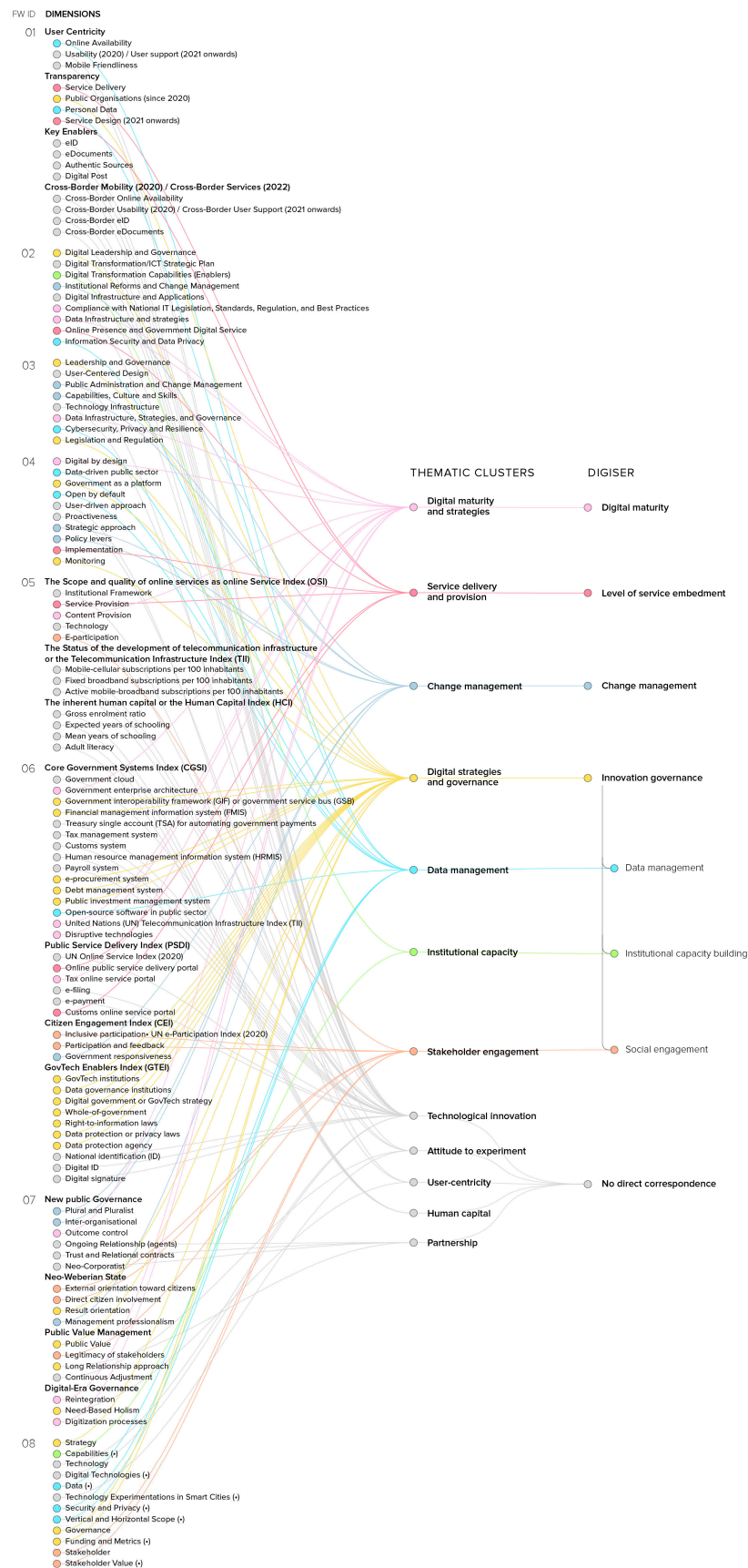


Figure 3. Dimensions and subdimensions of the existing frameworks analysed (left), their aggregation in thematic clusters (centre + colours), and their relation to the DIGISER framework dimensions and subdimensions (right) (Source: own elaboration).

4. Discussion

In the last few decades, (urban) governments have launched digital initiatives to reconfigure their models towards more open and collaborative ones. Albeit with differing levels of success [113], PAs around Europe started developing digital strategies building on principles of effectiveness, efficiency, collaboration, transparency, participation, and sustainability [25]. This push brought to light the need to enter the “black box” in which the mechanisms through which digital and organisational innovation develop and spread often remain locked. In particular, the necessity arose to understand the interrelations between technical, organisational, and socio-political dimensions and how these articulate in multi-level governance settings. This article contributes to the debate by proposing a conceptual model to better understand PA’s digital transformation at the city level. In particular, it focuses on public service provision and delivery, hereby identified as a proxy to analyse the maturity of public digital transformation.

The study systematises knowledge derived from the grey and scientific literature and advances an innovative perspective that seeks to unpack the complexity and multi-dimensionality of digital transformation dynamics. To address this scope, it proposes exploring three interrelated dimensions: (i) the digital service innovation maturity, analysing both processes, services and technological infrastructure; (ii) the proneness to change, providing insights into organisational, governance, and management settings and practices and their predisposition towards *adapting to* and *driving* innovation; and (iii) the orientation to mission, exploring the long-term vision underlying actions developed towards digital innovation and transformation. The identification of the categories and their testing against selected academic and policy frameworks concurred with the overcoming of conceptual gaps, with reference to the conceptualisation and specificity of digital innovation in relation to various types of public sector innovation, the identification of public administration determinants [15], and the role of public services along with digital transformation processes. Services can be interfaces between citizens and public administrations [114]. They contribute to internal organisational change, increasing efficiency and effectiveness in delivering services and creating public value, thus feeding citizens’ access to services and rights and participation in the public sphere. Implicitly, a better service design and delivery aligns with a mission-oriented innovation, reframing and shaping how the public sector answers to grand societal challenges.

At the same time, the conceptual framework lays the foundation for analytical models attentive to how digital transformation and innovation spread across governance levels and units and take root in contexts. “Scaling mechanisms”, which are transversal to the conceptual dimensions mentioned above, are suggested as observation lenses to capture the dynamic nature of digital transformation processes.

A twofold purpose guided the design of these conceptual categories. On the one hand, it aims at providing a more comprehensive view of digital transformation in the public sector, supporting the critical interpretation of ongoing processes through adopting a systemic, long-term, cross-sector, and mission-oriented approach. Therefore, the conceptual framework can support policymakers in exploring digital transformation processes in specific contexts. In particular, the proposed conceptual dimensions can facilitate reflection in- and on- action [27], e.g., supporting the identification of (organisational, technological, and discursive) factors affecting the design and implementation of digital innovation strategies and public services’ design and delivery. Adding on to the existing literature, the conceptual framework model contributes to framing digital transformation not only as a process influenced by external drivers such as the adoption of new technologies but as a complex phenomenon to which several elements concur. From this perspective, the DIGISER framework responds to the need to move beyond hyper-technological biases and to understand digital transformation processes in their interrelation with both contextual and exogenous factors, e.g., including organisational culture and mindset, but also individuals’ competencies, skills, and their propensity to experiment and innovate. On the other hand, it seeks to lay the foundations for an analytical model, identifying conceptual categories that

can support cities in understanding whether, how, and why the actions undertaken can generate impacts. Therefore, identifying the conceptual coordinates described above is a first step in gaining awareness about digital behaviours and performances. Reflecting on the digital performance of organisations constitutes a fundamental step in the digital transformation process, serving as a possible compass to be used for orienting the next digital strategies [115] and possibly favouring the capacity of governments to effectively ‘steer’ the digital transformation process, e.g., through a better design and delivery of public services across multiple sectors.

5. Conclusions

A reflection on the application potential of this conceptual framework is outside the scope of this work as it would require a further translation of the conceptual categories into an analytical model. Nevertheless, the discussion allows some preliminary observations on how the framework could support cities strategically navigating towards a more effective, sustainable, and inclusive digital transformation. In addition to suggesting dimensions of observation and paying attention to some transversal mechanisms that are not usually considered in an analysis of the dynamics of transformation, the innovation potential of the model lies in the attention it places on different levels of interpretation. Unlike other frameworks proposed in both the scientific and grey literature, the DIGISER one adopts an “urban scale” dimension, suitable for analysing innovation dynamics at the local level. At the same time, it suggests framing local dynamics in a broader picture, capturing their relationship with broader transformation processes and reading their evolution across multiple levels.

To conclude, this study proposes a conceptual framework emphasising some key dimensions that are underestimated by most of the existing models on the digital transformation of the public sector. While the DIGISER framework contributes to open innovation mechanisms’ “black boxes” and might work as a basis for analytical models, some limitations can be highlighted. The first potential difficulty is reuniting the “orientation to mission” with an operational perspective. The operationalisation of the conceptual framework would also require addressing challenges related to the dynamic analysis of complex phenomena: given the great emphasis on change, some of the dimensions identified would require a transversal reading of the phenomena. In summary, this model assumes a reiterated observation of phenomena over time.

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References

1. Arundel, A.; Bloch, C.; Ferguson, B. Advancing Innovation in the Public Sector: Aligning Innovation Measurement with Policy Goals. *Res. Policy* **2019**, *48*, 789–798. [[CrossRef](#)]
2. Bertot, J.; Estevez, E.; Janowski, T. Universal and Contextualized Public Services: Digital Public Service Innovation Framework. *Gov. Inf. Q.* **2016**, *33*, 211–222. [[CrossRef](#)]

3. Janssen, M.; van der Voort, H. Adaptive Governance: Towards a Stable, Accountable and Responsive Government. *Gov. Inf. Q.* **2016**, *33*, 1–5. [CrossRef]
4. European Commission—Directorate-General for Research and Innovation. *Powering European Public Sector Innovation: Towards a New Architecture. Report of the Expert Group on Public Sector Innovation*; European Commission—Directorate-General for Research and Innovation: Brussels, Belgium, 2013.
5. Trondal, J.; Keast, R.; Noble, D.; Pinheiro, R. *Governing Complexity in Times of Turbulence*; Edward Elgar Publishing: Cheltenham, UK, 2022; ISBN 978-1-80088-964-4.
6. Kattel, R.; Mazzucato, M. Mission-Oriented Innovation Policy and Dynamic Capabilities in the Public Sector. *Ind. Corp. Chang.* **2018**, *27*, 787–801. [CrossRef]
7. Mazzucato, M. *Mission-Oriented Innovation Policies: Challenges and Opportunities*; UCL, Institute for Innovation and Public Purpose: London, UK, 2017.
8. Kirchherr, J.; Hartley, K.; Tukker, A. Missions and Mission-Oriented Innovation Policy for Sustainability: A Review and Critical Reflection. *Environ. Innov. Soc. Transit.* **2023**, 100721. [CrossRef]
9. Hinings, B.; Gegenhuber, T.; Greenwood, R. Digital Innovation and Transformation: An Institutional Perspective. *Inf. Organ.* **2018**, *28*, 52–61. [CrossRef]
10. Cepparulo, A.; Zanfei, A. The Diffusion of Public EServices in European Cities. *Gov. Inf. Q.* **2021**, *38*, 101561. [CrossRef]
11. Cinar, E.; Trott, P.; Simms, C. A Systematic Review of Barriers to Public Sector Innovation Process. *Public Manag. Rev.* **2019**, *21*, 264–290. [CrossRef]
12. Clausen, T.H.; Demircioglu, M.A.; Alsos, G.A. Intensity of Innovation in Public Sector Organizations: The Role of Push and Pull Factors. *Public Adm.* **2020**, *98*, 159–176. [CrossRef]
13. Demircioglu, M.A.; Audretsch, D.B. Conditions for Complex Innovations: Evidence from Public Organizations. *J. Technol. Transf.* **2020**, *45*, 820–843. [CrossRef]
14. Epstein, B. Two Decades of E-Government Diffusion among Local Governments in the United States. *Gov. Inf. Q.* **2022**, *39*, 101665. [CrossRef]
15. Hong, S.; Kim, S.H.; Kwon, M. Determinants of Digital Innovation in the Public Sector. *Gov. Inf. Q.* **2022**, *39*, 101723. [CrossRef]
16. Bannister, F.; Connolly, R. ICT, Public Values and Transformative Government: A Framework and Programme for Research. *Gov. Inf. Q.* **2014**, *31*, 119–128. [CrossRef]
17. Misuraca, G.; Barcevičius, E.; Codagnone, C. *Exploring Digital Government Transformation in the EU—Understanding Public Sector Innovation in a Data-Driven Society*; Publications Office of the European Union: Luxembourg, 2020; p. 126. Available online: <https://publications.jrc.ec.europa.eu/repository/handle/JRC118857> (accessed on 20 May 2023).
18. Perez, C. Technological Revolutions and Techno-Economic Paradigms. *Camb. J. Econ.* **2010**, *34*, 185–202. [CrossRef]
19. Routzouni, A.; Vasilakis, N.D.; Kapetanakis, S.; Gritzalis, S.; Pouloudi, A. Public Sector Innovation through Design Thinking: Applying a Participatory Policy Design Practice to Support the Formulation of a National Digital Transformation Strategy. In *Proceedings of the ICEGOV 2021: 14th International Conference on Theory and Practice of Electronic Governance*, Athens, Greece, 6–8 October 2021; Association for Computing Machinery: New York, NY, USA, 2022; pp. 104–110.
20. Mazzucato, M. Building the Entrepreneurial State: A New Framework for Envisioning and Evaluating a Mission-Oriented Public Sector. *Levy Econ. Inst. Bard Coll. Work. Pap. No. 824.* **2015**. [CrossRef]
21. Damanpour, F.; Schneider, M. Characteristics of Innovation and Innovation Adoption in Public Organizations: Assessing the Role of Managers. *J. Public Adm. Res. Theory* **2009**, *19*, 495–522. [CrossRef]
22. De Vries, H.; Bekkers, V.; Tummers, L. Innovation in the Public Sector: A Systematic Review and Future Research Agenda. *Public Adm.* **2016**, *94*, 146–166. [CrossRef]
23. Osborne, S.P.; Brown, L. Innovation, Public Policy and Public Services Delivery in the UK. The Word That Would Be King? *Public Adm.* **2011**, *89*, 1335–1350. [CrossRef]
24. Walker, R.M. Internal and External Antecedents of Process Innovation: A Review and Extension. *Public Manag. Rev.* **2014**, *16*, 21–44. [CrossRef]
25. Barcevičius, E.; Cibaitė, G.; Codagnone, G.; Gineikytė, V.; Klimavičiūtė, L.; Liva, G.; Matulevič, L.; Misuraca, G.; Vanini, I. *Exploring Digital Government Transformation in the EU: Analysis of the State of the Art and Review of Literature*; Misuraca, G., Ed.; Publications Office of the European Union: Luxembourg, 2019.
26. Mergel, I.; Edelman, N.; Haug, N. Defining Digital Transformation: Results from Expert Interviews. *Gov. Inf. Q.* **2019**, *36*, 101385. [CrossRef]
27. Argyris, C.; Schön, D.A. *Organizational Learning: A Theory of Action Perspective*; Addison-Wesley: Reading, MA, USA, 1978; Volume 1.
28. Schön, D.A. *The Reflective Practitioner: How Professionals Think in Action*; Harper Torchbooks; Basic Books: New York, NY, USA, 1983; ISBN 978-0-465-06878-4.
29. Pedler, M.; Boydell, T.; Burgoyne, J. The Learning Company. *Stud. Contin. Educ.* **1989**, *11*, 91–101. [CrossRef]
30. Elliott, I.C. Organisational Learning and Change in a Public Sector Context. *Teach. Public Adm.* **2020**, *38*, 270–283. [CrossRef]
31. Plesner, U.; Justesen, L.; Glerup, C. The Transformation of Work in Digitized Public Sector Organizations. *J. Organ. Chang. Manag.* **2018**, *31*, 1176–1190. [CrossRef]
32. Van der Voet, J.; Kuipers, B.S.; Groeneveld, S. Implementing Change in Public Organizations: The Relationship between Leadership and Affective Commitment to Change in a Public Sector Context. *Public Manag. Rev.* **2016**, *18*, 842–865. [CrossRef]

33. European Commission—Directorate-General for Communications Networks, Content and Technology. *eGovernment Benchmark 2020: EGovernment That Works for the People: Insight Report*; Publications Office of the European Union: Luxembourg, 2020.
34. Idowu Lamid, L.; Ali Ibrahim, I.; Inuwa Abdullahi, K.; Gambo Abdullahi, U. A Framework for Digital Government Transformation Performance Assessment and Toolkit for Developing Countries. In *Proceedings of the ICEGOV 2021: 14th International Conference on Theory and Practice of Electronic Governance*, Athens, Greece, 6–8 October 2021; Association for Computing Machinery: New York, NY, USA, 2022; pp. 203–215.
35. Melhem, S.; Lee, Y.; Dener, C.; Yamamichi, M.; Priftis, M.L.; Pahlavooni, S.; Petrov, O.V.; Chrzanowski, P.A.G.; Sfaxi, M.E. *World Bank Digital Government Readiness Assessment (DGRA) Toolkit V. 31: Guidelines for Task Teams*; World Bank Group: Washington, DC, USA, 2020.
36. Organisation for Economic Cooperation and Development (OECD). *OECD Digital Government Index (DGI)*; Organisation for Economic Cooperation and Development (OECD): Paris, France, 2020. [\[CrossRef\]](#)
37. United Nations. *E-Government Survey 2020. Digital Government in the Decade of Action for Sustainable Development*; United Nations—Department of Economic and Social Affairs: New York, NY, USA, 2020.
38. Dener, C.; Nii-Aponsah, H.; Ghunney, L.E.; Johns, K.D. *GovTech Maturity Index: The State of Public Sector Digital Transformation*; International Development in Focus; The World Bank: Washington, DC, USA, 2021; ISBN 978-1-4648-1765-6.
39. Osmani, M.; Weerakkody, V.; El-Haddadeh, R. Developing a Conceptual Framework for Evaluating Public Sector Transformation in the Digital Era. In *AMCIS 2012 Proceedings, Proceedings of the Eighteenth Americas Conference on Information Systems, Seattle, WA, USA, 9–12 August 2012*; Association for Information Systems: Atlanta, GA, USA, 2012; Volume 4, pp. 2555–2563.
40. Hämäläinen, M. A Framework for a Smart City Design: Digital Transformation in the Helsinki Smart City. In *Entrepreneurship and the Community: A Multidisciplinary Perspective on Creativity, Social Challenges, and Business*; Ratten, V., Ed.; Springer International Publishing: Cham, Switzerland, 2020; pp. 63–86. ISBN 978-3-030-23604-5.
41. European Commission—Directorate-General for Communications Networks, Content and Technology. *eGovernment Benchmark 2022: Synchronising Digital Governments: Insight Report*; Publications Office of the European Union: Luxembourg, 2022.
42. Dafoe, A. On Technological Determinism: A Typology, Scope Conditions, and a Mechanism. *Sci. Technol. Hum. Values* **2015**, *40*, 1047–1076. [\[CrossRef\]](#)
43. Alford, J.; O’Flynn, J. Making Sense of Public Value: Concepts, Critiques and Emergent Meanings. *Int. J. Public Adm.* **2009**, *32*, 171–191. [\[CrossRef\]](#)
44. Gobble, M.M. Digitalization, Digitization, and Innovation. *Res.-Technol. Manag.* **2018**, *61*, 56–59. [\[CrossRef\]](#)
45. Alvarenga, A.; Matos, F.; Godina, R.; Matias, J.C.O. Digital Transformation and Knowledge Management in the Public Sector. *Sustainability* **2020**, *12*, 5824. [\[CrossRef\]](#)
46. Chen, J.; Walker, R.M.; Sawhney, M. Public Service Innovation: A Typology. *Public Manag. Rev.* **2020**, *22*, 1674–1695. [\[CrossRef\]](#)
47. Pollitt, C. Innovation in the Public Sector: An Introductory Overview. In *Innovation in the Public Sector: Linking Capacity and Leadership*; Bekkers, V., Edelenbos, J., Steijn, B., Eds.; Palgrave Macmillan: London, UK, 2011; pp. 35–43. ISBN 978-0-230-30752-0.
48. Bhatti, Y.; Olsen, A.L.; Holm Pedersen, L. Administrative Professionals and the Diffusion of Innovations: The Case of Citizen Service Centres. *Public Adm.* **2011**, *89*, 577–594. [\[CrossRef\]](#)
49. Borins, S. Loose Cannons and Rule Breakers, or Enterprising Leaders? Some Evidence about Innovative Public Managers. *Public Adm. Rev.* **2000**, *60*, 498–507. [\[CrossRef\]](#)
50. Salge, T.O.; Vera, A. Benefiting from Public Sector Innovation: The Moderating Role of Customer and Learning Orientation. *Public Adm. Rev.* **2012**, *72*, 550–559. [\[CrossRef\]](#)
51. Walker, R.M. Innovation Type and Diffusion: An Empirical Analysis of Logical Government. *Public Adm.* **2006**, *84*, 311–335. [\[CrossRef\]](#)
52. Bekkers, V.; Tummers, L. Innovation in the Public Sector: Towards an Open and Collaborative Approach. *Int. Rev. Adm. Sci.* **2018**, *84*, 209–213. [\[CrossRef\]](#)
53. Meeus, M.; Edquist, C. Introduction to Part I. Product and Process Innovation. In *Innovation, Science and Institutional Change. A Research Handbook*; Hage, J., Meeus, M., Eds.; Oxford University Press: Oxford, UK, 2006; pp. 23–37.
54. Edquist, C.; Hommen, L.; McKelvey, M. *Innovation and Employment: Process Versus Product Innovation*; Edward Elgar Publishing: Cheltenham, UK, 2001; ISBN 978-1-84376-287-4.
55. Moore, M.; Hartley, J. Innovations in Governance. *Public Manag. Rev.* **2008**, *10*, 3–20. [\[CrossRef\]](#)
56. Bekkers, V.; Edelenbos, J.; Steijn, B. *Innovation in the Public Sector. Linking Capacity and Leadership*; Governance and Public Management; Palgrave Macmillan: London, UK, 2011.
57. Wimmer, M.A.; Boneva, R.; di Giacomo, D. Interoperability Governance: A Definition and Insights from Case Studies in Europe. In *Proceedings of the 19th Annual International Conference on Digital Government Research: Governance in the Data Age*, Delft, The Netherlands, 30 May–1 June 2018; Association for Computing Machinery: New York, NY, USA, 2018.
58. Tambouris, E.; Tarabanis, K. Towards Inclusive Integrated Public Service (IPS) Co-Creation and Provision. In *Proceedings of the 22nd Annual International Conference on Digital Government Research*, Omaha, NE, USA, 9–11 June 2021; pp. 458–462.
59. Ansell, C.; Torfing, J. *Public Governance as Co-Creation: A Strategy for Revitalizing the Public Sector and Rejuvenating Democracy*; Cambridge University Press: Cambridge, UK, 2021.
60. Bentzen, T.Ø.; Sørensen, E.; Torfing, J. Strengthening Public Service Production, Administrative Problem Solving, and Political Leadership through Co-Creation of Innovative Public Value Outcomes. *Innov. J. Public Sect. Innov. J.* **2020**, *25*, 1–28.

61. Fox, C.; Jalonen, H.; Baines, S.; Bassi, A.; Marsh, C.; Moretti, V.; Willoughby, M. *Co-Creation of Public Service Innovation—Something Old, Something New, Something Borrowed, Something Tech*; Turku University of Applied Sciences: Turku, Finland, 2019.
62. Hambleton, R. The New Civic Leadership: Place and the Co-Creation of Public Innovation. *Public Money Manag.* **2019**, *39*, 271–279. [[CrossRef](#)]
63. Ferro, E.; Caroleo, B.; Leo, M.; Osella, M.; Pautasso, E. The Role of ICT in Smart Cities Governance. In Proceedings of the 13th International Conference for E-Democracy and Open Government, Krems, Austria, 22–24 May 2013; pp. 133–145.
64. Mazzucato, M. Mission-Oriented Innovation Policies: Challenges and Opportunities. *Ind. Corp. Chang.* **2018**, *27*, 803–815. [[CrossRef](#)]
65. Kattel, R.; Cepilovs, A.; Drechsler, W.; Kalvet, T.; Lember, V.; Tõnurist, P. *Can We Measure Public Sector Innovation? A Literature Review*; LIPSE Project Working Paper No 2; European Union: Brussels, Belgium, 2013.
66. Bekkers, V.; Tummers, L.G.; Voorberg, W.H. From Public Innovation to Social Innovation in the Public Sector: A Literature Review of Relevant Drivers and Barriers. *Rotterdam Erasmus Univ. Rotterdam* **2013**, *320090*, 1–38.
67. Hanelt, A.; Bohnsack, R.; Marz, D.; Antunes Marante, C. A Systematic Review of the Literature on Digital Transformation: Insights and Implications for Strategy and Organizational Change. *J. Manag. Stud.* **2020**, *58*, 1159–1197. [[CrossRef](#)]
68. Mahraz, M.-I.; Benabbou, L.; Berrado, A. A Systematic Literature Review of Digital Transformation. In Proceedings of the International Conference on Industrial Engineering and Operations Management, Toronto, ON, Canada, 23–25 October 2019; pp. 917–931.
69. Zaoui, F.; Souissi, N. Roadmap for Digital Transformation: A Literature Review. *Procedia Comput. Sci.* **2020**, *175*, 621–628. [[CrossRef](#)]
70. van der Panne, G.; van Beers, C.; Kleinknecht, A. Success and Failure of Innovation: A Literature Review. *Int. J. Innov. Manag.* **2003**, *7*, 309–338. [[CrossRef](#)]
71. Geels, F.W. *Technological Transitions and System Innovations: A Co-Evolutionary and Socio-Technical Analysis*; Edward Elgar: Cheltenham, UK; Northampton, MA, USA, 2005; ISBN 978-1-84542-009-3.
72. Geels, F.W. The Multi-Level Perspective on Sustainability Transitions: Responses to Seven Criticisms. *Environ. Innov. Soc. Transit.* **2011**, *1*, 24–40. [[CrossRef](#)]
73. Geels, F.W. Micro-Foundations of the Multi-Level Perspective on Socio-Technical Transitions: Developing a Multi-Dimensional Model of Agency through Crossovers between Social Constructivism, Evolutionary Economics and Neo-Institutional Theory. *Technol. Forecast. Soc. Chang.* **2020**, *152*, 119894. [[CrossRef](#)]
74. Geels, F.W.; Schot, J. Typology of Sociotechnical Transition Pathways. *Res. Policy* **2007**, *36*, 399–417. [[CrossRef](#)]
75. Riddell, D.; Moore, M.-L. *Scaling Out, Scaling Up, Scaling Deep*; JW McConnell Family Foundation: Montréal, QC, Canada; Tamarack Institute: Waterloo, ON, Canada, 2015.
76. Dam, R.F.; Siang, T.Y. *Design Thinking: A Quick Overview*; Interaction Design Foundation: Aarhus, Denmark, 2020.
77. Pande, M.; Bharathi, S.V. Theoretical Foundations of Design Thinking—A Constructivism Learning Approach to Design Thinking. *Think. Ski. Creat.* **2020**, *36*, 100637. [[CrossRef](#)]
78. Tosey, P.; Visser, M.; Saunders, M.N. The Origins and Conceptualizations of ‘Triple-Loop’ Learning: A Critical Review. *Manag. Learn.* **2012**, *43*, 291–307. [[CrossRef](#)]
79. Romme, A.G.L.; van Witteloostuijn, A. Circular Organizing and Triple Loop Learning. *J. Organ. Change Manag.* **1999**, *12*, 439–454. [[CrossRef](#)]
80. Schein, E.H. *Organizational Culture and Leadership*; Jossey-Bass Publishers: San Francisco, CA, USA, 1985.
81. Teichert, R. Digital Transformation Maturity: A Systematic Review of Literature. *Acta Univ. Agric. Silvic. Mendel. Brun.* **2019**, *67*, 1673–1687. [[CrossRef](#)]
82. Nerima, M.; Ralyté, J. Towards a Digital Maturity Balance Model for Public Organizations. In *Research Challenges in Information Science, Proceedings of the 15th International Conference, RCIS 2021, Limassol, Cyprus, 11–14 May 2021*; Cherfi, S., Perini, A., Nurcan, S., Eds.; Springer International Publishing: Cham, Switzerland, 2021; pp. 295–310.
83. Becker, J.; Knackstedt, R.; Pöppelbuß, J. Developing Maturity Models for IT Management. *Bus. Inf. Syst. Eng.* **2009**, *1*, 213–222. [[CrossRef](#)]
84. Wichmann, J.; Wißotzki, M.; Sandkuhl, K. Toward a Smart Town: Digital Innovation and Transformation Process in a Public Sector Environment. In *Human Centred Intelligent Systems*; Zimmermann, A., Howlett, R.J., Jain, L.C., Eds.; Smart Innovation, Systems and Technologies; Springer: Singapore, 2021; Volume 189, pp. 89–99. ISBN 9789811557835.
85. Brynskov, M.; Raitisoja, G.; Campolargo, M.; Kershot, H.; Concilio, G.; Bianchi, I.; Fagiani, F.; Fontana, M.; Mariani, I.; Secchi, M.; et al. *DIGISER—Digital Innovation in Governance and Public Service Provision: Final Report*; ESPON: Luxembourg, 2022.
86. Kemp, R.; Loorbach, D.; Rotmans, J. Transition Management as a Model for Managing Processes of Co-Evolution towards Sustainable Development. *Int. J. Sustain. Dev. World Ecol.* **2007**, *14*, 78–91. [[CrossRef](#)]
87. Organisation for Economic Cooperation and Development (OECD). *Government at a Glance 2017*; OECD Publishing: Paris, France, 2017.
88. Organisation for Economic Cooperation and Development (OECD). *Government at a Glance 2019*; OECD Publishing: Paris, France, 2019.
89. Fernandez, S.; Rainey, H.G. Managing Successful Organizational Change in the Public Sector. *Public Adm. Rev.* **2006**, *66*, 168–176. [[CrossRef](#)]

90. Loorbach, D. Transition Management for Sustainable Development: A Prescriptive, Complexity-Based Governance Framework. *Governance* **2010**, *23*, 161–183. [[CrossRef](#)]
91. Loorbach, D.; Rotmans, J. The Practice of Transition Management: Examples and Lessons from Four Distinct Cases. *Futures* **2010**, *42*, 237–246. [[CrossRef](#)]
92. Komatsu, T.T.; Salgado, M.; Deserti, A.; Rizzo, F. Policy Labs Challenges in the Public Sector: The Value of Design for More Responsive Organizations. *Policy Des. Pract.* **2021**, *4*, 271–291. [[CrossRef](#)]
93. Trischler, J.; Dietrich, T.; Rundle-Thiele, S. Co-Design: From Expert- to User-Driven Ideas in Public Service Design. *Public Manag. Rev.* **2019**, *21*, 1595–1619. [[CrossRef](#)]
94. Faro, B.; Abedin, B.; Kozanoglu, D.C. Continuous Transformation of Public–Sector Organisations in the Digital Era. In Proceedings of the 25th Americas Conference on Information Systems, AMCIS 2019, Cancún, Mexico, 15–17 August 2019.
95. Wimmer, M.A.; Pereira, G.V.; Ronzhyn, A.; Spitzer, V. Transforming Government by Leveraging Disruptive Technologies: Identification of Research and Training Needs. *ef. eDemocr. Open Gov.* **2020**, *12*, 87–114. [[CrossRef](#)]
96. Georghiou, L.; Edler, J.; Uyarra, E.; Yeow, J. Policy Instruments for Public Procurement of Innovation: Choice, Design and Assessment. *Technol. Forecast. Soc. Chang.* **2014**, *86*, 1–12. [[CrossRef](#)]
97. Talebi, A.; Rezania, D. Governance of Projects in Public Procurement of Innovation a Multi-Level Perspective. *J. Public Procure.* **2020**, *20*, 187–206. [[CrossRef](#)]
98. Concilio, G.; Pucci, P. The Data Shake: An Opportunity for Experiment-Driven Policy Making. In *The Data Shake. Opportunities and Obstacles for Urban Policy Making*; Concilio, G., Pucci, P., Raes, L., Mareels, G., Eds.; SpringerBriefs in Applied Sciences and Technology; Springer International Publishing: Cham, Switzerland, 2021; pp. 3–18. ISBN 978-3-030-63692-0.
99. Mortati, M.; Magistretti, S.; Cautela, C.; Dell’Era, C. Data in Design: How Big Data and Thick Data Inform Design Thinking Projects. *Technovation* **2023**, *122*, 102688. [[CrossRef](#)]
100. Callinan, C.; Scott, M.; Ojo, A.; Whelan, E. How to Create Public Value through Open Data Driven Co-Creation: A Survey of the Literature. In Proceedings of the 11th International Conference on Theory and Practice of Electronic Governance, Galway, Ireland, 4–6 April 2018; Association for Computing Machinery: New York, NY, USA, 2018; pp. 363–370.
101. Janssen, M.; Charalabidis, Y.; Zuiderwijk, A. Benefits, Adoption Barriers and Myths of Open Data and Open Government. *Inf. Syst. Manag.* **2012**, *29*, 258–268. [[CrossRef](#)]
102. Klievink, B.; Romijn, B.-J.; Cunningham, S.; de Bruijn, H. Big Data in the Public Sector: Uncertainties and Readiness. *Inf. Syst. Front.* **2017**, *19*, 267–283. [[CrossRef](#)]
103. Mazzucato, M. *Mission-Oriented Research & Innovation in the European Union*; European Commission—Directorate-General for Research and Innovation: Brussels, Belgium, 2018.
104. Robinson, D.K.R.; Mazzucato, M. The Evolution of Mission-Oriented Policies: Exploring Changing Market Creating Policies in the US and European Space Sector. *Res. Policy* **2019**, *48*, 936–948. [[CrossRef](#)]
105. Avgerou, C. IT and Organizational Change: An Institutional Perspective. *Inf. Technol. People* **2000**, *13*, 234–262. [[CrossRef](#)]
106. Deserti, A.; Rizzo, F. Embedding Design in the Organizational Culture: Challenges and Perspectives. In *Design Culture: Objects and Approaches*; Julier, G., Folkmann, M.N., Skou, N.P., Jensen, H.-C., Munch, A.V., Eds.; Bloomsbury Academic: London, UK, 2019; pp. 39–51.
107. Poole, M.S.; Van de Ven, A.H. (Eds.) *The Oxford Handbook of Organizational Change and Innovation*; Oxford University Press: Oxford, UK, 2021; ISBN 978-0-19-884597-3.
108. Chilvers, J.; Pallett, H.; Hargreaves, T. Ecologies of Participation in Socio-Technical Change: The Case of Energy System Transitions. *Energy Res. Soc. Sci.* **2018**, *42*, 199–210. [[CrossRef](#)]
109. Shove, E.; Pantzar, M.; Watson, M. *The Dynamics of Social Practice: Everyday Life and How It Changes*; Sage Publications: London, UK, 2012.
110. Hansen, M.T.; Birkinshaw, J. The Innovation Value Chain. *Harv. Bus. Rev.* **2007**, *85*, 121. [[PubMed](#)]
111. Bugge, M.M.; Fevolden, A.M.; Klitkou, A. Governance for System Optimization and System Change: The Case of Urban Waste. *Res. Policy* **2019**, *48*, 1076–1090. [[CrossRef](#)]
112. Campbell, T. *Beyond Smart Cities: How Cities Network, Learn and Innovate*; Routledge: London, UK, 2012.
113. ESPON. *Policy Brief: The Territorial and Urban Dimensions of the Digital Transition of Public Services*; ESPON EGTC: Luxembourg, 2017.
114. Concilio, G.; Karimi, M.; Rössl, L. Complex Projects and Transition-Driven Evaluation: The Case of the EasyRights European Project. *Sustainability* **2021**, *13*, 2343. [[CrossRef](#)]
115. Bianchi, I.; Concilio, G.; Gauk, M.; Mariani, I.; Secchi, M. Making Public Administrations Reflect on Digital Transition. The Approach of the DIGISER Project. In Proceedings of the IFKAD—17th International Forum on Knowledge Asset Dynamics, Lugano, Switzerland, 20–22 June 2022; pp. 1729–1747.

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