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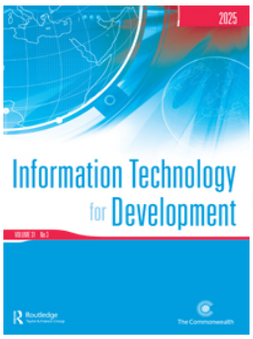

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Digital policy narratives: addressing grand challenges or exacerbating digital inequalities?

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ABSTRACT

Like many countries, the UK has been exploring digital technologies to address grand challenges. In this paper, we study UK policy-generated narratives of the past 10 years to explore the role of digital inequalities within the UK policy rhetoric on the benefits of digital technologies. We combine topic modeling and qualitative analysis to analyse 227 policy documents. Our findings indicate that policy frames digital technologies as able to support efficiencies and innovation. Policy proposes that regional initiatives are needed to incentivise businesses, through funding, and to support citizens, primarily through digital skills training. We argue that, in this discourse, digital technologies are framed as the panacea for addressing challenges, without sufficiently recognizing that techno-centric solutions, considering digital inequalities, can instead exacerbate existing divides. In this respect, our study contributes by showcasing the need for policy framing being aligned and consistent with the prioritization of digital inequalities for constructive digital transformations.

KEYWORDS

Digital inequalities; digital transformation; public sector; United Kingdom; digitalization

1. Introduction

Government policy plays a pivotal role in addressing grand challenges, encompassing issues such as climate change, healthcare disparities, economic inequalities (OECD, 2020), and facets of social justice (Alves & Mariano, 2018), as policymaking needs to ensure not only the sustainability and resilience of societies and economies but also the equitable and fair distribution of benefits, opportunities and resources that will enable these (Levy et al., 2020). In this context, we observe that very often policy and industry advocate and propose the use of digital technologies toward supporting the economy and growth, as well as for addressing and achieving targets within the social justice agenda. As such, digitalization has come to form a core part of policymaking (Yang & Huang, 2024). Indeed, there has been increasing reliance on technology to formulate and implement effective solutions at the policy level (Escobar et al., 2023), where it is expected that the technology's transformative potential can revolutionize economies and enhance productivity (Avgerou & Bonina, 2020; Misuraca et al., 2012).

However, scholarship has criticized the overreliance on digital technologies toward meeting such goals and has highlighted that in many cases, digitalization can simultaneously contribute to and complicate the issues they aim to solve (Aanestad, 2023). For example, digital technologies have

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been framed as a solution towards improving education (Davies et al., 2021) and healthcare, by enabling responsiveness and efficiencies, and contributing the necessary evidence that can inform policymaking around societal needs (Radermacher, 2019). Yet, the delivery of such services via digital technologies can deepen existing and create new inequalities, because not everyone has access to or can use digital technologies (Hsieh et al., 2008; Shao & Kostka, 2023). Thus, digitalization can result in the unfair distribution of resources and benefits (Sanders & Scanlon, 2021).

Policy and policy making are often characterized by purposeful ambiguity (Vayrynen et al., 2022), which is further compounded by little clarity in terms of what digital transformation might mean and encompass (Markus & Rowe, 2023). As such, to address these, current literature on policymaking and digitalization and digital transformation has placed great emphasis on what digital transformation might entail, and what might be the key performance or success indicators (Mettler et al., 2024). Much less is known however about how policy frames the digital transformation (Mettler et al., 2024). While it is crucial to understand what digital transformation is, what it might entail and what success looks like, we believe it is even more crucial to understand policy framing because it is this activity that legitimizes problems, actions and resource allocation (Ulnicane & Aden, 2023), and thus prescribes assumptions and expectations regarding digital inequalities.

In the United Kingdom (UK), since 2013, government services have moved to a 'digital by default' approach (GOV.UK, 2013), i.e. defaulting to digital versions of governmental services and steadily withdrawing face-to-face equivalents, where possible. This strategic choice is believed to create cost efficiencies across government departments, to better respond to citizens' expectations and preferences, and to reach more citizens, especially those living in remote and rural areas, and those who cannot access services due to personal circumstances and health conditions (DSIT, 2023). In doing so, the government has been unequivocally committed, however, not to 'leave anyone behind' (GOV.UK, 2013).

Just shy of a decade later, the updated version of the UK government's Digital Strategy remains consistent with these commitments, and great focus is placed on the digital as a transformative force for the economy, the environment, and society, where '[n]o one, and no place, should be left behind' (DCMS, 2022). Yet, it is estimated that approximately 19 million individuals in the UK experience digital poverty in some form, which manifests in the inability to engage fully with the digital world (Deloitte, 2023). Moreover, the ongoing 'cost of living crisis' the country has been facing since 2021 further worsens this situation, limiting access to vital services if these are primarily delivered digitally.

In this study, we focus on the UK's policy regarding grand challenges and the use of digital technologies for addressing them, and we ask: 'How does the UK policy frame digitalisation and to what extent does it address its implications on digital inequalities?' We aim to identify the policy areas where digital technologies seem to be prioritized, how these are framed and critically reflect on whether and to what extent such framing considers the implications of digitalization within the context of digital inequalities. Policy documents help capture policy rationales through the careful analysis of their rhetoric (Devlieghere et al., 2017), and we focus specifically on policy framing that advocates for the use of digital technologies. In more detail, we analyse policy documents published between the initial introduction of the UK Digital Strategy in 2013 and its subsequent revision in 2022, using a mixed methods approach that combines topic modeling and the critical analysis of documents.

Our findings suggest that the UK policy puts forward digitalization to achieve efficiencies in core policy areas, such as energy and the welfare sector, to innovate and achieve growth. Digitalization is also considered a priority when it comes to addressing disparities and everyday problems affecting citizens. Our reflection on the policy framing suggests that in doing so, policymakers underline the need for relevant policy and regional initiatives to materialize the benefits along the above-mentioned dimension; yet, the treatment of digital inequalities is rather superficial, where training on digital skills and expanding infrastructural work are seen as enough to address them. In other words, digitalization is framed as the ultimate 'go-to' solution rather unquestioningly, whereby

the implications of (digital) inequalities are expected to be addressed through further digitalization. In other words, UK policy adopts a rather technosolutionist approach, where the values operationalized in the framing of these policies are those of efficiencies and growth, and where the implications of digital inequalities are considered as obstacles toward achieving these values.

In what follows, we first present the background of the study. This is followed by the presentation of our methods and our findings from the document analysis, and we then discuss these against the background of existing literature to showcase our study's contributions. The paper concludes with a discussion of the study's limitations and future research avenues.

2. Background

2.1. Digital transformation of the public sector and addressing grand challenges

To date, digital transformation efforts and projects within the context of the public sector operate at different government levels: from the digitalization and reengineering of internal business processes (Weerakkody et al., 2011) to the establishment of digital identity systems (Masiero & Bailur, 2021) and the use of big data analytics to inform policy-making (Giest, 2017). In all cases, the digitalization of the public sector is understood both 'as an alternative to bureaucratic government' and as a move 'towards a more integrated, efficient and accurate public action addressing the needs of citizens and business' (Di Giulio & Vecchi, 2023, p. 135), and it is often framed as an instrument to achieve competitive advantage over other countries and economies (Mettler et al., 2024).

Indeed, the dominant discourse around the digitalization of the public sector has been primarily focused on the positive effects of digital technologies, which are often understood through the lenses of productivity gains, efficiencies and savings. As such, digital technologies are often framed as having a positive transformative impact and that they can benefit *everyone* in society, including minoritised and marginalized individuals (Avgerou & Bonina, 2020). In addition to the above, a frequently invoked motivation for the digitalization of the public sector is that of improved service delivery to all citizens, where public services and products can be personalized and tailored to their own particular needs (Bertot et al., 2016).

While it is certainly true that digital transformation can bring about positive changes and help address grand challenges, it is also important to acknowledge the numerous negative implications by omission or commission (Andersson et al., 2022; Medaglia et al., 2022; Sheldrick, 2023).

2.2. What do we mean when we talk about digital inequalities

Digital inequalities constitute a substantial problem on a global scale which can be broadly understood as inequalities in the access and use of digital technologies (Hsieh et al., 2008). Yet, recent literature exhibits great variation in how digital inequalities are conceptualized and therefore treated. A commonly used term is that of the digital divide, theorized as a multi-level phenomenon, that draws attention to differential access to digital goods and services, as well as digital capabilities (van Dijk, 2020; van Dijk & Hacker, 2003; Wei et al., 2011), i.e. the differences between the haves and the have-nots. Digital exclusion is a similar concept where inclusion and exclusion as policy discourses emerged in France in the 1970s to identify social groups that were (or were not) protected by the government's social welfare system (De Haan, 2000). Contextualized within the digital world, digital exclusion can be the result of one being either outside the periphery of policy's awareness, or the target of different levels of societal oppression (Velicu et al., 2022). We can therefore argue that digital exclusion, much like the digital divide, can be the result of inertia, inactivity, unawareness, or indifference. In contrast, digital inclusion requires determination and deliberate action in tackling multiple layers of exclusions. More recently in 2004, the term digital poverty emerged (Galperin & Mariscal, 2004), to describe the inability to engage comprehensively with the digital and online world, in a manner that aligns with one's specific needs for how, when and from where they engage (Allmann, 2021).

At first glance, the aforementioned concepts seem quite similar, yet there are some small differences between them (Zamani & Rousaki, 2024). The terms digital divide and digital exclusion allude to a relational or a distributional perspective of resources, whereby there is a distinction between those who have and those who have not access to these, and those who are within a certain group or outside of that, respectively. Digital poverty, however, is linked to both consequences and causes of other forms of socio-economic disadvantages, at the same time intensifying and exacerbating socio-economic, educational, racial, linguistic, gender, and health-related structural inequalities (Deloitte, 2023), thus existing along a spectrum. It also indicates that there is an absolute threshold, below which one's living standard deteriorates significantly. In other words, digital poverty allows us to consider what might be an absolute minimum or a minimum standard that is required for people to be digitally included and thus benefit from the digital world in an attempt to overcome digital inequalities (Barrantes Cáceres, 2007). As such, digital poverty as a term is a better vehicle for policy-level action-orientated discussions (Zamani & Vannini, 2022).

Irrespective of the preferred term, addressing digital inequalities is a matter of social justice. Social justice refers to fairness and equality in terms of the distribution of resources and rights within a society (United Nations, 2006). It thus follows that, whenever digital technologies are used for delivering and distributing resources, providing access to services and products, and granting/restricting rights, they risk exacerbating injustices – even when their intended purpose is to provide relief and fairness (Aanestad et al., 2022). For example, the digitalization of healthcare may suggest (and often does) that digitally poor patients (e.g. without access to IT equipment, skills and/or connectivity) may struggle to book or attend a doctor's appointment and renew prescriptions (Heponiemi et al., 2022), resulting in the unfair access to healthcare, a core social justice issue. Therefore, considering social justice within the context of public sector digitalization is essential for ensuring that drawn-up policies are equitable and beneficial for all and that they safeguard against further inequalities.

2.3. Policy making, digitalization and inequalities

Policy can be understood as 'a statement of intent, a system of principles to guide decisions toward outcomes desired by any governing body,' where often 'policy issues are mundane, having to do with efficiency and effectiveness' (King & Kraemer, 2019, p. 843). Within the context of our study, policymaking plays a central role in shaping the direction and focus of digitalizing the public sector, by influencing, often indirectly, the allocation of resources, and the spirit of digitalization (Schou & Hjelholt, 2018).

In doing so, and despite the possible mundaneness, policymaking is characterized by a web of policymakers and influencing actors, who may hold conflicting agendas and priorities. As part of policy making, policymakers and influencing actors interact with each other within unpredictable environments, the former tasked with establishing rules and regulations, and the latter seeking to influence this process with their own perspectives, often by defining problems, responding to consultations and lobbying (Mayne et al., 2018). In this respect, public values can be a way to address and navigate the complexity through the various stages of policy-making, i.e. formulation, implementation, execution, enforcement, and evaluation (Janssen & Helbig, 2018), whereby said values can inform the direction of travel. For example, and particularly concerning digital inequalities, depending on public values, a government may choose different approaches toward addressing them (or not) and policy is instrumental in operationalizing them. Relevant policy measures and initiatives can take different forms, from interventions to provide infrastructural access to incentivising and supporting localized partnerships with other providers (Vassilakopoulou & Hustad, 2023).

It thus follows that the way a policy is framed is exceptionally important: framing tactics are highly popular and effective in removing obstacles and overcoming challenges, and entail persuasion (i.e. showing the benefits) and accommodation (i.e. providing training or compensations) (Suchitwarasan et al., 2024). This also means that policy and the way it is framed can often define the problem to be addressed, it limits the pool of potential solutions and may dictate the path to implement the latter

(Monaghan & Ingold, 2019). It is then important to remind ourselves that much of the policy discourse frames digitalization 'as imminent and their consequences are predefined – for societies, communities and individuals. All we have to do is 'reach out' for the opportunities offered' (Klecun, 2008).

3. Methods and context

Our focus is that of the UK precisely because the country, through successive governments, has shown commitment and dedication to large-scale IT projects within the public sector, each of which sought to transform large public sector areas and change the way the government interacts with and serves its citizens (Omar et al., 2017). Some of these projects include the National Program for Information Technology (NPfIT) which sought to digitize patient records and integrate patient services and systems across the country; the Making Tax Digital project, which aims at digitalizing the tax system; and the Universal Credit Programme, that aimed at rationalizing the welfare benefits system. In addition, and alongside the commitment to digital transformations in the public sector, and through its digital strategy, the UK government has explicitly acknowledged that in pursuing digitalization, '[n]o one, and no place, should be left behind' (DCMS, 2022). Yet, there are about 19 million individuals (about 35% of the total population) in the UK who experience some form of digital exclusion and inequalities (Deloitte, 2023). This has resulted in heavy criticism with regard to inconsistencies between very high ambitions for becoming a science and technology superpower and digital economy leader, without however having a viable plan for combatting digital inequalities (House of Lords, 2023). Indeed, the country's digital inclusion plan is more than ten years old now (Government Digital Service, 2014), and antiquated.

In this study, we explore the role of digital technologies within UK policy rhetoric and we are interested in identifying priority areas in terms of digitalization, so as to explore whether and to what extent digital inequalities are adequately considered. Therefore, we analysed policy documents published by the UK government and documents prepared by its various offices (e.g. Office for Product Safety & Standards), which are typically used to provide the evidence required for informing policy. The publication period covers the period between 2013 and 2023, i.e. the period between the publication of the first and second Digital Strategy documents. To identify and collect these sources, we used the Overton database (app.overton.io), a web-based application that allows researchers to search and download policy documents. We conducted our search in July 2024, using the following keywords: 'digital poverty,' 'digital inclusion,' 'digital exclusion,' and 'digital divide,' filtered for 'UK government' documents. For each policy document, we recorded the title of the document, the link to the UK government's website, the publishing body, and the date of publication. Following that, we checked the preliminary pool of documents for any duplicates, and documents having only a passing interest in digitalization and themes pertaining to grand challenges, which were then removed (e.g. cursory reference to digital poverty).

This was followed by identifying important linked documents (e.g. reference to an addendum, updated versions). The final pool contains 227 documents (Table 1). The average word count per document is 2,1261 words (min: 485, max: 121,359), with the median being 15,877 words. Figure 1 shows the spread of policy documents over the past decade. Mentions of digital poverty seem to have emerged more recently, starting to appear in 2019. As expected, the year following the eruption of the COVID-19 pandemic saw a flurry of policy documents referring to or addressing digital inequalities.

We adopted a mixed methods approach to document analysis. Document analysis is the systematic analysis of reviewing and evaluating documents, whereby the aim is to analyse said documents to elicit meaning and develop a rich understanding of the phenomenon of interest (Bowen, 2009). Our mixed methods approach entailed the use of topic modeling and critical analysis of the collated policy documents. Combining the two methods allowed us to leverage the potential of topic modeling for identifying latent topics and the linkages between them (whereby line-by-line reading and

Table 1. Overview of policy documents.

Keyword	Initial number of policy documents	Publication time frame
Digital poverty	28	2019–2023
Digital inclusion	306	2013–2023
Digital exclusion	195	2013–2023
Digital divide	273	2013–2023
Total	802	
Removal of duplicates, summaries and documents with only a passing interest on digitalization	624 documents removed	
Linked document search	49 documents added	
Final pool	227	

Note: All documents retrieved via the Overton database. Some documents were Executive Summary documents or Foreword documents, summarizing or introducing a policy, with the actual policy being provided via a separate link or not at all. In these cases, we accessed the actual policy via the link (if that was available) or we located it via a Google search.

analysing would be prohibitive due to the volume of documents), while accounting for and responding to the shortcomings that a topic modeling analysis alone could present (Brookes & McEnery, 2019), including contextualizing the resulting topics (Hannigan et al., 2019) within the UK policy landscape.

First, we conducted topic modeling to inductively identify prominent topics and relationships between them within the large corpus of documents. Topic modeling helps identify word associations that form topics within the corpus of the textual material. It allows the creation of groups of terms (e.g. 'immigration rules,' 'social prescribing,' 'consultation paper') which collectively formulate a specific topic (e.g. 'regulations and consultations') within the pool of policy documents. Using this method helped reduce the complexity of the large corpus of text analysed into fewer,

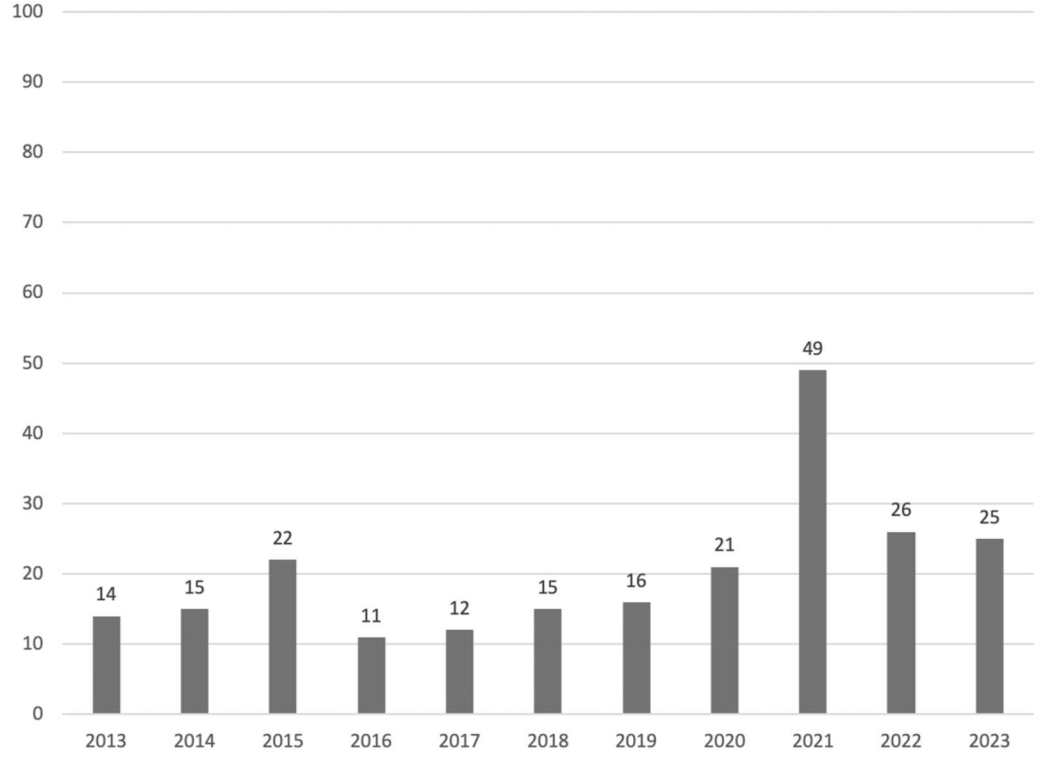

Figure 1. Number of published policy documents per year containing one or more of the keywords.

meaningful topics (Kotsialos & Vassilakopoulou, 2023). We employed the Latent Dirichlet Allocation (LDA), which is a probabilistic unsupervised learning technique for topic modeling, and we used BigML, a web-based application for pre-processing the corpus and conducting the LDA analysis. During pre-processing, we excluded all numerical and special characters (e.g. HTML markers) and all non-dictionary words, as well as certain words that were irrelevant to the analysis but repetitive across the text corpus ('table of contents,' 'executive summary,' 'et al.'). We then conducted several topic modeling analyses, starting with the default topic modeling parameters (Table 2, model 0) and then manipulating the number of topics, number of terms and n-grams, until we identified the model that yielded interpretable results (Table 2, model 21), or as Hannigan et al. (2019) suggest, the most semantically meaningful results. Table 2 presents the parameters for all the models produced, whereby 15 topics have been identified overall, clustered around three themes (Figure 2). Table 4 summarizes the emerging topics and the terms these topics include, and Figure 2 presents the relative distance between them, i.e. association strength between them.

Topic modeling, while powerful, can only help identify the clustering of terms around topics, and the clustering of topics around possible themes; however, as a method, does not lend itself to directly assigning labels and meaning to the above-mentioned clustering, i.e. interpreting and critically analysing the results. To address this, we turned to an interpretive analysis (Hacker et al., 2020; Williams et al., 2023), and adopted grounded theory method techniques for analysis, labeling and interpretation. Our approach is summarized in Table 3. The interpretive analysis of the topic modeling results helped us develop a better and richer understanding of the relationships among the terms included in each topic, and among all topics (Jacobs & Tschötschel, 2019), and thus clarify the identified themes. It is also through this interpretive analysis that we assigned meaningful labels to each of the 15 emerging topics (based on the terms they contain and the UK policy context), and to the three themes the 15 topics cluster around. For example, the term 'connected car' was grouped together with other terms, such as 'church buildings' and 'living labs,' via topic modeling. These terms seem quite disparate, but through the interpretive analysis of sampled documents, we were able to clarify that the terms together relate to the ways and techniques for engaging citizens toward achieving consensus and getting buy-in for pursuing innovations. The topic was thus labeled as 'Engagement and Innovation.' To support the analytical process, and to confirm the

Table 2. LDA topic modeling analyses performed with BigML. Model 21 (in bold) is the adopted model.

Model	Max N of topics	Max n-grams	N of terms per topic	Non-language characters excluded	Numbers excluded	Single tokens excluded
model 0	auto (40)	four	10	yes	yes	yes
model 1	30	four	10	yes	yes	yes
model 2	20	four	10	yes	yes	yes
model 3	18	four	10	yes	yes	yes
model 4	18	tri	10	yes	yes	yes
model 5	15	tri	10	yes	yes	yes
model 6	15	bi	10	yes	yes	yes
model 7	16	tri	10	yes	yes	yes
model 8	16	four	10	yes	yes	yes
model 9	13	tri	10	yes	yes	yes
model 10	13	four	10	yes	yes	yes
model 11	13	bi	10	yes	yes	yes
model 12	14	tri	10	yes	yes	yes
model 13	14	four	10	yes	yes	yes
model 14	15	four	10	yes	yes	yes
model 15	17	four	10	yes	yes	yes
model 16	18	bi	10	yes	yes	yes
model 17	16	bi	10	yes	yes	yes
model 18	20	bi	10	yes	yes	yes
model 19	14	bi	10	yes	yes	yes
model 20	17	tri	10	yes	yes	yes
model 21	**15**	**four**	**10**	**yes**	**yes**	**yes**

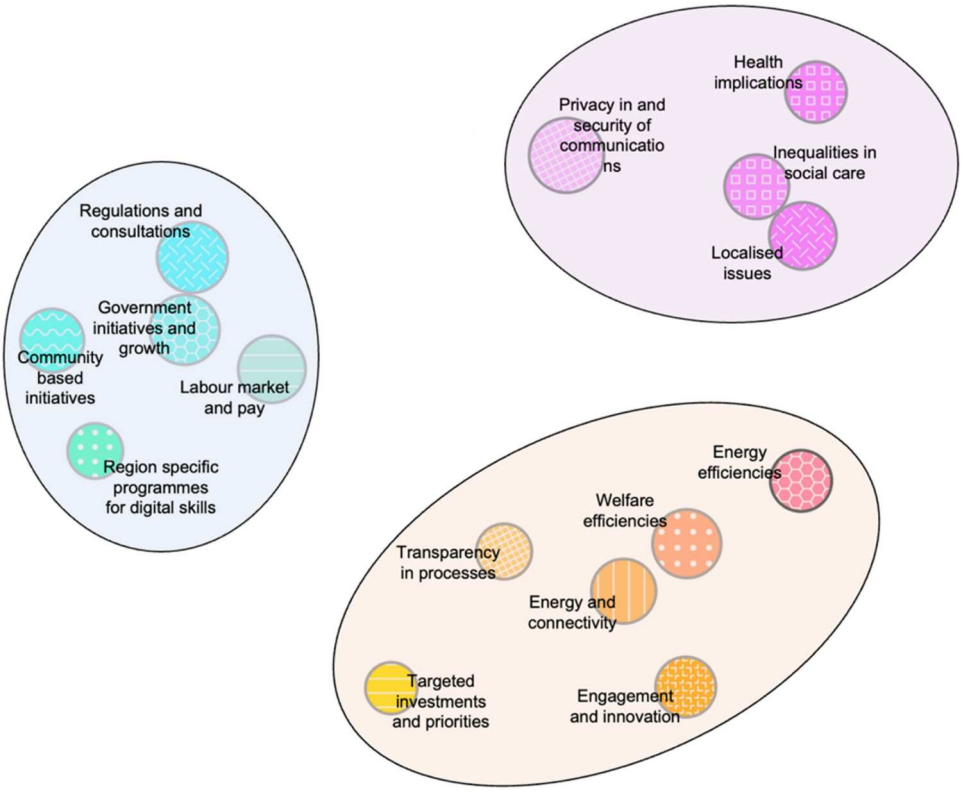

Figure 2. Relative mapping of the resulting topics.

validity of our understanding and interpretations, we continuously sampled policy documents included in the final pool to confirm and validate our understanding and interpretations through their close and careful reading in full, held extensive discussions between the two authors, and relabeled topics and themes where necessary. At the write-up stage, we also consulted more recent

Table 3. Analytic process.

Stage	Description
Initial labeling	Assigned tentative labels to the 15 identified topics based on the terms forming each topic, by sampling policy documents containing these terms, and extracting representative extracts from said documents. Sampled policy documents were read in full.
Review	Reviewed tentative labels and scrutinized them against the UK policy context and relevant literature (discipline-agnostic and focused largely on digital transformation and public sector digitalization). Consultation between authors to examine whether initial labeling reflects the topic of interest, and to avoid semantic overlaps and gaps. Relabeled tentative labels where necessary (e.g. 'monitoring' was relabeled as 'privacy and security of communications').
Focused labeling	Considered the relative distance of topics and themes (Figure 2), resampled policy documents to cross-check relevance, and reviewed the literature to identify theoretical explanations that could help us elaborate on distance/proximity and clustering. Labels for themes and topics were stabilized (Table 3).
Critical analysis	Examined the stabilized scheme against the literature (discipline-agnostic, with a focus on policy and policy-making, social justice and digital inequalities) to further analyse the linkages between the three emerging themes and the implications of the UK policy on digital technologies within the context of digital inequalities.
Review and reporting	Final analysis and write-up, development of chains of evidence through tables, figures and other diagrammatic memoing, revisiting the literature and revising.

Note: while the process above seems to suggest a linear progression in the analysis, there were several iterations between stages (e.g. critical analysis resulted in further focused labeling, and review and reporting resulted in revisiting initial labeling).

policy documents (i.e. published post 2023) so as to explore the possibility of changes in direction and policy around digitalization. The results of this inductive analysis are depicted in Figure 2 and summarized in Table 4.

4. Findings

Findings in this section are organized around the three inductively developed themes, and their presentation focuses on teasing out and elaborating the linkages between them. In brief, the three themes are those of: **efficiencies and innovation**, which correspond to policy priorities and

Table 4. The three inductively developed themes, the corresponding 15 topics, and the terms constituting each topic.

Theme	Topic	Terms
Policy and regional initiatives	Regulations and consultations	immigration rules, social prescribing, consultation paper, voucher scheme, support worker, law commission, national security, evidence base, commission consultation, commission consultation paper
	Government Initiatives and Growth	library services, economic growth, social isolation, data collection, digital technologies, UK government, developing countries, civil society, prosperity fund, economic development
	Community-based initiatives	Northern Ireland, digital inclusion, civil society, national review, voluntary national, private sector, voluntary national review, third sector, digital service, mobile networks
	Labor market and pay	labor market, low pay, low paid, national statistics, government departments, climate change, economic growth, low carbon, wide range, paid workers
	Region-specific programs for digital skills	digital skills, west midlands, the best start for life, assisted digital, digital identity, justice system, more developed, south east, south west, government response
Digitalization implications and concerns	Privacy and security of communications	monitoring data, cyber security, project leads, mobile telecoms, future use cases for mobile telecoms in the UK, target value, jobcentre plus, public value, national infrastructure, blended advice
	Health implications	mental health, health condition, climate change, social action, mental health conditions, weight management, management services, hate crime, industrial strategy, based social
	Inequalities in health and social care	social care, public health, ethnic minority, local government, health services, UK national, cities program, health inequalities, service delivery, UK government
	Localized issues	local authorities, superfast broadband, superfast broadband program, broadband program, domestic abuse, policy implications, hill farmers, learning disabilities, local authority survey, future cities
Efficiencies and Innovation	Energy efficiencies	smart metering, mobile phone, BPS consumers, local visitors energy suppliers, energy efficiency, pay gap, smart metering information, metering information, energy consumption
	Welfare efficiencies	Universal Credit, service providers, competent authorities, local government, renewable energy, international development, action plan, communities fund, wide range, disabled people
	Energy and connectivity	Home Office, public sector, public services, fuel poor, poor households, challenges faced, fuel poor households, digital infrastructure, wireless connectivity, measurement unit
	Transparency in processes	modern slavery, supply chains, local bodies, sustainable development, universal support, public services, modern slavery act, financial support
	Targeted investments and priorities	European regional development fund, regional development, development fund, regional development fund, European regional, European regional development, investment priority, disabled people, specific objective, managing authority
	Engagement and Innovation	public engagement, technological innovation, public engagement technique, engagement technique, social mobility ageing population, church buildings, autonomous vehicles, living labs, connected car

Note: Universal Credit is the UK's social security payment system (means-based); Blind and Partially Sighted (BPS).

thus function as the main drivers for digitalizing public sector services and processes; **policy and regional initiatives**, which are needed for designing and enacting digitalization endeavors; and **digitalization for addressing citizens' concerns**, which correspond to the main policy considerations with regards to leveraging digitalization for addressing the issues that affect citizens at more micro and local level.

4.1. Efficiencies and Innovation: the promise of digitalization

The digitalization of the public sector has always been linked with concerns regarding creating efficiencies and facilitating and supporting innovation. The argument often is that digitalization can facilitate power and resource (re)distribution (Sheldrick, 2023), whereby innovative technologies result in efficiencies, and increased/improved performance (Avgerou & Bonina, 2020). Our findings indicate that efficiencies that echo the need for accurate resource (re)distribution are mostly linked to core resources (energy) and services (welfare state), and which are considered together with transparency and investment concerns, whereby the latter are used to support specific government priorities. For example, in the 2018 Future Telecoms Infrastructure Review, the government prioritizes the use of 5G connectivity for enhancing the energy grid and facilitating improvements in other services, which could result in environmental benefits and efficiencies:

> Smarter infrastructure and public services: Street lighting, traffic management systems, energy grids and other areas could be enhanced by 5G connectivity. Potential benefits: More efficient and secure service delivery, environmental benefits [Future Telecoms Infrastructure Review, July 2018, p. 18]

This focus on efficiencies is evident across policy documents, where the narrative positions digitalization as necessary to achieve the government's commitments and efficiencies in the welfare state:

> Budget advice will be offered at a national and local level, to anyone claiming Universal Credit or transferring from another benefit. […] Many claimants will be able to self serve via the online budgeting support services that are already available [The Government Response to the Communities and Local Government Select Committee Report, 2013, p. 11].

Part of achieving efficiencies relates to increasing transparency across government processes, supply chains and public services. Here, digital technologies are framed as the means that provide the required transparency and visibility of processes, that can in turn help deter exploitation:

> An online platform was launched in June 2020 to provide easier access for buyers across the public sector in Scotland to the national sustainable procurement tools […] enabling buyers to access information on how to take an ethical approach in their procurement activity including the consideration of human trafficking and exploitation [Independent Anti-Slavery Commissioner Annual Report, 2020-2021, p. 98]

Public engagement, while consistently being within the government's agenda, is primarily discussed for achieving consensus on digitalization to address macro-level challenges rather than local contextual needs at the micro-level, that would enable access and use of public services. For example, within the context of the UK Geospatial Strategy 2030, the Department for Science, Innovation & Technology consulted with various stakeholders and the general public on the use of location data, governance and ethical risks about their use (macro-level); yet the same consideration was not given to the digitalization of the benefits system, through Universal Credit (UC), where consultation took place primarily with industry technology consultants (micro-level) (Sheldrick, 2023; Timmins, 2016).

Indeed, the UC system provides a case in point in terms of how policy values influence digitalization, and how discourses on efficiencies and transparencies can be weaponised. UC was advertised as a system that would support 'welfare that works,' by ensuring a simple and easy-to-use system that would merge six different benefits (housing benefit, employment and support allowance, jobseeker's allowance, child tax credit, working tax credit, income support) into one, paid monthly. By

virtue of being a centralized system and being digital, it was hoped it would prevent instances of fraud and errors, it would help better monitoring and would be cost-efficient for the government (Omar et al., 2017). Yet, to this date, the system is heavily criticized for disempowering (in many cases exceptionally) vulnerable individuals and exacerbating the inequalities experienced by digitally excluded citizens (Sheldrick, 2023). In other words, this centralized system, as a result of a long-standing government policy that has embraced and abided by market economics (Ferguson, 2004), ignored the implications of (digital) inequalities for the benefit of prioritizing the efficiency ideal (Weigl et al., 2024).

4.2. Digital technologies for addressing citizens' issues

The second theme that emerged from the analysis pertains to digitalization for addressing challenges and pressures that affect communities and citizens at a micro- and local level.

Across many of the analysed documents, policy indicates that there is a need for quality evidence to e.g. forecast the demand for services, and thus inform the process of policy-making. It is further argued that this evidence can come from the access and use of different digital services and products (e.g. smart meters, location data, and benefits claimant data). Indeed, the production, collection, and analysis of streams of data can inform policy (Misuraca et al., 2013). In this light, some of the citizens' concerns relate to monitoring and surveillance, and overall skepticism with regards to the purpose of data collection and actual use of said data: while policy is aware of these concerns, the solution seems to be the use of secure technologies, rather than the provision of e.g. alternative means for interacting with government:

> (…) underlying mistrust of government use of personal data, data accuracy leading to poor decision making and security of systems against cyber attacks [Government response to the consultation on draft legislation to support identity verification, 2023]

> We will ensure technologies and data sharing systems are secure by design so they are safe and predictable. Using tools to protect the UK against threats to national security, we will create a secure environment for technology to flourish. We will safeguard personal privacy and property rights, including intellectual property. [The UK's International Technology Strategy, 2023]

There are other, more localized issues, where place-based obstacles raise barriers to benefitting from digitalization. This primarily refers to infrastructural issues, where connectivity may be patchy or not available due e.g. geography (rural/remote areas: availability in mid-2023 was at around 45%), or affordability (e.g. too expensive for telcos to extend their network). In such cases, the focus turns to removing the barriers for the required work, particularly for the national roll-out of gigabit broadband, which is a policy priority:

> Introducing the Product Security and Telecommunications Infrastructure (PSTI) Act 2022. The PSTI Act makes changes to the Electronic Communications Code, the legislation that governs the rights of operators to access land for building and maintaining telecommunications networks. The reforms make it easier for operators to gain rights share and upgrade telecoms infrastructure located on public and private land [Gigabit broadband in the UK: Government targets, policy, and funding, 2023, p. 29]

> [for the delivery of broadband in more areas] We have made permanent the 2013 planning requirements making the deployment of fixed broadband infrastructure by operators with rights under the Electronic Communications Code quicker and cheaper. [A new broadband Universal Service Obligation, 2018, p.7]

The two final areas within this theme are tightly related to each other, and policy often frames them jointly. The first relates to the health and social care sector, specifically within the context of improving the quality-of-care provision, and the quality of health and wellbeing among citizens, while emphasizing savings:

> Digital tools help health and social care providers to plan, design and deliver services in a more personalised way while saving time for staff. Services focus on what matters to each person and their families, helping to

> reduce disparities, and reflecting individual needs and preferences. [A Plan for digital health and social care, 2022]

The second area relates to health disparities and other inequalities, that can be addressed through digitalization, where health conditions can be managed better due to improved access, and where patients can take control over their care and feel empowered:

> The NHS has been exploring whether wearable technology can help patients that have vision and hearing impairments access the health services they need. Health inequalities could be addressed on a larger scale with the assistance of technology, although this would not be without its challenges. For rural communities, establishing services to deliver medical examinations and monitoring at a distance (telemedicine and telehealth respectively) could significantly improve patient accessibility to healthcare [CDEI AI Barometer, 2020]

> People will be empowered, and their experience of health and care will be transformed, by the ability to access, manage and contribute to digital tools, information and services [The NHS Long Term Plan, 2019, p. 93]

Supporting the implementation and use of telecare and remote monitoring is obviously beneficial. Yet, such schemes require the presence of adequate infrastructure (and which in many cases is missing), as well as being able to afford broadband connectivity. As such, digitalizing health and social care needs to be examined against the fact that until mid 2023, the availability of broadband in rural and remote areas was at around 45% (Clark, 2023), while around 9 million UK households have difficulties in affording the cost of broadband (OFCOM, 2024). Recent evidence further indicates that the almost mandated use of digital means (for booking appointments to actual consultations) has resulted in those with the greatest need for care benefiting the least from digitalization, which is inconsistent with the ambition of policy to combat health and social care disparities, as in effect it is used to control access instead (Paddison & McGill, 2022). This inconsistency is reminiscent of what Dignum et al. (2016) highlight when discussing the design and implementation of new technologies: the authors argue that successful and acceptable technologies (including digital ones) need to consider what values are at stake and which of these might be conflicting, as it is not possible to accommodate all in the same design. Indeed, in the above example, we see that the values of social justice regarding equitable access to health conflict with those of efficiencies and cost-cutting, and that the latter have been prioritized over the former, with consideration of digital inequalities.

4.3. Policy and Regional Initiatives: requirements for achieving digitalization

A clear consideration within the policy discourse is centered around the requirements of achieving digitalization. Broadly speaking, these requirements relate to initiatives that can inform but also deliver digitalization across regions, departments and sectors, in line with policy priorities.

Such initiatives can be centrally devised (i.e. government) or more local (community-based), and they are often focused on digital skills and securing digital talent, also as means for addressing labor and pay issues and for supporting growth and productivity. Immigration rules, and specifically post-Brexit, serve as an illustrative example. Post-Brexit commitments entailed imposing stricter controls over immigration, which in turn resulted in labor shortages in sectors such as health and social care, and high skill/high value workers, further exacerbating pressures on critical systems, such as the NHS. To address such shortages, the UK revamped its points-based-system to facilitate the immigration of high skilled workers (Dias-Abey, 2022), where several different digital economy-specific visa routes have been established (e.g. Start Up Visa, Innovator Visa), based on consultations with digital employers and evidence that attracting 'global talent' will help the UK secure its position as innovation and a science superpower. These visa routes could help the country address '*the digital skills gap [that] is estimated to cost the UK economy £63 billion per year' [UK Digital Strategy 2022].*

The above is particularly aligned with considerations regarding the labor market as a whole and pay levels, whereby low unemployment rates do not necessarily lead to increased productivity and economic growth if a large percentage of the labor force is low paid:

> But our economy is in fundamental trouble. We have a strong record on employment, but it is no longer true for millions of families that working hard can keep their heads above water: 15 years of wage stagnation have left households £11,000 worse off each year on average. (…) The promise of liberalisation and deregulation has not brought the promised revolution in investment and productivity. Instead, it has brought the expected side-effects of lower wages and higher inequality [Lord Wood of Anfield on UK Economy: Growth, Inflation and Productivity, 2023]

To address lower wages, and thus tackle stagnating economic growth and productivity within the digital economy, policy considers regional programs and community-based initiatives that aim at digital skills training and support:

> DCMS is supporting Local Digital Skills Partnerships (LDSPs), which are being set up to tackle local digital skills challenges to help build thriving and inclusive local economies. Working closely with LEPs [Local Enterprise Partnership] and other regional stakeholders, these partnerships are encouraged to design and deliver new and innovative digital skills provision that can then be replicated and scaled across the country as more Local DSPs are set up [Connected Growth, April 2019, p.46]

> To support businesses in overcoming this challenge, DCMS supported the development and launch of Digital Boost, which matches small businesses and charities with a network of digital experts willing to offer pro bono 1:1 mentoring, and directs them to digital skills-related content, courses and webinars [2022 UK Digital Strategy].

However, a critical analysis of the above, and particularly in terms of the focus on digital skills, the treatment of digital inequalities is rather superficial and framed through a 'deficit' perspective, whereby the premise is that the lack of such skills is a barrier to growth and to the digital economy:

> For the UK to be a world-leading digital economy that works for everyone, it is crucial that everyone has the digital skills they need to fully participate in society. (…) Individuals, businesses, government and other organisations must take steps now to ensure that we have the skilled and capable workforce needed in an increasingly digital world. As our modern industrial strategy sets out, a lack of digital skills is not only a barrier to people fulfilling their potential, but also a barrier to a more productive economy [Digital skills and inclusion – giving everyone access to the digital skills they need, 2023]

In other words, the lack of digital skills is framed as an obstacle toward financial stability, and work opportunities, which in turn hurt the economy. As such, the provision of digital skills training aims at primarily supporting the growth of the digital economy, rather than people's equal participation in society and combatting digital inequalities. This interpretation is further supported by the suggestion, seen earlier, that the digital skills gap is said to be costing the UK economy £63 billion per year.

5. Discussion

In this study, we analysed UK government policy documents to inquire into how the government approaches and frames digitalization, focusing on the role of digital technologies in addressing challenges, and whether and how digital inequalities are considered against this context. Our findings indicate the presence of three interrelated themes. We find that policy frames the digitalization of the public sector as a requirement for achieving **efficiencies and innovation (macro-level)**, and for addressing issues that affect **citizens at the micro-level** (e.g. healthcare) in their every day. In this way, efficiencies and innovation, particularly in areas such as energy and welfare are particularly pronounced and among policy's main priorities. Against this background, **policy and regional initiatives** are deemed crucial for supporting the design and implementation of digitalization on the grounds. However, placing these findings within the larger discourse and context of digital inequalities, we further show that the dual focus on efficiencies and innovation and the digitalization of products, services and processes, in many cases exacerbates rather than addresses said societal issues and concerns (Figure 3), i.e. they are both the problem and the solution.

We therefore contribute to the existing literature on policy and policy-making with and for digital technologies and their deployment for problem-solving across business and society. We do this by

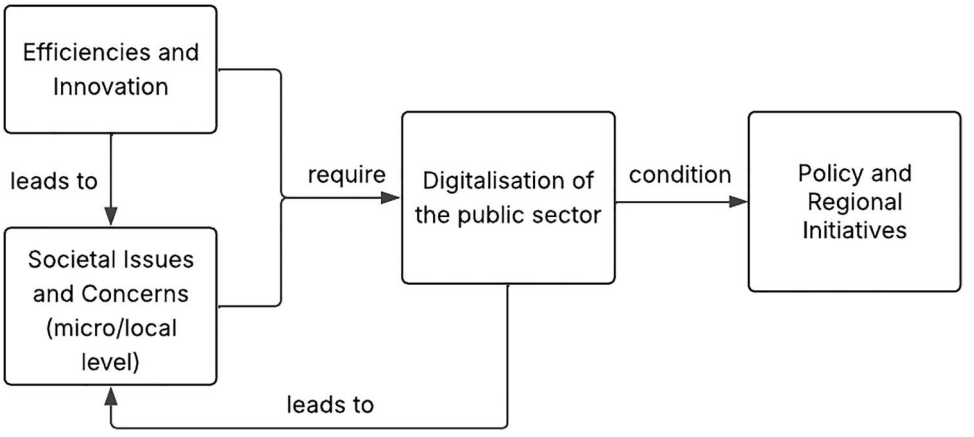

Figure 3. Overview of findings.

highlighting the discernible inclination of UK policy making to resort to technological solutions for issues ranging from health care disparities to energy efficiency. This is not unexpected, and it is not restricted to the UK, as shown by the multi-country efforts employed in tracking and monitoring progress against issues, such as the Sustainable Development Goals (SDGs): achieving goals like reducing health disparities and improving energy efficiency necessitates centralized and coordinated interventions and reliable data. In many cases, it is digital technologies and systems that support this work, by providing data, and helping produce benchmarks across countries (Eden & Wagstaff, 2021). However, our study illustrates the paradoxical tension within the context of digital inequalities, whereby digitalization is seen as the (only) solution to problems often associated with digital inequalities. This is despite acknowledging that there are limitations in digital technologies, whereby initiatives and programs can be successful only if aspects of digital inequalities are addressed first (e.g. poor or no connectivity addressed through regional initiatives).

We argue that such policy framing is reminiscent of the technological determinism discourse (Bimber, 1990), whereby challenges (irrespective of nature or scope) are expected to be solved with technofixes, despite the broad recognition that technology is an insufficient tool for change in and of itself (Kleine, 2013). Indeed, it is technology that often sustains (digital) inequalities (Nordrum, 2023): our findings illustrate, for example, that social concerns and issues regarding access to healthcare conflict with logics of efficiencies, cost-cutting and innovation, and are framed as problems that can be addressed through the digitalization of healthcare instead, without consideration for digital inequalities nor the diversity of factors that result in (digital) inequalities and reduced healthcare access. Within the context of deepening inequalities, technofixes create additional limitations and threats, which in turn function as barriers to solving the very same problems set out to address in the first place: technology amplifies existing societal issues (Toyama, 2015), and even exacerbates the risks that marginalized social groups already face (Korkmaz, 2022; Vannini et al., 2020), under the guise of rationalizing government spending, improving systems and increasing transparency. In other words, our findings show that there is misalignment between the problems to be solved, and the solutions provided with regard to how these are interdependent and interact with each other to produce knock-on effects. This is precisely because technosolutionist-inspired policy framing, by dictating the direction of travel, and the legitimization of agendas (Daviter, 2007), positions digitalization and digital technologies as a certainty with predetermined impacts, rather than a possibility whose fit with specific problems needs to be assessed (Klecun, 2008).

Here, we make our second contribution. Policy studies often focus on policymaking as a process (Mettler et al., 2024), whereby power and conflict are useful terms to unpack relevant phenomena,

such as the institutionalization of digital technologies in the public sector (e.g. Manda, 2022; Medaglia et al., 2022). Further, earlier studies at the intersection of digital transformation, policy and technological regulation have shown that both policy making and regulation can lead to unintended consequences and exacerbate pre-existing problems (e.g. Butler et al., 2023), often due to power imbalances and dynamics among diverse stakeholders (Kokshagina et al., 2023), and due to regulatory ambiguity that can have unpredictable outcomes (Väyrynen et al., 2025). In other words, existing scholarship has mostly concentrated on the later stages of the policy cycle i.e. those mostly relating to the legitimization, the implementation and institutionalization of policy. Our findings help us argue that the earlier stages of this cycle are equally if not more crucial, because the rhetoric that underpins policy framing legitimizes agendas and issues and dictates the direction of travel for policy making (Mettler et al., 2024). We therefore contribute to policy studies within IS by drawing attention to and emphasizing agenda setting and policy formulation, which focus on identifying and describing problems and choosing possible solutions and policy instruments, respectively (Cairney, 2020). In doing so we draw attention to the fact that policy problems do not exist independently, but they are constructed by policymakers and politicians. Focusing on policy framing helps us appreciate policy priorities and agendas and illuminate paradoxical tensions experienced as a result of the implementation and adoption of policy.

The significance of this becomes evident when considering the following: our findings show that digitalization is framed as the solution to both macro-(efficiencies, innovation) and micro-level (societal issues and concerns) problems, yet digitalization and the focus on efficiencies reproduce and exacerbate the very same problems that affect citizens, particularly those experiencing digital inequalities. In other words, implemented policies are problematic because policy framing has already produced paradoxical tensions and antagonistic relationships, where e.g. efficiencies in the welfare sector are framed as possible only by controlling access to, and therefore gatekeeping rather than democratizing, welfare. Here, one could argue that other regional and policy initiatives could reduce these effects, by enabling digitalization to unfold alongside and as part of reforms that halt the perpetuation of inequalities (Bloom, 2017), and support the betterment of society (Monson, 2023). Yet, our findings indicate that such initiatives in the UK are primarily focused on skills development with a focus on growth and innovation, rather than meaningfully and constructively engaging with the root causes of digital poverty and disengagement. Therefore, by focusing on policy framing, we argue that scholarship can tease out and elaborate policy's ideological underpinnings (Zamani & Rousaki, 2024): as Avgerou and Bonina (2020) discuss, it is these underpinnings that inform the later stages of policy-making for digital transformation rather than the real problems experienced and felt in society. This is particularly evident in the UK, where the country is still experiencing the impacts of austerity measures (e.g. Farnsworth, 2021; Farrall et al., 2021), and framing digitalization as required for efficiencies and innovation becomes a convenient distraction from addressing structural inequalities and systemic injustices perpetuated by the economic policies that prioritize corporate interests (Weinberg, 2022) over societal issues and concerns. This is precisely because policy framing aims at identifying and prioritizing what problems exist, what their nature is and what are the possible solutions (Cairney, 2020).

6. Conclusions

As we join our voices with other scholars who have argued for prioritizing the implications of continuously accelerated digitalization (Imran, 2023), we highlight the importance of critically analysing government policy and policy framing of digital transformation initiatives within the context of digital inequalities. Digitalization can hold a transformative promise, but the benefits stemming from it are not consistent nor equitably distributed across different actors and groups (Aanestad et al., 2022; Levy et al., 2020; Sanders & Scanlon, 2021). This gives rise to a vicious cycle of existing inequalities, whereby those digitally excluded, are subjected to the emergence of new disparities.

This is because, as shown from our analysis, the negative (possible) implications are not constructively and meaningfully dealt with by policy. We further posit that the implications of the above will not be restricted to traditionally over-researched but underserved social groups, such as older adults, women, people with disabilities, and minority ethnic and faith groups. Rather, we expect that, as digitalization increases, even financially and socially affluent groups may be affected in different phases of their lives, because of other factors that will dictate what and how they have access to (e.g. due to place-based reasons, changing life conditions).

We wish to highlight that our account of digital technologies is not one of condemnation. Policy views digitalization as able to address both grand challenges, such as those that align with the SDGs (energy, welfare sectors), and supporting the UK's digital economy, as well as problems faced by citizens in everyday life (access to healthcare for example). Indeed, we agree that digitalization can help us achieve many of the above (Popkova et al., 2022), assuming policymaking supports such an endeavor. In other words, digitalization should not be seen as the singular solution toward addressing challenges and social justice, but rather it is crucial to critically explore and reflect on policy framing, policy making and the consistency between the two.

In essence, through this study we wish to advocate for a paradigm shift in policy framing and policy making, and to urge policymakers and other relevant actors in this discourse, to recognize and prioritize the challenges that digital inequalities impose, where these should be considered outside the boundaries of techno-solutionism thinking. We contend that the matter of digital inequalities is a matter of social justice and the fair distribution of resources and benefits (Sanders & Scanlon, 2021), and thus affects everyone in society, both the haves and the have-nots, and it is essential for fostering inclusive and sustainable economic growth that is both inclusive and sustainable. We thus propose framing and contextualizing economic growth and sustainable development as issues intrinsically linked to tackling digital inequalities, where digitalization is guided by the values of social justice. Framing policy around the values of social justice can in turn encourage industry and market players to adopt a pathway that is more in sync with responsible digitalization (Bednar & Spiekermann, 2024), where technological solutions distribute fairly the benefits to all society members, enabling a more just and resilient economy.

Before we conclude, we wish to highlight certain limitations in our study. We focused exclusively on the UK policy context. However, there are similar policy approaches in other countries as well. For example, the Danish government has emphasized the strategic importance of digital technologies for implementing the UN SDGs (Ministry of Foreign Affairs of Denmark, n.d.). Similarly, Greece has more than 450 ongoing digital transformation projects aimed at digitalizing multiple aspects of the economy and the public sector (International Trade Administration, 2022) with the view to enable growth and strengthen the economy. While we have not analysed other countries' policies, Mettler et al. (2024) notes that policy framing is exceptionally similar across countries, and we thus expect that our study can be read and interpreted within the wider context and that our findings support a fairer and more just approach to digitalization projects as digital inequalities exist across the world.

Another limitation is that we examined policy documents that spanned numerous policy areas (from climate and the environment to energy, healthcare and social care). These might seem disparate and disjointed, but they all represent policy areas that have been identified as constituting grand societal challenges, directly but often indirectly linked to the SDGs and social justice matters. It is within this perspective that we wish to analyse them all. While this allowed us to identify and consider how the digitalization of one sector (e.g. welfare) can lead to debilitating effects on another (e.g. access to social care), it necessarily meant that we were unable to trace policies on digitalization throughout the policy cycle (framing, development, implementation, enforcement, evaluation, reframing etc) (Janssen & Helbig, 2018). We would thus welcome future studies that focus on one sector to provide additional insights and whether and to what extent digital inequalities and their impacts are used during evaluation and reframing.

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Data availability statement

Data sharing is not applicable to this article as no new data were created or analysed in this study.

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