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The Evolution of Government Strategies from IT to Digitalization: A Comparative Study of Two Time Periods in Swedish local governments

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Abstract. In this paper we explore the evolution of the use of digital technology in the public sector. We do so by analyzing a corpus of IT- and digitalization strategies from Swedish local governments, produced from two time periods, using topic modeling. Our analysis reveals salient topics covered in these two sets of strategies and classifies them into three types: topics that persist across the two periods, topics that are unique to each period, and topics that evolved in content. We suggest that local government strategies became more general and optimistic in terms of the technologies' new opportunities, specific in terms of management practices, and increasingly blurry in terms of organizational and material boundaries. We also provide evidence of digitalization strategies becoming more homogenous in their covered topics than their IT counterparts. By doing so, we contribute to research devoted to analyzing the discursive landscape of digital government by investigating the official content found in these strategies. Thus, we contribute to research devoted to studying policy in order to historically situate contemporary use of digital technologies and its evolution. We conclude the paper with important implications for practice.

Keywords: Digitalization, IT, Public policy, Local government, Topic modeling.

1 Introduction

In this paper we examine the evolution of topics related to the use of digital technology in the public sector by studying a corpus of IT- and digitalization strategies from Swedish local government produced over two time periods. By doing so, we contribute to research devoted to analyzing the discursive landscape of digital government by investigating official narratives found in these strategies.

The field of digital government, or e-Government[1], has evolved from a practice-oriented field that emerged in the 1990s, influenced by the success of e-commerce [1], to a multi-disciplinary research field, influenced by disciplines such as public administration and information systems [2]. In the early years, government activities and scholarly attention focused on the use of information technology (IT), fueled by the possibilities enabled by widespread adoption of the Internet. Since then, the terminology used in both practice and research has shifted: from IT to digitalization, or digital transformation, and from e-Government to digital government. Janowski [3] showed how the focus areas in e-Government research have changed over time in four stages, and Scholl [4] argued that digital government constitutes a second phase as the "d" replaced the "e". These changes are reflected by name changes in research tracks (e.g., the digital government track in the HICSS conference), literature databases (e.g., the digital government reference library, see [5]), thus indicating an evolutionary trajectory. However, it is important to remember that digital government research has also been accused of reproducing techno-optimistic stories about the transformative capabilities of the latest technologies [6]. Thus, there is a need for more empirical-based evidence to outline if the shifts in research focus have been accompanied by actual changes in the way governments perceive and work with digital technologies. In other words, we aim to answer the research question (RQ): "*How have digitalization strategies changed (from IT strategies) over the past two decades?"*

To answer the RQ, we argue that government policies, investigations, and strategies play a key role in understanding the discursive landscape of digital government. Such documents carry purpose and intention [7], create shared problems, definitions and solutions [8], and stabilize and materialize certain narratives [9-10]. Therefore, they are important research objects to study the evolution of digital government over time. Our contribution consists of a comparative analysis of IT and digitalization strategies, which are policy documents produced in the Swedish local government context.

This paper is structured as follows: first, we review previous research on digitalization in the public sector and the role of digitalization strategies in the discourse of digital government, concluding with a more elaborate description of why such a comparative analysis is needed. Second, we present the research method, including data collection and analysis using topic modeling. Third, we discuss the findings through an analysis of the topic contents and their distribution over the selected strategies. Finally, we discuss our findings against digital government literature and the wider digitalization literature within information systems.

2 Previous research

Digitalization strategies have become drivers for the development of digitalization and digital government everywhere. Such strategies exist at the EU level in Europe [11] as well as on the national and regional levels in many countries [e.g., 10, 12]. These types

[1] In this paper, we use e-government to denote the research area, while digital government to denote the phenomenon of digital technologies transforming government.

of strategies are typically written as policy documents that set the goals of digital transformation and are designed to instigate the changes that are needed to reap its supposed benefits [7, 13]. Thus, digitalization strategies are reflections of their contemporary settings regarding how digital transformation is, or was, perceived.

Previous research presents conflicting findings regarding how changes in the terminology for digital technology in the public sector have been paralleled with changes in focus, purpose, and narratives associated with the implementation of these technologies. Ilshammar et al. [14] argued that the shift from "automatic data processing" in the 1960s to "IT" in the 1990s did not entail any shifts in the expected values with the use of these technologies. Most initiatives aimed to increase government efficiency, hence the authors' choice of title, "old wine in new bottles". Melin [15] described the discursive landscape in Swedish action plans of e-Government as rather static, referring to "The emperor's new clothes". Giritli-Nygren [16] identified in the same Swedish action plan that the use of IT is focused on efficiency and increased service. Service and efficiency are common themes in e-government policies where Sundberg [17] highlights a shift towards a more service-dominant logic as the terminology shifted around 2010, from "IT" to "digitalization". Moreover, the two are sometimes expressed together, known as the e-Government paradox [18]. These types of values could be identified in different government policies [e.g., 19-20]. Heidlund and Sundberg [21] conducted a study of digitalization strategies in Swedish municipalities and found a repository of general and identical optimistic statements, which these authors referred to as the "parrot syndrome." Meanwhile, findings from the Danish context suggest that the values proposed in strategies on the use of digital technology were relatively static between 1994 – 2016, and the role of e-democracy was minimal during these years [20]. Furthermore, Schou and Hjelholt [22] identified that Danish digitalization strategies were built on the idea of an ideal citizen to whom certain needs have been attached.

The above examples demonstrate previous research on digitalization strategies. However, to the best of our knowledge, research providing insights into the evolution of IT and digitalization strategies over a longer time period is scarce, and the current study aims to fill that research gap. Lately, novel methodologies to study the evolution of digital government have gained popularity [see, e.g., 23]. As outlined in the next section, we contribute to this strand of research by using topic modeling on a corpus of strategies authored in the Swedish public sector.

3 Research method

In order to identify the respective scopes of IT and digitalization strategies at the local government level, and be able to compare them, we turn to topic modeling. Topic modeling has been increasingly used in IS research in general [24-25] and in e-government research specifically [7, 26] due to its ability to inductively uncover dominant topics in large text corpora. We apply topic modeling to quantitatively, yet inductively, extract topics from IT strategies published in the early 2000s as well as those from digitalization strategies published in the years around 2020. Extracted topics

are used to highlight the main concepts of interest covered by these strategies. By comparing these two sets of strategies, we aim to understand the evolution of digitalization from IT. Hannigan et al. [27] refer to this process as a rendering process in which topic modeling acts as a "means to juxtapose data and theory" (p. 590). As such, this paper also addresses the recent calls for mid-range theorizing within information systems research using topic modeling [28]. Before detailing our data collection and analysis, we first briefly describe the Swedish local government context.

3.1 The Swedish context

In the Swedish context, the government has emphasized over a long period of time the importance of utilizing the opportunities of digital technology for the benefit of citizens, companies, and organizations in general. In 2004/2005, a proposition made to the government emphasized the need to shift perspective from IT politics for the benefit of society, to politics benefiting an IT-integrated society [29]. In this proposition, the possibilities related to ICTs and their potential consequences in care and education were of particular emphasis. By 2011, Sweden had the vision to "become the best in the world in utilizing digitalization's opportunities" [30, p. 5], which was reiterated in 2017 [31].

Digitalization strategies can exist on several levels of government, as is the case in Sweden. The Swedish local government consists of 290 municipalities, each of which enjoys a high degree of autonomy vis-à-vis the national government. As a result, there are such strategies both on the national and local levels, with the local level strategies being specific versions and interpretations of the goals set by the national level strategy.

3.2 Data collection

Since the terminology and context describing the documents is shifting, we apply the following demarcations to outline what constitutes an IT/digitalization strategy: The document has a clear focus on IT/digitalization and is authored on a strategic level in the local government. The document must be an overarching strategy for the entire municipality and should not be a general strategy concerning government operations, of which IT/digitalization is a subset. Lastly, the document should be a formal strategic document (i.e., not a PowerPoint presentation or text on a website). After establishing what constitutes an IT/digitalization strategy we collected the two different types of strategies in two phases as follows:

Collection of IT strategies. All 290 municipalities were contacted by e-mail to request their respective IT strategies for the years 2000-2003 or the closest strategy to that period written by the municipality. The Swedish law requires public authorities to respond to such requests for public documents within a reasonable timeframe, typically within a few weeks. Within two weeks, we received over 90 documents, without the need to send reminders. After this period, our analysis commenced, which meant that any documents received later were not included in this analysis. We excluded plans attached to strategies for the same year (e.g., a plan for IT in education). We also

excluded strategies after 2005 to maintain at least a 10-year buffer period between the two sets, since the earliest digitalization strategy in our dataset was published in 2015. This resulted in 71 IT strategies published between 1997 and 2005, with the majority published in the years 2000-2003.

Collection of digitalization strategies. The contemporary digitalization strategies were gathered from the official websites of the Swedish municipalities. Opting for a different approach for this dataset stems from our earlier experience where municipalities refer us to their official websites when requesting publicly accessible documents. The search was performed in two steps:

- Using search engines and/or navigation tools on the websites, looking for keywords (in Swedish) such as "digitalization AND policy OR strategy OR plan."
- If no strategic document could be found in step one, we used Google to search for "MunicipalityName AND digitalization," with further refinement as needed.

In case these steps did not lead to any documents, we concluded that the municipality did not have a digitalization strategy. This search also revealed that many municipalities are currently working on formulating this type of strategy, as expressed in, for example, city council protocols. If multiple documents were found (e.g., both a strategy and a policy), the most recent document was used. This process resulted in 85 strategies published between 2015 and 2021. Many of these strategies focused on developing digitalization for several following years (e.g., a strategy published in 2019 for the digital municipality 2020-2023).

3.3 Data pre-processing

The digitalization strategies were primarily in pdf format (except 3 that were in MS Word formats such as .doc), which were all readily machine-readable; a requirement for the software used for our topic modeling approach. The older IT strategies contained 33 scanned, 31 machine-readable pdf, and 7 MS Word documents. Accordingly, we first applied optical character recognition (OCR) to the scanned documents to make them machine-readable. The following pre-processing steps were applied on both sets of documents using the data science platform RapidMiner:

- Tokenization: transforming the text into a sequence of tokens, or words, and removing special characters and punctuation. However, dashes and slashes were kept, because some of the strategies often contained tokens such as "e-strategy", "IT-strategy" or "IS/IT" which we wanted to keep as single tokens.
- Case transformation: transforming all text to lower case.
- Filter stopwords: removing the most common Swedish stopwords such as "är", "bara", and "inte" (en: "is", "only", "not"). We also removed a list of stopwords customized for this analysis which focused on municipal contexts including all municipality names, the words "stad" and "kommun" (en: "city", "municipality"), along with their variations.

- Stemming: transforming all tokens/words to their stem. E.g., “infrastruktur”, “infrastrukturen” and “infrastrukturer” are all stemmed to “infrastruktur” (en: “infrastructure”, “the infrastructure”, “infrastructures”).

The main purpose of these preprocessing activities is to minimize the variations across the corpus and create a more accurate representation of the recurring tokens [25, 28, 32].

3.4 Topic extraction and interpretation

In order to choose the best number of topics, we relied on the rate of declining perplexity score (i.e., the trained model’s ability to predict words on unseen data). We chose the range of 1 to 20 topics to consider the feasibility of the researchers’ interpretation of the output topics [27]. Figure 1 shows the perplexity graph for both corpora. The optimization algorithm showed the lowest decline in perplexity taking place between 11 and 12 topics for the digitalization strategies, and between 9 and 10 for the IT strategies. Accordingly, we chose 11 and 9 topics, respectively. The topics were extracted using the Latent Dirichlet Allocation (LDA) algorithm based on Newman et al. [33].

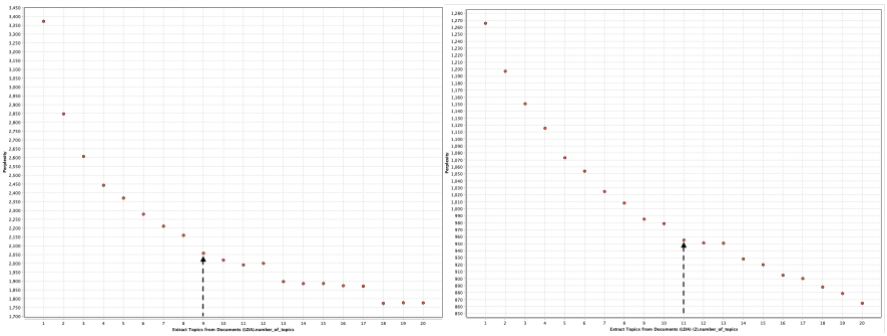

Fig. 1. Relationship between number of topics and perplexity (Left: IT; Right: Digitalization)

For each topic, the top 20 words along with their weights were extracted and interpreted collectively during three workshops by the four co-authors. The first workshop focused on digitalization strategies, where the noise in the topics informed the list of customized stopwords described in the previous section. After adding to that list and rebuilding the model, the second workshop focused on the interpretation of the refined topics and words. The third workshop focused on interpreting topics extracted from the IT strategies. Upon examining the topics and top words, three cases of topic mergers took place under the condition that at least three top words were common across the pair of merged topics. In that case, the weights were summed for the merged topic, and the unique words were added with their original weight. This resulted in 10 and 7 unique topics for digitalization and IT strategies, respectively.

4 Results

Our analysis suggests that while some topics are unique to each period, other topics persist and evolve in their focus. IT strategies are clearly focused on material elements of IT, such as the broadband infrastructure and security of files and programs on PCs. They also focused on the administration and governance in the – then emerging – IT units, with frequent use of words such as *system responsible* and *system owner*. Whereas digitalization strategies included topics dedicated to the economical and budgetary aspects of digitalization, and relating the local level to other levels, such as the national. Figure 2 illustrates the relationship between the topics now and then (for a list of topics and associated words, see the Appendix). It is important to note here that the arrows do not indicate any causal relationship between topics, they represent our interpretation of how the topics evolved over time. Following the figure, these topics are described.

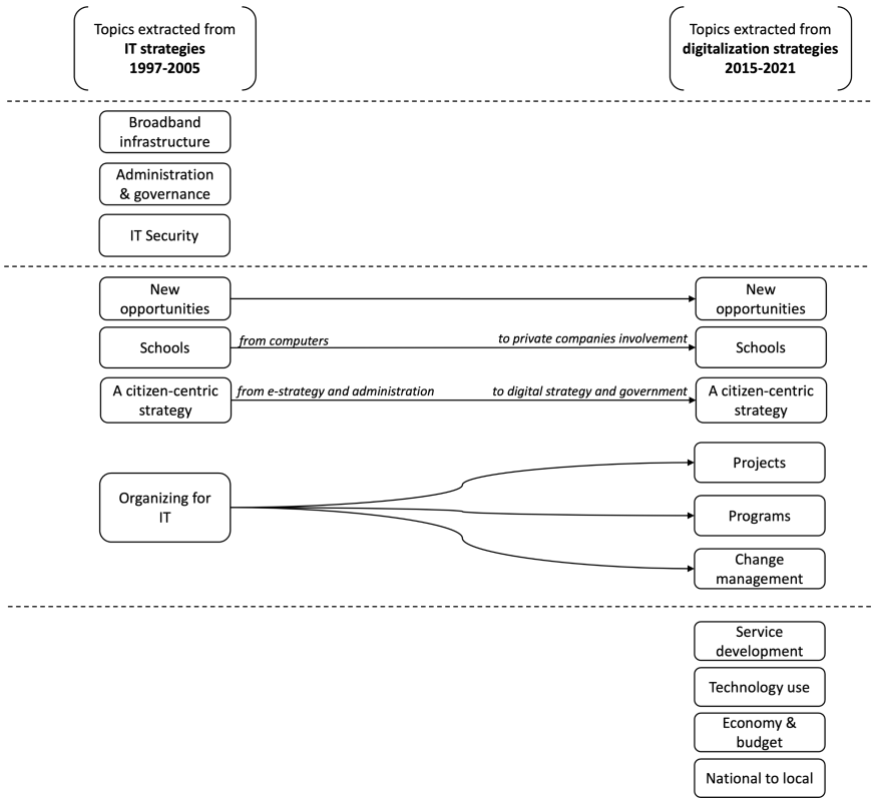

Fig. 2. Topics evolution from IT to digitalization strategies

The first three topics that can be seen on top of Figure 2 are specific to the IT-strategies, i.e., they are not observed in the later digitalization strategies. The first of these,

“Broadband infrastructure” contains words that are focused on internet and the underlying infrastructure, reflecting the fact that broadband development was a focus area in Sweden in the early 2000s. The topic “Administration & governance” includes words such as “system”, “responsibility” and “system owner”, thus being focused on system management procedures in municipalities. The third topic unique to the IT strategies is “IT Security”, that is focused on security and personal responsibility in relation to using IT on an individual user level and password management.

Some of the topics persist over time, from IT strategies to digitalization strategies. One of the these we refer to as “Organizing for IT”, which handles the organizational activities needed to accomplish related goals. While this topic is expressed in a single topic in IT strategies, we observed that there are three related topics in the corresponding digitalization strategies, namely: projects, programs, and change management. In projects, “digitalization work” is a frequent term, along with the notions of “responsibility”, “follow-up” and “support”. In programs, target groups and values associated with such programs are in focus. In change management, application (of technology), current state, activities, and concerns with such activities are frequently mentioned. It is worth noting that standardization is frequently mentioned in Organizing for IT, whereas no equivalent has appeared in the top words in the corresponding digitalization topics (or any other topic in the corpus).

“Schools” is another topic that persists over time. Both versions of the topic include students, teachers, schools, and pedagogy among the frequent words. However, in IT strategies, these words are complemented by computers and computer halls, whereas in digitalization strategies, terms such as agenda, company and efforts emerge (note that the term “insats” in Swedish can be translated to “efforts” or “stake”). With the potential double meaning of “insats” in mind, we interpret that the involvement of private companies in schools has been more prominent and that having a digitalization agenda for schools is emphasized (in contrast to focus on e.g., equipping local classrooms with computers during the IT period).

Having a citizen-centric strategy is another persistent topic in such strategies in both time periods. The only difference between the top words describing this topic is the shift from general administration (and e-administration) towards specific governmental bodies such as the national government and the local municipal boards.

One of the topics, referred to as “New opportunities” contained the highest frequencies of terms most associated with both IT and digitalization. This topic (in both corpora) puts emphasis on new opportunities or possibilities, organization and development. While the topic may seem very similar in both analyses in terms of frequent terms, there is a difference in its relative weight to the other topics within the same corpus. This is indicated by comparing its relative weight to other topics (Figure 3) and by the document-topic predictions (Figure 4) in both corpora. Note that Figure 4 presents document-topic predictions based on the highest probability (dominance) for a given topic in said document. This means two things: a) some topics will not appear in Figure 4 if no document is predicted to be primarily discussing that topic, and b) each document will be counted towards only one topic based on this highest probability, even if other topics are present in the document.

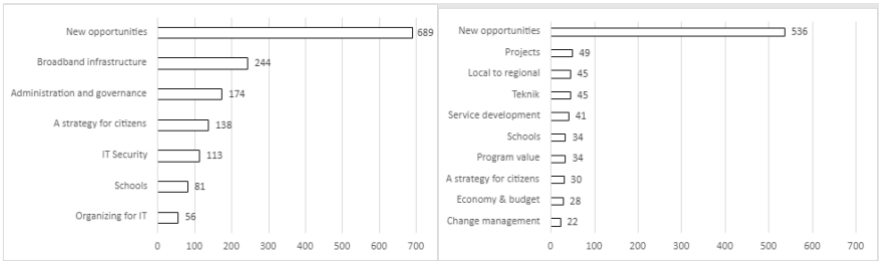

Fig. 3. Avg. Weighted topics (Left: IT; Right: Digitalization)

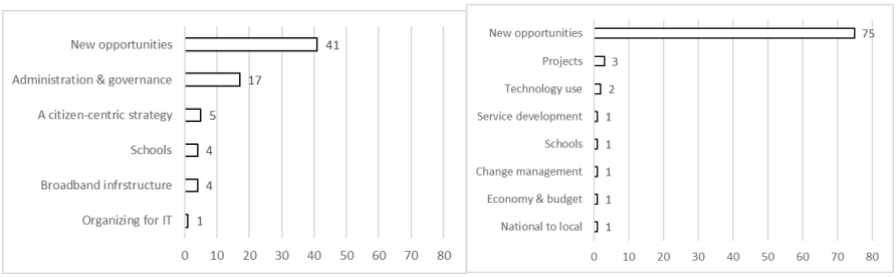

Fig. 4. Number of documents predicted to belong to topics (Left: IT; Right: Digitalization)

The last four topics are specific to digitalization strategies. The first of these is "Service development", a topic focused on services, and methods, leadership and needs related to developing services. The topic "Technology use" is a topic that generally denotes words pertaining to technology and the use of technology. "Economy & budget" is a topic that contains both financial words and words such as "responsibility", "digitalization overview" and "current", seemingly indicating that it is common for digitalization strategies to discuss the costs of digitalization at current and in the future. Finally, the topic "National to local" is a topic that mentions other levels of government (pan-national, national, and regional) as well as other influential institutions that affect policymaking. Thus, the digitalization strategies do not only discuss the respective municipalities in a vacuum, rather, the strategies are related to a wider societal context.

5 Discussion

As our analysis suggests, digitalization is neither old wine in new bottles nor a completely new phenomenon. It can be argued that it is an evolution from IT with both a difference in degree and a difference in kind. The difference in kind can be represented by the topics distinct to each period, while the degree in difference by the topics that persist and change in scope.

At first glance, the results make intuitive sense. For example, it is unsurprising to see that the strategies from twenty years ago were preoccupied with the development of broadband infrastructure. This corroborates well with the history of societal development in Sweden, where there was a push in the late 1990s and early 2000s to rapidly develop Internet infrastructure [34-35], in combination with initiatives to

increase adoption of computers by citizens. Consequently, it is only natural that this topic should have died down since then. Another aspect of this evolution is the visibility of topics focusing on service development and technology use after said infrastructure has been developed as a precondition [36].

On the other hand, the lack of an equivalent security topic in the digitalization strategies seemed surprising at first. There are two potential explanations for this observation. First, the notion of IT security has evolved from focusing on specific users and password protected information to a much broader issue of cybersecurity that is not addressed in digitalization policy anymore. Rather, there are other policy documents that address that very topic in detail. Second, the issue might still be addressed in digitalization strategies, yet, not in the frequency required to be picked up by the topic modeling algorithm. Our insights from the data collection process suggest that the former explanation is more plausible, as IT strategies would normally be accompanied by IT plans, while the later digitalization strategies have various other attachments, including cybersecurity policies.

Meanwhile, there are also differences between the two corpora that suggest that digitalization draws more from regional, national, and pan-national strategies than the IT counterparts. Keywords such as “regional”, “national” and “europ*” refer to policies formulated at higher levels of government, such as the digital agendas of the European Commission [37-38] or the National Swedish digitalization strategy [31]. Such influence from other levels of government can also be observed in another topic “New opportunities”, albeit indirectly.

We noted in our results that the topic “New opportunities” persisted between the two datasets and became even more prevalent in the recent one (in digitalization strategies). The focus on “new opportunities” goes back to the official Swedish IT and digitalization strategies, which state that “The overarching goal is that Sweden shall be the best in the world at utilizing the opportunities created by digitalization.” [31, p. 6]. As such, the relative increase in the “New opportunities” topic is likely a result of the more visceral top-down push from the Swedish government regarding digitalization, which was established in the years preceding the digitalization strategies [10]. This lends credence to previous research that claims that this type of content exhibits a state of equilibrium, as suggested by Persson et al. [20]; what can be referred to as “old wine in new bottles” [14] or “the emperor's new clothes” [15] highlighting a reoccurring rhetoric but the class of technology changes (e.g., IT to digitalization). However, since the goal of utilizing the new opportunities created by digitalization is an abstract goal, the recreation of this goal on the local level possibly makes these strategies difficult to operationalize on the local level. As the landscape of digital technologies is far from static, and thus the prevalence of this topic can also be seen as a reflection of the fact that municipalities find themselves in a chronic state of catching up with the latest opportunities.

On the other hand, we observe an evolution towards more specific digitalization strategies in terms of working practices. This can be reasoned from the comparison of the IT strategy topic “Organizing for IT”, which we consider related to the digitalization strategy topics “Projects”, “Programs” and “Change management”. Based on the similarity between these topics, we view the latter ones as more specific instances of

the broader theme of "Organizing for IT" that has emerged over the last decades. In the early 2000s, the role of IT in organizations was still unclear, and implementation and management of IT was similar (or, usually conducted by an IT-department). In the years since, however, the area of IT, or digitalization, has become more pervasive and prevalent for most, if not all parts of organizations, with more well-established practices. It can also be interpreted that there is a recent focus on the (articulation of) value of digital technology realized through programs, as opposed to earlier strategies [19-20]

Notably, there also exists a trend towards a "service" ideal associated with digitalization (see, [17]). A few years after the millennium shift, municipalities aimed to become "24h governments", referring to increasing the availability of digital (or, e-) services published via their web sites [36, 39]. Thus, where the IT strategies emphasized physical aspects such as broadband and infrastructure, the digitalization strategies are more concerned with intangibles. Echoing Löwgren and Stolterman's [40] notion of the digital as a material without qualities, digitalization is transcending the physical to a higher degree than IT and is thus associated with less borders and more blurriness. This blurriness does not only apply to the physical vs intangible but also to the boundaries between local and national governments. A potential concern here is that national discourses are incorporated on a local level without any translation, which may hamper the possibilities to locally adapt the content of these strategies.

6 Conclusions, limitations and future research

In this study, we sought to answer the research question: "*How have digitalization strategies changed (from IT strategies) over the past two decades?"* Based on our analysis we observe the following changes. First, digitalization strategies are more homogenous than IT strategies, indicating that local government strategies on digitalization are becoming more similar to one another, reinforcing the national discourse concerning digitalization. Second, the practices of managing digitalization have become more specific over time, with digitalization strategies presenting a more nuanced picture of how digitalization is organized. Third, we note that strategies over time have become blurry regarding organizational and material boundaries. The newer digitalization strategies mentioned other levels of government, the European union and the private sector, thus relating the strategy to organizations other than the local government in question. Similarly, the older IT strategies present a clearer distinction between the material aspects of digitalization (such as infrastructure) and e.g., software. In the digitalization strategies, however, these distinctions are not as present, indicating that digitalization over time has become a more amorphous phenomenon where these different aspects are intermingled.

By performing topic modeling on a corpus of IT- and digitalization strategies, we contribute to research and practice as follows. First, we contribute to a research stream devoted to studying policy to historically situate contemporary use of digital technologies in its evolution. By doing so, this study constitutes an important contribution of both a snapshot of stories about digitalization, and how they relate to previous ideas about the use of technology in the public sector.

Second, we present a novel methodological approach to studying the evolution of narratives associated with the use of digital technology in the public sector. The use of topic modeling enables us to process large numbers of policy documents and retrieve an overview of the topics linking such documents together and their respective representations of terms or words.

Third, our study has important implications for practice. As we noted the trend towards increasingly homogeneous "general" content in the policies, streamlined with national and pan-national ideas, we ponder what value these documents provide to actual operations in the local governments? While digitalization entails more intangible qualities than "IT", we encourage policymakers to aim to be more specific and focus on local challenges; e.g., to find ways to translate general ideas about digitalization to local conditions.

The dataset included in this study has some inherent limitations. For instance, the different municipalities release their strategies in different years, resulting in both sets being published over extended periods, risking that the strategies belonging to the same corpus were handling different narratives. We mitigated this risk by ensuring a 10-year gap between both sets. The datasets also do not represent strategies from the same set of municipalities, even though there is a large overlap. Our assessment is that given the overarching scope of this paper, such lack of 1:1 mapping is not crucial. However, we suggest that future research include a qualitative analysis of a sample of the chosen strategies where the comparison would consider the specific evolution of the same municipality's IT-digital discourse. The selection of these municipalities can be informed by our analysis, for example, by choosing municipalities covering a wide range of topics for maximum variation.

References

1. Grönlund, Å., Horan, T. A. (2005). Introducing e-gov: history, definitions, and issues. Communications of the association for information systems, 15(1), 39.
2. Heeks, R., Bailur, S. (2007). Analyzing e-government research: Perspectives, philosophies, theories, methods, and practice. *Government information quarterly*, *24*(2), 243-265.
3. Janowski, T. (2015). Digital government evolution: From transformation to contextualization. Government information quarterly, 32(3), 221-236.
4. Scholl, H. J. (2020). Digital government: Looking back and ahead on a fascinating domain of research and practice. *Digital Government: Research and Practice*, *1*(1), 1-12.
5. Scholl, H. J. (2021). The digital government reference library (DGRL) and its potential formative impact on digital government research (DGR). *Government Information Quarterly*, *38*(4), 101613.
6. Bannister, F., Connolly, R. (2012). Forward to the past: Lessons for the future of e-government from the story so far. Information Polity, 17(3-4), 211-226.
7. Guenduez, A. A., Mettler, T. (2022). Strategically constructed narratives on artificial intelligence: What stories are told in governmental artificial intelligence policies?. Government Information Quarterly, 101719.
8. Sundberg, L. (2019a). If digitalization is the solution, what is the problem? In *papers presented at the 19th European Conference on Digital Government ECDG 2019* (pp. 136-143).

9. Lindberg, J., Kvist, E., Lindgren, S. (2022). The Ongoing and Collective Character of Digital Care for Older People: Moving Beyond Techno-Determinism in Government Policy. *Journal of Technology in human Services*, *40*(4), 357-378.
10. Nyhlén, S., Gidlund, K. L. (2022). In conversation with digitalization: Myths, fiction or professional imagining? Information Polity, 1-11.
11. European Commission. (2022). *European Commission Digital Strategy*. The Euopean Commission. https://ec.europa.eu/info/publications/EC-Digital-Strategy_en
12. Kinnunen, J., Androniceanu, A., Georgescu, I. (2019). Digitalization of EU countries: a clusterwise analysis. In *Proceedings of the 13rd International Management Conference: Management Strategies for High Performance* (pp. 1-12).
13. Dolfsma, W., Seo, D. (2013). Government policy and technological innovation—a suggested typology. *Technovation*, *33*(6-7), 173-179.
14. Ilshammar, L., Bjurström, A.,Grönlund, Å. (2005). Public E-Services in Sweden: Old Wine in New Bottles? Scandinavian Journal of Information Systems, 17(2), 3.
15. Melin, U. (2009). The emperor's new clothes? Analysing the Swedish action plan for e-government. *International Journal of Public Information Systems*, *5*(2).
16. Giritli Nygren, K. (2009). The rhetoric of e-government management and the reality of e-government work: the Swedish action plan for e-government considered. *International Journal of Public Information Systems*, (2), 135-146.
17. Sundberg, L. (2019b). From Automatic Data Processing to Digitalization: What is Past is Prologue. In Electronic Government: 18th IFIP WG 8.5 International Conference, EGOV 2019, San Benedetto Del Tronto, Italy, September 2–4, 2019, Proceedings 18 (pp. 31-42). Springer International Publishing.
18. Bertot, J. C., Jaeger, P. T. (2008). The E-Government paradox: Better customer service doesn't necessarily cost less. Government Information Quarterly, 2(25), 149-154.
19. Toll, D., Lindgren, I., Melin, U., Madsen, C. Ø. (2020). Values, benefits, considerations and risks of AI in government: A study of AI policy documents in Sweden. eJournal of eDemocracy & Open Government, 12(1).
20. Persson, J. S., Reinwald, A. K., Skorve, E., Nielsen, P. A. (2017, June). Value positions in e-government strategies: Something is (not) changing in the state of Denmark. In 25th European Conference on Information Systems (pp. 904-917). The Association for Information Systems (AIS).
21. Heidlund, M., & Sundberg, L. (2023). What is the value of digitalization? Strategic narratives in local government. Information Polity, (Preprint), 1-17.
22. Schou, J. Hjelholt, M. (2019). Digitalizing the welfare state: citizenship discourses in Danish digitalization strategies from 2002 to 2015. Critical Policy Studies, 13(1), 3-22
23. Puron-Cid, G., Villaseñor-García, E. A. (2023). Applying neural networks analysis to assess digital government evolution. Government Information Quarterly.
24. Jeyaraj, A., Zadeh, A. H. (2020). Evolution of information systems research: Insights from topic modeling. Information & Management, 57(4), 103207.
25. Müller, O., Junglas, I., Brocke, J. V., Debortoli, S. (2016). Utilizing big data analytics for information systems research: challenges, promises and guidelines. European Journal of Information Systems, 25(4), 289-302.
26. Isoaho, K., Gritsenko, D., Mäkelä, E. (2021). Topic modeling and text analysis for qualitative policy research. Policy Studies Journal, 49(1), 300-324.
27. Hannigan, T. R., Haans, R. F., Vakili, K., Tchalian, H., Glaser, V. L., Wang, M. S., Jennings, P. D. (2019). Topic modeling in management research: Rendering new theory from textual data. Academy of Management Annals, 13(2), 586-632.

28. Rizk, A., Elragal, A. (2020). Data science: developing theoretical contributions in information systems via text analytics. Journal of Big Data, 7, 1-26.
29. The Swedish Government Offices. (2005). *Från IT-politik för samhället till politik för IT-samhället*. URL: https://www.regeringen.se/rattsliga-dokument/proposition/2005/07/prop.-200405175 (Visited March 20, 2023)
30. The Swedish Government Offices. (2012). Med medborgaren i centrum Regeringens strategi för en digitalt samverkande statsförvaltning. Näringsdepartementet.
31. The Swedish Government Offices. (2017). För ett hållbart digitaliserat Sverige – en digitaliseringsstrategi. The Swedish Government Offices. URL: https://digitaliseringsradet.se/media/1191/digitaliseringsstrategin_slutlig_170518-2.pdf (Visited November 14, 2022).
32. Debortoli, S., Müller, O., Junglas, I., & Vom Brocke, J. (2016). Text mining for information systems researchers: An annotated topic modeling tutorial. Communications of the Association for Information Systems (CAIS), 39(1), 7.
33. Newman, D., Asuncion, A., Smyth, P., Welling, M. (2009). Distributed algorithms for topic models. Journal of Machine Learning Research, 10(8).
34. Hansteen, K. (2005). Norwegian and Swedish broadband initiatives (1999-2005). *Hoykom report*, *505*.
35. The Swedish Government Offices. (2008). Utredningen Bredband 2013. SOU 2008:40: Bredband till hela landet.
36. The IT Commission. (2003). SOU 2003:55: Digitala tjänster - hur då? En IT-politik för resultat och nytta. Näringsdepartementet.
37. European Commission (2018). Digital Europe Program. Available at: https://ec.europa.eu/commission/presscorner/detail/en/IP_18_4043
38. European Commission (2021). Digital Europe Program. Available at: https://ec.europa.eu/commission/presscorner/detail/en/ip_21_5863
39. The 24-hour Delegation. (2005). SOU 2005:119: e-tjänster för ett enklare och öppnare samhälle. Finansdepartementet.
40. Löwgren, J., Stolterman, E. (2004). *Thoughtful interaction design: A design perspective on information technology*. Mit Press.

Appendix: Topic interpretations and top words[2]

IT strategies		Digitalization strategies	
Topic	**Top words**	**Topic**	**Top words**
Broadband infrastructure	internet, infrastructure, urban areas, capacity, broadband *nät, infrastruktur, tätort, kapacitet, bredband*	Service development	Service, fulfill, way of working, method, leadership *tjänst, uppfylla, arbetssätt, metod, ledning*
Administration and governance	System, operation, responsib*, system owner, collective *system, drift, ansvar, systemägare, gemensam*	Technology use	Technology, technical, system, unit, functions, use* *teknik, teknisk, system, enhet, fungerar, använd*
IT security	User, information, responsib*, password, staff *användare, information, ansvar, lösenord, personal*	Economy and budget	responsib*, finance, conducted, estimat*, exist* *ansvar, finansiering, genomfört, beräkna, befint*
New opportunities	opportunit*, organization*, develop*, goal, new *möjlig, verksam, utveckling, mål, nya*	New opportunities	Service, organization*, opportunit*, develop*, condition, new *tjänst, verksamhet, möj, utveckling, förutsättning, nya*
Schools	Student*, school, computer, pedagogical, child* *elev, skolan, dator, pedagogisk, barn*	Schools	Agenda, student, teacher, company, effort, child* *agenda, elev, lärare, företag, insats, barn*
A citizen-centric strategy	Citizen, administration, e-strategy, proposal[3] *medborgare, förvaltning, e-strategi, förslag, tjänstutlåtande*	A citizen-centric strategy	National government, digitalization strategy, citizen, municipal board, open* *regering, digitaliseringsstrategi, medborgare, kommunstyrelse, öpp*
Organizing for IT	Systematic, before, goal, function, activity *systematisk, inför, målet, funktion, aktivitet*	Projects	Digitalization work, project, responsib*, follow-up, support *digitaliseringsarbet, projekt, ansvar, uppföljning, stöd*
		Programs	Service, program, effect, target group, value *service, program, effekt, målgrupp, värd*

[2] A sample of the top words are selected for each topic based primarily on their weight. The words are presented in English (authors' translation) and Swedish (original). Since the words are stemmed, an asterisk * is added to the English word to indicate possible variations (e.g., the responsib* stems from words such as responsible, responsibility and responsibilities)

[3] Both Swedish terms "förslag" and "tjänsteutlåtande" can be translated to the English term "proposal". The difference is that "förslag" is a general suggestion while "tjänsteutlåtande" is a specific to proposals by public servants, typically preceding a decision.

	Change management	Concern*, application, change, proposal, activity, focus area *koncern, tillämpning, förändring, förslag, aktivitet, fokusområde*
	National to local	Region, inhabitant, national, government, SALAR[4], external environment, local, europ* *region, invånare, nationell, regering, skl, omvärld, lokal, europ*

[4] The Swedish Association of Local Authorities and Regions, an interest organization for local and regional governments.