SWINS

Sustainable Well-being through INvestment in Social Services

D3.1

Impacts of Digital Transformation on Social Services:

Technological Practices, Consequences, and Conditions for Responsible Adoption

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Disclaimer

This deliverable is part of Task 3.1 "Analyse consequences of digitalization of social services". This task task involves the analysis and comparison of digitalization in social services across selected Member States and associated EEA countries, focusing on minimum income support (MIS) and ALMP. The study will explore the implications of digital transformation for the take-up of social services in cash and in kind, The task will also explore the link between digitalization of social services and their efficiency and quality, providing insights for Task 4.3. Furthermore, the analysis will include reflections on the Matthew effects, not only concerning age and education but also institutional capacity and geographical disparities. The ultimate goal is to provide clear indications on the broader social and economic implications of digital transformation, guiding strategies to maximize its benefits and mitigate negative consequences.

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Abstract

This working paper presents a scoping review of academic articles published between 2015 and 2026 on the digitalisation of social services in Europe, particularly in the EU and EEA regions. It focuses on how digitalisation takes place in and affects the results of public employment services and social assistance benefit provision. Through a thematical evidence synthesis and a rough comparison between the member states, this paper analyses and identifies three general patterns across Europe on (i) the evolution of technological strategies and practices; (ii) the multi-layered consequences of digitalisation; and (iii) the challenges that constrain responsible adoption of digital technologies. An experimental literature search strategy is employed.

First, through three interrelated yet analytically distinct concepts in the literature – 'digitisation', 'digitalisation' and 'digital transformation' – we analyse and compare the main technological practices and strategies shaping social service delivery. Digital technologies have been commonly used to *digitise* client-professional communication and service navigation, and increasingly to *digitalise* service delivery and decision-making processes. We argue digital transformation as more than the cumulative outcomes of these practices, but a complex ecosystem, consisting of and mediated by diverse policy strategies and technologies, that shapes social service delivery. Despite cross-national variations, the findings indicate a broad trend towards greater digitalisation of social service delivery in Europe, extending beyond discrete digitisation initiatives to more extensive digital transformation.

Second, we argue that the consequences of digitalising social service delivery are mixed, inconsistent, and far inconclusive across European counties. At the practical level, more public service agencies in Europe have adopted digital technologies in service delivery. While this might generally hint on an increasing *uptake* of digital services among citizens, the limited uptake among vulnerable groups marks digitalisation's overstated potential in facilitating the *accessibility* of services. The consequences of digitalisation regarding *efficiency*, along with the organisational impacts, including *transparency* and *accountability* of service delivery, *relational changes* between claimants and case workers, case handling accuracy and user-centricity as *service quality*, and use of *professional discretion*, are also found rather divided across European countries. Further, as for societal consequences, despite several positive claims, the existing evidence does not clearly and consistently suggest that digitalisation of social service delivery can significantly foster citizens' *social connection* and *social equity.* Rather, it may risk de-integrating citizens from labour market and communities and widening unequal distribution of services across citizens. However, this paper does not present a rigorous comparative study, and the present assessment of these consequences are not conducted under defined measurements.

Third, we argue that European countries may experience different challenges but share several comparable core issues that need to be addressed to sufficiently implement digitalisation initiatives. The first one concerns how to activate two implementation networks. That is to facilitate the collaboration and integration between human (service users/frontline professionals) and technology for maximum gains, and to enhance the coordination among the government, market, and civil society. The second is that in front of the raising legal, ethical and technical issues, European countries as well as the European Union, face a critical lack of guidelines that can instruct a legally-, ethically-, and technically compliant deployment of digital technologies in service delivery.

1. Introduction

In this paper, we review the literature on the digitalisation of the provision of social services in Europe. We pay particular attention to implementation of the digitalisation initiatives in two service domains, namely employment services and social security benefits (including minimum income and social assistance), and to its multi-layered impacts and implications, such as the accessibility, take-up, efficiency, and quality of the services in cash and in kind. Digitalisation in the public sector and public service delivery has been advanced through policy and legislation across Europe, especially the EU countries (Heikkinen et al., 2026). In recent years, digitalisation has been upheld as a promising solution for addressing the pressure many European countries are facing, that the declining tax revenues and demographic shifts challenge high-quality welfare service provision (Germundsson et al., 2024). While the need to distinguish relevant terms (e.g., digitisation, digitalisation, digitation) (Mergel et al., 2019; Ball et al., 2023; Gradillas & Thomas, 2025) and the 'varieties of digitalisation' (Considine et al., 2022, p. 521; Ball et al., 2023) has been highlighted in the literature, we can understand digitalisation as 'all forms of electronic, online, algorithmic, automated and data-driven processes, procedures, calculations and systems (Griffiths, 2024, p. 13)', as an umbrella definition[1]. In public service delivery scenarios, the notion of digitalisation can be very often contextualised as 'e-government', 'electronic government', or 'digital government' (Terlizzi, 2021). Digitalisation in public service delivery can therefore refer to 'the government's use of the Internet and other ICTs to deliver information and public services to citizens' (Terlizzi, 2021, p. 15), or a more holistic view, 'an overarching transformation of the public sector's activities, policies, instructions, culture, and relationships (internal and external) that is steered by information and communication technologies' (Gomes et al., 2022).

Many European countries have demonstrated ambition to initiate and accelerate digitalisation in, among others, employment services and social assistance. Both service domains are particularly critical for persons with insufficient income from paid work in the ordinary labour market, those most in need of support (Gallagher & Griffin, 2023; Germundsson, 2024). Citizens of working age need a minimum income to support themselves, to mitigate risks of poverty, reduce experiences of economic hardship, reduce their welfare dependency and achieve paid work. Social assistance thus provides a 'final safety net for the economically most vulnerable' (Germundsson, 2024, p. 513). Employment services and active labour market policies (ALMPs), which are normally provided as services in kind, such as various training, education, coaching, rehabilitation, and monitoring programmes and measures aimed to enhance the prospects of the beneficiary or 'client' to enter or re-enter the labour market. Delivering both services are, however, expensive and resource-intensive (Senghaas et al., 2019; Ranerup & Svensson, 2022; Gallagher & Griffin, 2023). More importantly, both have been facing problems such as scarce resources in public agencies (Sacchi & Scarano, 2024; Eppel et al., 2026), pressure from increasing and evolving societal demands (Hasenfeld, 2010; Plesner et al., 2018; Ranerup & Svensson, 2022), misallocation of services and benefits (Haitsma, 2025), and mismatch between the investments in and the outputs of the services (Eppel et al., 2026). The properties and advantages of digitalisation, have been expected to reduce administrative burden and cost and providing triaging and targeting services, so that the efficiency, cost-effectiveness, user-centricity, transparent, fairness and quality of the service delivery could be ensured (Kaun, 2021; Ball et al., 2023; Fondazione Giacomo et al., 2023; Jørring, 2025).

While the digitalisation in employment services and social assistance in Europe has been given increasing scholarly attention, this paper adds to the literature by reviewing and synthesising the existing evidence and provide a nuanced understanding of the digitalisation initiatives at three specific aspects, including technological practices, and particularly, impacts and policy conditions that may foster responsible adoption of digital technologies in the service delivery. To achieve the study objective, this paper adopts a scoping literature review of 21 academic articles published over the past ten years and aims to answer the following three questions:

1. How has the delivery of employment services and social assistance been digitalised in European countries?
2. What is the evidence of its impacts and implications?

[1] In this paper, "digitalisation" is used as an overarching concept closing to Griffiths (2024)'s definition. However, (only) in section 3, "digitalisation" is discussed and specified as a specific technological practice for informing varieties of digital initiatives and mechanisms in public service delivery.

3. Under which conditions may digital technologies be more effectively and responsibly adopted in the service delivery?

2. Methods

2.1. Research Design

This study adopts a scoping literature review. A scoping review provides an approach to evidence synthesis for identifying and mapping relevant evidence regarding specific topics, fields, contexts, concepts or issues under review. It often addresses broader questions than traditional systematic reviews, mainly by identifying, presenting and describing relevant characteristics of included sources of evidence instead of systematically combining data for developing synthesised results (Peters et al., 2021). A scoping review design is appropriate because the study aims to explore emerging perspectives and debates in the literature that contribute to understanding digitalisation in employment services and social assistance.

2.2. Literature Search Strategy

This paper adopts an experimental, AI-assisted literature search strategy. A Python script was developed for the literature search, with assistance from Codex, an AI-assisted coding tool from OpenAI, under the authors' supervision. The Python script and search functions were tested and adjusted based on the authors' ideation and requirements over two weeks before applying to the final search procedure. Metadata databases, namely OpenAlex and CrossRef, were used, and at this stage, publications between 2015 and 2026 were targeted to ensure the retrieval of adequate records. We chose OpenAlex and CrossRef for two reasons. First, they offer open-source, free-of-charge Application Programming Interface (API) which can be easier to deploy in Python programming, rather other mainstream commercial databases. Second, they provide numerous, inclusive, interdisciplinary publication records, suggesting better coverage than better coverage of traditional bibliometric databases such as Scopus and Web of Science (Cicero & Sarlo, 2026). The search started with defining two thematic concepts: 'digitalisation' and 'social services', and several seed articles were used to expand the two thematic concepts and generate search terms for the first round.

Then in each subsequent round, titles and abstracts of the records from the previous round were analysed to identify relevant terms for the new search. In this way, we aimed to ensure highly relevant search terms for each search attempt. The Boolean operator AND was applied to pair search terms across 'digitalisation' and 'social services', and the pairwise logic, 'new AND new' as well as 'new AND previous', were applied to cover more relevant search queries and records. Appendix 1 presents an overview of the search terms, number of search queries and results for each round. Notably, as will be explained, one of the limitations of using OpenAlex and CrossRef is the risk retrieving articles from controversial journals and publishers. To ensure only titles and abstracts of higher-quality publications were included and analysed for expanding new search terms, we identified controversial journals from the records of each round with (1) suspicious multi-disciplinary titles, such as 'Global Journal for Research Analysis', 'World Journal of Advanced Research and Reviews', (2) branding quick review and publication and claiming publication fee on the journals' websites, such as 'the International Journal of Vast Advancements in Science and Technology'. In the meanwhile, we also filtered out journals with apparent research scopes on e.g., law, electronic engineering, medicine, nursing. The searches were conducted until the fifth round, when few newer search terms were suggested, and the five rounds of searches resulted in 2206 records. All records with their metadata information were automatically written into an Excel spreadsheet.

In the spreadsheet, we continued to filter and exclude the records by (1) identifying those without DOI number, author information, or abstract, (2) continuously checking the journal sources according to the abovementioned criteria, and (3) evaluating article relevance and potential overlapping across those with comparable research fields and objectives based on articles titles and abstracts. After this step, 73 articles remained. Finally, we uploaded the articles' DOIs to Zotero where the 'Find Full Text' was used to download the articles' full texts where available. In this way, 70 articles remained for the analysis. Appendix 2 provides a PRISMA flowchart

to report on the search procedures and results. Finally, to align with the research focus of the SWINS project, we added two extra criteria so that only articles on (1) 'public employment service' and 'social assistance', with (2) empirical studies in the European context, were selected. This step yielded 21 articles (see Appendix 3).

2.3. Disclaimer on the use of artificial intelligence (AI) tools

AI tools were used in this study in a responsible and transparent manner. Codex (an AI-assisted coding tool) was used to help build, revise and test the literature search Python script according to the authors' ideas, anticipation, requirements and under their review. Gemini Notebook was used as a Retrieval-Augmented Generation (RAG) tool for scanning the PDF files of the selected articles, navigating and retrieving relevant text chunks, with the relevance and source reliability of the retrieved texts carefully reviewed and verified by the authors. We emphasise that the main research design, analysis, and arguments in this paper remain the authors' own, and no content of this paper was generated by any AI tools. All uses have been documented for necessary audit purposes.

3. Technological practices of digitalising employment service and social assistance deliver in Europe: From 'digitisation' to 'digital transformation'

We all talk about digitalisation, without distinguishing subtle among different 'digitalisation' technological practices. These related and widely used concepts, namely 'digitisation', 'digitation', 'digitalisation', and 'digital transformation', have been very often interchangeable in the literature (Ball et al., 2023; Gradillas & Thomas, 2025), and also very likely in practice. Here we introduce how Mergel et al. (2019) define the three terms. They understand *digitisation* as 'the transition from analogue to digital services with a 1:1 change in the delivery mode and the addition of a technological channel of delivery' (p.12), while *digitalisation* as 'potential changes in the processes beyond mere digitising of existing processes and forms' (p.12). Further, *digital transformation* is a 'holistic effort to revise core processes and services of government beyond the traditional digitisation efforts. It evolves along a continuum of transition from analogue to digital to a full stack review of policies, current processes, and user needs and results in a complete revision of the existing and the creation of new digital services.' (p.12) It thus emphasises changes in the culture, organisation, and relations (Mergel et al., 2019). While these technological practices are closely related, they should be analytically distinguished, as they suggest different outcomes and impacts.

In both employment services and social assistance provision, digital technologies are very often discussed as innovative tools to *digitise* the service delivery. In terms of providing employment services, e-service applications and platforms, such as the follow-up system *Modia* adopted by the Norwegian labour and welfare administration (NAV), have been developed as 'digital encounters', where clients send applications online, view their case information, and communication with caseworkers online (Breit et al., 2020). In Denmark, Belgium, and the UK, digital technologies, mainly including online meetings (such as Zoom or Teams) or journaling platforms, have also been more commonly adopted to move more face-to-face servicing forms to virtual environments (Ball et al., 2023). Similarly in the social assistance domain, one of the major digitalisation initiatives in Finland has been to digitise the application process of basic social benefits, including income support, basic pension, and unemployment benefits, via the Kela's e-service portal (Buchert et al., 2022). The citizens can submit their application and documents, view decisions, send and read messages, regardless of their locations (Kansaneläkelaitos, n.d.). In most of these cases, services are delivered or 'digitalized' through *digitisation*, in other words, analogising in-person service delivery in a digital format (Mergel et al., 2019), or digitally mediated virtual client-casework interactions (Breit et al., 2020; Ball et al., 2023). The use of digital technologies in this context tends to provide additional alternatives or choices in parallel with in-person services, suggesting a kind of 'format' change to address more practical problems such as rural/remote populations' access to services. Such technological practices do not explicitly indicate an intention to change the 'human-to-human' interaction nature (Considine et al., 2022, p. 522) and provide a 'system-level bureaucracy intervention' (Ball et al., 2023, p. 1173).

In the recent years, approximately since the outbreak of the COVID-19 pandemic, the interest and intention in piloting and deploying newer digital technologies in more essential and decisive phases of public service delivery has been increasing, continuously evolving the digitalisation of employment services and social assistance in Europe. Instead of merely facilitating client-caseworker interactions, newer digital technologies, such as more advanced programmed and even self-learning algorithms, have been used to automate and

empower service provision, that is to *digitalise* the delivery process, aiming at more radical organisational changes through digitalisation. One well-discussed example is the introduction of robotic process automation (RPA), what Wirtz et al. (2019) called 'limited AI', to achieve automated decision-making (ADM) during service delivery. The RPA initiative expects to execute repetitive and routine work through a set of software, which emulate and automate human performance regarding data collection and retrieval from existing digital systems and interfaces, based on a formalised computational process and predefined scripts and rules (Andersson et al., 2022; Asatiani et al., 2024).

RPA has been employed in both employment services and social assistance scenarios in Europe. In Denmark, an RPA technology, *Digital Assistant* (DIAS), has been adopted by job centres to improve workflow efficiency, for example, collecting 'obligatory and informative data about citizens from different systems across the municipality and compiled it into a single, easily accessible overview.' In doing this, RPA helps reduce repetitive 'clicks' and save time for casework to prepare meetings with citizens (Jørring, 2025, p. 501). Digital automation of social assistance has been deployed in Finland for the past nearly ten years, which is still evolving towards a full digital transformation. Their digital automation initiatives, including *Incomes Register* launched in 2019, has provided significant support for automating and accelerating various preparatory and procedural tasks, such as automatically accessing and collecting real-time data on citizens' income and employment relationships from clients' bank accounts and official registered sources for social assistance benefit evaluation and decision-making, structuring work queues, and so on. Their rule-based programs may automate preliminary calculations on clients' eligibility, benefit periods, payment amounts, and decision letter drafting (Heikkinen et al., 2026).

Alongside these pre-defined programmed automation, another more advanced AI empowered by the capability of self-learning, calculating, and predicting (Lacity & Willcocks, 2018; Wirtz et al., 2019) has also been increasingly piloted and adopted across Europe. Such digital technologies aim to automate not only specific reunited workflows, but also decision making – either partially (Berman et al., 2024) or fully (Kaun, 2021) – depending on to what extent human intervention is involved. A typical example in employment services is the profiling tools utilised in the labour market policy assessments in Poland (Sztandar-Sztanderska, 2025), Sweden (Berman et al., 2024), Denmark (Jørring, 2025), Belgium (Ball et al., 2023), Austria (Eppel et al., 2026), and Italy (Sacchi & Scarano, 2024). This technological practice is to use a statistical model, a neural network trained on a large historical dataset consisting of millions of profiles collected over years, particularly pertaining to personal demographic information, previous unemployment activities, and so on (Bennmarker et al., 2021), in labour market related assessments. Then the statistical profiling tools aim to predict the jobseekers' employment prospects, i.e., the probability of finding a job within a certain period of time, assign them into different segments, and accordingly match the jobseekers with different employment recommended activities and services (Ball et al., 2023; Berman et al., 2024; Sztandar-Sztanderska, 2025; Eppel et al., 2026). In Poland's *Syriusz*^{Std} initiative, for example, the profiling tool supports to assign jobseekers into three profile types. Only those assigned into profile II could access most of the active labour market programmes and relevant benefits, whereas profile I (jobseekers very close to the labour market and ready to work) and profile III (those distant from the labour market) have restricted access to ALMPs. The emerging 'machine bureaucracy' (Considine et al., 2022) in these cases, empowered by algorithms and machine learning, have been given large or even full responsibility in deciding the offers and demands that jobseekers receive and monitoring most claimants to self-manage their own forms of activation, with minimal human involvement in these processes. In this context, public services, including employment services and social assistance are delivered by digitally empowered procedural changes, and new citizen-servant interaction methods, processes, and even outcomes have started to be appeared and formed.

Does *digital transformation* refer to specific technological practices for public service delivery, or, echoing Mergel et al. (2019), an outcome after all-round cultural, organisational, and relational changes? Sacchi and Scarano (2024) vividly illustrated how the digital transformation of public employment services in Italy has been achieved so far. It started from providing online service platforms for remote service delivery, then introducing profiling tools to determine the level of assistance that one needs, and their assignment to different activation paths to return to the labour market, and recently to developing AI- and big data-enabled predictive analysis for service matching. Ball et al. (2023) also identified that, across several European countries, digital initiatives and technologies in public employment services have showed some modes and patterns of digitalisation, similarly, from client-caseworkers virtual engagement, to procedural and transactional automation, and AI-profiling and learning algorithms to determine who is in need of what. Clearly, all these specific digitisation and digitalisation initiatives eventually seek and contribute to all-round transformation of public service delivery. From another perspective, we also argue that digital transformation represents a technological practice, or more specifically, a complex or 'digital ecosystem' (Verdin et al., 2023), of enhanced, systematic, and intelligent

technological practices. In this context, digital transformation itself provides a solution – moderated and mediated through diverse digitisation and digitalisation initiatives – to ensure more efficient and advanced public service delivery.

4. Impacts of digitalisation in employment services and social assistance: A "practical-organisational-social" synthesis framework

In the previous section, we have seen that different digitalisation technological practices may aim at and lead to changes in various aspects of service delivery. Accordingly, the expected outcomes and implications of different practices may vary. In this section, we distinguish and discuss the impacts of digitalising public employment services and social assistance across three analysis levels: practical, organisational, and social.

4.1 Practical impacts: Uptake, accessibility and efficiency

The potentials of digitalisation have resulted in a rapid *uptake* of digital technologies by public agencies in service delivery. In Northern Europe, for example, the municipality Trelleborg of Sweden, the share of social assistance applications submitted through digital encounter already reached 75 percent by 2017, while 85 percent of the applications were handled at least partly and 30 percent entirely by robotic automation system in 2019. In Southern part, already half of the 21 Italian regions have fully delivered employment services using digital encounters by mid-2022. Yet, whether the uptake by the citizen side has been growing is not clear based on the literature. On one hand, the expanding deployment might lead to, and therefore hint on, a generally growing adoption among citizens; on the other hand, if we analyse from the perspective of *accessibility* that concerns whether citizens can reach the needed services and relevant information through digital technologies, the reality could be more complicated.

E-service portals and digital encounters in, e.g., Norway and Sweden, have been endorsed to offer 24/7 access to service applications and meetings as well as support from caseworkers, which is expected to reduce travel time- and physical barriers for citizens (Ranerup & Henriksen, 2019; Breit et al., 2020), and thus to facilitate the accessibility and uptake of public services. Empirically, there were indeed comments that using online meetings or journaling applications can improve access to employment services by avoiding unnecessary face-to-face appointments and saving travelling time, and particularly benefiting jobseekers with caring duties, physical or mental health issues, or part-time jobs, in Ball et al. (2023)'s comparative study. However, if we zoom in other citizen groups, the story can be different. For instance, in Finland, Buchert et al. (2022) found 35 percent of their investigated Russian-speaking older migrants did not use digital health and social welfare services due to various structural barriers. Hence, we imply that the overall uptake of and access to digital services may be promising, whilst it can still be struggling for specific citizen groups that face structural challenges.

Efficiency first refers to whether digitalisation can make the service delivery more procedurally efficient, e.g., accelerating the social assistance application process (Ranerup & Henriksen, 2019). The adoption of robotic process automation in social assistance across several Swedish municipalities, such as Nacka, has been found supportive for social assistance organisations to save processing time and improve their internal processes (Ranerup & Svensson, 2022). Similar automation initiatives in Denmark were also perceived by caseworkers as a way to save time and improve efficiency during the case overview, assessment, and management (Jørring, 2025). However, in a similar study on digitalising and automating social assistance in Sweden, Germundsson (2024) argued that the introduction of process automation caused a cumbersome adoption process with modest outcomes in terms of alleviating administrative workload and focusing on client support.

Further, efficiency also concerns whether the service delivery can become cost-efficient through digitalisation for organisations. In Sweden, Ranerup and Svensson (2022) found that the deployment of robotic process automation in social assistance has its principal goal of optimising the resources and costs spent on providing social assistance. The point is to optimize the service processes through digitalisation, which facilitates clients' own use and access to online services and achieve self-support, and thereby costs of application process and economic support. Likewise, one of the drivers of Austria's 'Labour Market Chances Assistance System' (AMAS) initiative came from the pressure of scarce budgetary resources in employment services, and a mismatch between the costs invested in the service delivery and the success of the interventions. However, the analysis results have shown that the introduction of the statistical profiling model to predict clients' reemployment and assign different levels of support and programmes does not yield the expected efficiency gains (Eppel et al., 2026).

4.2. Organisational Impacts: Changes in relationship, professionalism, and organisation

4.2.1. Interpersonal Relationship

Interpersonal relationships, especially the claimant-professionals relationship, is key to the successful delivery of many public and social services, as it helps build trust clients' trust and therefore enhance their participation and engagement during the service delivery (Nordesjö et al., 2021; McMullin, 2025). In this section, we focus on and discuss how digitalisation may drive changes in client-professional interaction and relationship dynamics, which could further shape the service delivery processes and outcomes. It should be noted that another type of relational change in broader societal context has also been identified (see section 4.3. (1)) and distinguished from the present discussion which is more contextualised during rather than after service delivery.

Using digital technologies has been expected or found as an enable to make clients more self-guided and -supported and therefore more interactive with digital platforms and services (Breit et al., 2020; Ranerup & Svensson, 2022; Ball et al., 2023). In some cases, this can further enhance the client-professional relationship building. Through digital encounter, caseworkers in NAV in Norway, for example, now are able to delegate tasks and responsibilities to clients, e.g., giving them more participation in the management of their own cases, which allows them to co-produce services with caseworkers (Breit et al., 2020). But more likely, as the evidence shows, the increasing 'digitalisation for most' and 'machine bureaucracy' risk negatively influence both clients and caseworkers' engagement, especially for caseworkers. Simplified and standardised handling process by automation can undermine caseworkers' feeling toward the meaningfulness and values of their work (Andersson et al., 2022; Jørring, 2025). Moreover, the increasing digitalisation practically reduces human contact during the service delivery, which makes the complexity of clients' employment and life situations not sufficiently considered and evaluated (Germundsson et al., 2024).

The point is that human interaction has not yet been completely diminished, whereas the client-professional relational and power dynamics have been gradually reshaped. It seems that caseworkers start to be put in a more fragile position and may need to play strategically in the client-professional relationship. For instance, the improved accessibility to services *and* caseworkers through digital platforms has increasingly made caseworkers face pressure to respond, and clients can be empowered by various digitally mediated



approaches to push the responses and interaction. Meanwhile, caseworkers now have to worry that all the written communication on e-service platforms could be leaked social media and press, and used to lodge complaints against the caseworkers. All these pressures can trigger coping strategies from caseworkers when interacting with clients (Breit et al., 2020). On the other hand, it has been found that, when manual decisions are needed, caseworkers may become stricter and reject more applications, as the client-professional communication and interaction as well as their relationship building have become less frequent and necessary due to digitalisation and automation (Germundsson et al., 2024).

4.2.2. Service Quality

While very often mentioned as an outcome of digitalisation alongside other terms such as efficiency, the notion of service quality has not been explicitly defined, measured and assessed in the literature (Andersson et al., 2022; Ranerup & Svensson, 2022). However, several themes have emerged across the reviewed articles that we categorise as quality parameters here. First, a concern on whether and how digital technologies, especially AI and the algorithms that are described as 'no shared science underpinning them' and 'kinds of voodoo maths going on' (Ball et al., 2023, p. 1175), can provide accurate recommendations, predications, and even decisions, to support service delivery, has been raised recently across Europe (Ball et al., 2023; Gallagher & Griffin, 2023; Sztandar-Sztanderska, 2025). Thus, we trust that ensuring the accuracy of the digitalised and automated service delivery processes and outcomes incorporates a crucial indicator of service quality.

Take the statistical profiling tool in employment services. The capacity of the profiling algorithms to ration active labour market policy interventions to those predicted as being at risk of becoming long-term unemployed have been found overstated across the Organisation for Economic Co-operation and Development (OECD). It tended to produce high false positive rates, that is, falsely identifying those who prove to be frictionally employed as likely to be long-term unemployed (Gallagher & Griffin, 2023). Conversely, Berman et al. (2024) discussed whether AI technologies can provide more accurate decisions in classifying need for support among jobseekers in Sweden, suggesting a relatively high accuracy, despite variations across specific applicant groups. Beyond comparisons between digital and human decision-making, a further question asks whether and how digital technologies improve the accuracy of human decision-making, which so far has not been able to answer (Berman et al., 2024). Nonetheless, an accuracy of around 70% to 80% for the predicative algorithms has been reported in Flanders-Belgium, despite some other reservations (Ball et al., 2023). Moreover, the accuracy numbers provided in Sweden generally look not that mediocre. For instance, one measurement is to check the fraction of historical data points for which a correct decision is recommended, that is if the profiling tools assign a jobseeker as to the segmentation 'too near the job market' and they became employed after six months, or assign one to the segmentation 'suitable for Prepare and Match' or 'too far away from the job market' if they indeed remained employed. The result was 68%, which was 'relatively high' (Berman et al., 2024). Yet, Berman et al. (2024) also noticed that the accuracy varied across different sub-populations. The accuracy for persons with disabilities had the highest accuracy and true positive rate, while the youth had the lowest.

Accuracy further turns us to assess whether those digitalised services are more likely to align with user needs, in other words, *personalisation* or *user/citizen-centricity* (Ranerup & Henriksen, 2019). It has been argued that user needs in various public services are individual, very often intertwined with and complicated by personal preferences, lived experiences, sexual orientation, as well as social, cultural, and ethical backgrounds (van Toorn & Carney, 2024; Heikkinen et al., 2026; Werner et al., 2026). On one hand, digitalisation provides a supportive solution to identify and target who is in need of what specific services to return to the labour market (Ball et al., 2023). Many e-service platforms have also started to provide personalised interfaces (Breit et al., 2020). Ranerup and Henriksen (2020) argued that in the context of social assistance delivery in Trelleborg, Sweden, digitalisation, specifically automated decision-making, provides citizens with a more active role in decisions that fit their needs and affect their lives and rights via enhanced interaction with the technology and caseworkers. Other evidence, however, challenges such viewpoints, arguing that digitalisation, particularly automation that is built solely on administrative data has been increasingly reduced the spaces for clients' involvement in decision-making processes and for professional discretion which is crucial for meaningful judgement in last-resort social security and accommodating individuals' particular circumstances. Thus, service design and delivery have been far from user-centric (Berman et al., 2024; Germundsson et al., 2024), but become more de-individualised (Heikkinen et al., 2026).

4.2.3. Transparency and Accountability

It has been a common assumption that digitalisation can enhance the transparency and accountability of public service delivery (Germundsson et al., 2024), because, among other reasons, client-caseworker interactions will have to be documented (Breit et al., 2020), and the programmed standardisation are based on rules rather than human subjective judgement (Ranerup & Henriksen, 2020; Sacchi & Scarano, 2024). For more advanced digital technologies, such as AI, however, the digitalised service delivery can be more inscrutable, or a 'black box', because it provides inadequate explanations for its decisions and limited opportunities to contest it (Berman et al., 2024). In the UK, digitalisation of their Universal Credit program, technical features, such as automated data sharing, were believed as obscuring accountability. When automation is involved and errors occur, claimants may not know who should take action to solve the problems or may never receive explanations for the errors and receive rectified payments. Notably, this accountability issue was largely explained by the lack of human control with and limited visibility into decision-making and backstage processes (Bennett et al., 2024).

4.2.4. Discretion and professionalism

As mentioned earlier, the design and delivery of employment services and social assistance should be user-centric, and individual situations should be professionally and comprehensively evaluated by caseworkers that are more experienced and capable of having nuanced understanding of users' situation (Berman et al., 2024; Germundsson et al., 2024). As these AI- and machine learning technologies has inherently limitation of obtaining and interpreting contextual information (Andersson et al., 2022), a debate on whether and how they could impact on caseworkers' professional autonomy and discretion during service delivery therefore arises (Ranerup & Henriksen, 2020; Ball et al., 2023; Germundsson et al., 2024; Heikkinen et al., 2026). More precisely, the debates centres on technology-induced streamlined, standardised, and thereby objective procedures versus humans' more experience-based, necessarily subjective judgement, in the normally complicated service delivery.

Some argue that digital technologies can diminish professional discretion, in two slightly distinct ways. First, these technologies may directly and explicitly take over the role of dominant decision-maker from caseworkers with caseworkers only assisting the automated decision-making. For instance, in Sweden, caseworkers were instructed to primarily follow the automated recommendation in employment services as the alignment with more streamlined operation and automated processing may potentially improve cost-effectiveness of the service delivery. Instead, they now may only override individual cases, their professional discretion appears to be diminished (Berman et al., 2024). In this context, caseworkers' educational training and professional experience, which benefit their interactions with citizens and service delivery, are no longer part of the automated decision-making process. This explains why digital technologies have been accused of diminishing professional discretion during the service delivery (Andersson et al., 2022). Second, in a more inexplicit way, although humans are still involved in the delivery process, their judgement will probably be influenced by digital technologies. In Italy, caseworkers in employment services have seemingly become uncertain about their professional discretion and judgements. They were found facing pressure not to align with the decisions made through automation, since these decisions are perceived as 'standardised outputs' (Sacchi & Scarano, 2024).

Voices and evidence that digitalisation does not necessarily threaten professional discretion also exist. First, digitalisation, especially automated decision-making practices, currently tends to be used to streamline the operations for 'easy cases'. Caseworkers' participation only has been increased in those 'hard cases' where their professional discretion is still much demanding and valued, therefore not necessarily undermined (Ranerup & Henriksen, 2020). Second, the standardisation of the service delivery process through digitalisation can produce procedural objectivity and eliminate human error, which is particularly needed and useful to handle the arbitrary nature of social service provision, and thereby support professional discretion. No mention that such digital technologies will only function properly by collaborating with professional discretion (Meilvang & Dahler, 2022). Ranerup and Henriksen (2020) echoed that in employment services, this automated standardisation supports services to be delivered according to rules and reduces human factors as well as the risk of unethical behaviour from caseworkers. In this sense, automation and digitalisation seem to develop the professionalism of public service delivery.

Clearly, in Europe we have not seen any completely digitalised delivery of employment services and social assistance cases at this stage, but more commonly a so-called 'hybrid model' in which both humans and technology are involved in the delivery processes (Callon, 1984). However, the interpretations and conclusions on the professional and organisational change vary across the scholars and contexts (Ranerup & Henriksen,

2020; Sacchi & Scarano, 2024). To what extent digital technologies can overtake human roles, in which situations they may significantly influence professionalism in public service delivery as well as the delivery outcomes – either support or harm – needs further discussion in both literature and practice.

4.3. Societal impacts: Enhanced labour market integration and fair service resource allocation?

How does the available literature report on the consequences of digitalisation for whether the claimants and beneficiaries of the services actually benefited from the services or not, i.e. whether the digitalization of the services improved or worsened the outcomes? As the societal impacts, *social connection* (including social participation and integration) and *social equity* (including social exclusion and fairness) have emerged as two widely discussed themes in the European context. Here, by social connection, we look for how digitalised public service delivery could contribute to enhancing citizens' contact and interaction with broader contexts, such as communities and society, *after* the services delivered – beyond the earlier discussed client-professional relationship building *during* the service delivery.

A more direct observation on any changes in social connection can be the gains of those profiling tools used in employment services cases. Generally, evidence from several European countries in the literature shows no strong and clear conclusions that such digital technologies can effectively and efficiently increase jobseekers' opportunities to return to labour market and improve labour market integration (Berman et al., 2024; Eppel et al., 2026). Moreover, Ball et al. (2023) noted that increasing virtual communication and interaction can be 'potentially dehumanising for jobseekers, which may make them experience alienation, isolation, or loss of connection.' (p.1173). In the social assistance domain, however, the story of the Mölndal in Sweden provides a positive, though unique, perspective on how digitalisation may contribute to social connection. It was said that digitalisation was expected to optimise the application process and help applicants to become self-supporting. In this way, digitalisation contributes to improve citizens' participation and integration by making citizens more self-supporting and reducing the number of people in need of social assistance (Ranerup & Svensson, 2022).

Meanwhile, the concerns about social equity issues, including exclusion, fairness, discrimination, and biases due to digitalisation in employment services and social assistance have paid extensive attention (Buchert et al., 2022; Alon-Barkat & Busuioc, 2023; Berman et al., 2024; Germundsson et al., 2024; Haitsma, 2025). On one hand, the computational power of digital technologies, particularly automation, at times has been believed as being superior to humans' arbitrary, biased, and discriminatory decision-making (Sztandar-Sztanderska, 2025). Such a promise seems to have been achieved. The digital automation in social assistance application handling in Sweden was suggested as contributing to fair and objective decisions, since it supports adherence to rules and reduces unethical behaviours when the human factor is diminished (Ranerup & Henriksen, 2020). More evidence, on the other hand, has consistently highlighted that populations in vulnerable situations, such as those digitally illiterate or unskilled, migrants, older adults, women, persons with disabilities, and the unemployed, have been systematically disadvantaged and excluded by the increasing digitalisation in public services, including employment services and social assistance (Breit et al., 2020; Buchert et al., 2022; Haitsma, 2025). Eppel et al. (2026)'s observation on the Austria's algorithmic profiling suggests that such a digitalisation initiative tends to reallocate resources from the low-chance to the medium-chance segment risks creating a 'Matthew effect' in access to and use of ALMPs, as it would selectively favour those who already have better prospects of reemployment and disadvantage those most in need of support. The consistently identified ethnicity-, disability-, age-, income-, and gender-based exclusions in employment services and social assistance delivery (Buchert et al., 2022; Alon-Barkat & Busuioc, 2023; Berman et al., 2024), suggest that digitalisation has not significantly contributed to social equity by providing equitable and inclusive services, but even risked widening the social inequalities.

At least two explanations can be relevant. First, structural barriers, mainly including insufficient deployment infrastructure and ICT devices, low socio-economic status, lack of various literacies and skills, lack of recognised identification can persist and widen the digital divide, which further exclude citizens from accessing, for example, social assistance (Buchert et al., 2022). Second, digital applications themselves can be

embedded with bias and exclusion as systemic issues. Especially those recently piloted AI and algorithm-based tools can be trained by problematic and limited datasets (Ball et al., 2023) and affected by historical biased data, which means the technological bias, unfairness, inequalities, and discrimination, can be 'based on and reinforces historical inequalities' (Kaun, 2021, p. 2047). Yet, Alon-Barkat and Busuioc (2023) reminded that bias and thereby unfair decisions may occur during human-technology interaction: how our caseworkers process, interpret, and act upon algorithmic outputs.

5. What conditions for promising digitalisation: implementation networks and guidelines?

Our review demonstrates that the digitalisation practices in public employment services and social assistance varied both in how they were implemented and in the results across European countries. Given that all countries have their vision and ambition to improve public service delivery through digitalisation, what conditions must be met to ensure the digitalisation initiatives to be implemented as envisioned? Much of literature has have mentioned challenges in the digitalisation of employment services and social assistance benefit provision, which, from another perspective, may inspire us to reflect on these questions. Therefore, in this section, we categorise and present three themes concerning the conditions that are likely to facilitate the implementation of digitalisation initiatives in employment services and social assistance delivery, from the literature.

5.1. Implementation networks

5.1.1. Engagement between service claimants, caseworkers, and technology

Despite the possibility of 'machine bureaucracy' (Considine et al., 2022), very little evidence in the European context has suggested that human involvement has been, or will be, completely replaced and even hollowed out in the employment services and social assistance domains. Rather, how and whether digitalisation can facilitate public service delivery first and greatly depends on the interactions, collaborations, and even integration between frontline caseworkers and technologies. Digital technologies that profile jobseekers' employment prospects and automate service matching first rely on data, most of which, however, is collected by caseworkers from their interviews with jobseekers. Meanwhile, to provide more accurate and objective information for the profiling algorithm, caseworkers' discretion and judgement upon the data inputs provided by the claimants (Sztandar-Sztanderska, 2025). Most importantly, the decisions made through digitalisation have been found possibly inaccurate and biased, which demands correction from caseworkers. Furthermore, it has been frequently highlighted that caseworkers can play an irreparable role in analysing and evaluating the claimants' practical needs, preferences, wishes, related to employment and social security, given most digital technologies' inherent limitations in this regard. Clearly, digital technologies, at least at the current stage, cannot ensure that public services will be delivered efficiently, professionally, user-centrically, as a matter of course. But a sound caseworker-technology collaboration, with the former either supporting or supported by the latter, is essential in safeguard both the quality, accountability, and fairness of digital public services (Ranerup & Henriksen, 2019).

In parallel, citizens are expected not any longer to be passive recipients of services delivered through those pre-designed mechanisms and systems. Rather, the value of public services, including employment and social assistance services, is built on the co-creation, co-design, and co-production between users and other parties (Breit et al., 2020; Berman et al., 2024). We have witnessed that the users' perceptions, experiences and assessments of digital technologies and broader transformation can significantly influence how engaged they could be with e-service applications and the service delivery (Ranerup & Henriksen, 2019; Ingold et al., 2024). Thus, the meaningful participation of citizens at various stages of the service delivery and, in this process, their communication with caseworkers, technologies and the service designers and developers, and other possible parties, are the key to leveraging the potential of digitalisation in enhancing user-centredness and inclusivity of the service delivery. In practice, the delivery of digital employment services and social assistance services at the current stage has not sufficiently involved users and considered their voices and needs, but relied primarily on registered data (Berman et al., 2024). Mechanisms that enable such co-creation and co-production interactions among citizens, professionals, and technologies, are therefore needed (Tuunanen et al., 2023).

5.1.2. Coordination across the government, market, and civil society

Chasing envisioned digitalisation of public services, we have to look further to and "pay careful attention to how power is likely to be wielded within the process and in whose interest' (Andersson et al., 2022, p. 8), in a broader implementation network that includes among other those actors across the government, market, and civil society.

In the government sector, for instance, *managers* in public service agencies have been well discussed in terms of shaping the implementation of digitalisation initiatives. In Polish employment services agencies, the managers have been found to significantly intermediate how caseworkers use and interact with digital technologies during public employment service delivery. It seems that when the managers position the digital technologies as supporting tools and encourage caseworkers to make their own judgements, the automatically set profiles are more likely and frequently corrected, thereby marginalising the digital technologies in the service delivery. In agencies with more hieratical culture, caseworkers are less likely to adjust the automatically set profiles, in which cases digital technologies take precedence over professionals in the decision-making (Sztandar-Sztanderska, 2025). In addition to technological practices, managers can also intermediate between policy strategies and organisational institutionalisation, for instance, taking responsibilities of a local adaptation of national e-government policy goals in Sweden (Andersson et al., 2022). To address those issues emerging from public employment services in Italy, Sacchi and Scarano (2024) commented that a central steering body with strategic vision and sustained action over time might be necessary. How regional policies need to be coordinated by national institutions and how programme implementation is overseen remained unresolved. Among others, how local government stakeholders and organisation managers are engaged in the implementation drives our further consideration.

Alongside the government sector, the *market or private sector* may present another crucial force influencing the progress, process and results of digitalisation in employment services and social assistance. Kaun (2021) argued that the process of digitalisation and datafication has been driving us toward a new regime of welfare provision. This new regime is 'characterised by new forms of privatization that not only take, for example, shape in new actors such as technology companies and coders entering the field of public administration, but also emerge in the form of increased delegation and reliance on complex technological systems' (Veale & Brass, 2019; Kaun, 2021, p. 2050). In this context, technology companies as well as service designers and providers have become crucial stakeholders in the public service delivery, and even played as 'new street-level bureaucrats' (Bovens & Zouridis, 2002; Ingold et al., 2024, p. 387), suggesting a reshaped power relationship between service users (including citizens and government agencies) and providers. In this relationship, communication – if not coordination – is needed, which is however something both parties are struggling with in practice (Ingold et al., 2024). As the evidence in the UK shows, technology companies and providers may be motivated by innovation; at the same time, they may also have to game when cost saving and profit must be prioritised, which consequently may incentivise them to play a safe card, providing rather standardised digital products and services that insignificantly drive innovation and reforms of public employment service delivery (Ingold et al., 2024).

Furthermore, the participation of civil society groups has also been mentioned as facilitators for higher-quality digital public service delivery. In Finland, the third-sector organisations have been found with increasing involvement and responsibilities in assisting vulnerable groups, such as older adults and migrants, to access social assistance services and benefits in the digital context. While these civil society groups have the potential

in improving the quality and especially inclusiveness of the services such organisations very often face scarce financial and human resources, as well as a legislative basis – even though their participation is encouraged by the government (Buchert et al., 2022). Moreover, since the explainability and transparency of, e.g., automated decision-making, remain concerned at the current stage, civil society groups seem to be engaged as independent audit sources that may foster the transparency of digitalised public service delivery. An example is that a journalist sued the Trelleborg municipality in Sweden, the pioneer of automating decision-making in their public service delivery as mentioned earlier, because the source codes of the automation software were not accessible for the public. The journalist won the appeal, which pressured the municipality and the technology company to collaboratively to share the source code in a later public request (Dagenssamhälle, 2020; Kaun, 2021). Yet, how to institutionalise and sustain the third-sector organisations' participation and engagement requires sustained attention from various stakeholders

5.2. Technical, legal, and ethical guidelines needed for the implementation

The increasing issues emerged during the digitalisation, on the other hand, relate to the lack of guidelines that contribute to a legally-, ethically-, and technically compliant implementation of digital initiatives and adoption of technologies in service delivery.

Digital divide has been restraining vulnerable groups from public services that is increasingly digitalised by default. Among others, older people and persons with disabilities have particular difficulties in using and interacting with digital technologies due to physical dysfunctions (Buchert et al., 2022). That is why technical guidelines such as the Web Content Accessibility Guidelines (WCAG) have been developed to instruct the inclusive design of digital tools and improve their accessibility. In Europe, we have similar technical guidelines such as EN301549 – Accessibility requirements for ICT products and services, and the European Accessibility Act requires the public agencies to comply with WCAG and EN301549 when providing digital public services. However, as human-technology interaction advances beyond information browsing, we very likely face a lack of technical guidelines that improves the accessibility of another level of use of and interaction with digital technologies, such as chatbot and those earlier mentioned self-supporting online activities and tasks in social assistance delivery. Moreover, many have argued that the bias and errors produced by AI and algorithms in employment services and social assistance originate from model or data inadequacies (Alon-Barkat & Busuioc, 2023), that result from human design, data collection, and training choices. This therefore suggests, among others, a lack of unified methods and standardised schemas for data collection and model development and training (Giovanola & Tiribelli, 2023).

Moreover, the ability of digital technologies in enhancing transparency remained doubtful as many issues are currently 'beyond the reach of legal remedies' (Berman et al., 2024; van Toorn & Carney, 2024, p. 34). Kaun (2021) mentioned that in Sweden's social assistance scenarios, the delegation of decisions to an algorithmic system was not supported by legal regulations for municipalities. Berman et al. (2024) argued that the use of digital technologies should adhere to laws, and especially automation of decision-making should be explainable and appealable, in line with legal regulations, which they did not find in their Swedish labour market decision-support system case. These legal issues, in turn, call for expanding the legal framework to guide the use of such technologies, such as the EU's General Data Protection Regulation (GDPR) and particularly the proposed EU AI Act that covers legal guidelines on addressing technical bias, transparency, and interpretability, as Berman et al. (2024) mentioned.

As for the raised ethical concerns in social assistance (Andersson et al., 2022; Haitsma, 2025) and employment services (Berman et al., 2024), alongside legal and regulatory frameworks (Seniutis et al., 2026), specific ethical guidelines to instruct an ethical use of digital technologies in public service delivery are also urgently needed (Gamble, 2020). While we now have something as Ethics Guidelines for Trustworthy Artificial Intelligence in Europe (Smuha, 2019), how these guidelines fits and practically guide the practices needs further assessment. In Haitsma (2025)'s investigation of how Dutch social security agencies address discrimination risks in algorithmic profiling which European laws require without providing practical guidelines, we can see somewhat constructed principles, protocols, assessments (including the ethical assessment and deliberation), and mechanisms applied to identify and mitigate these ethical risks by different agencies. While the Dutch social security agencies are rather autonomous regarding their approaches, Haitsma (2025) also

highlighted a number of challenges that agencies face when applying these approaches. More importantly, this case revealed the lack of an overarching ethical guideline which is both aligned with the current EU legal framework, compatible with technological practices in service delivery, and instructive for local public service agencies to prevent and address ethical risks.

6. Evidence summary: A nutshell of digitalisation in social service delivery of Europe

For a better overview of the evidence synthesis and discussion in the previous sections, we provide a summary table (Table 1) that thematically brings the evidence together and roughly inform comparisons between the countries and an overall picture of Europe. In doing so, we have captured the following patterns on digitalisation of social services across Europe

Table 1 Evidence synthesis by themes and service domains. Source: the authors' own organisation

		Public employment services	Social Assistance Benefits
Technological Practices	*Digitisation*	e.g., e-services portals and digital encounters, in Denmark, Norway, UK, Italy Denmark (Breit et al., 2020; Ball et al., 2023; Ingold et al., 2024; Sacchi & Scarano, 2024)	e.g., e-services portals and digital encounters, in Finland, Sweden, UK (Ranerup & Henriksen, 2020; Buchert et al., 2022; Bennett et al., 2024)
	Digitalisation	E.g., programmed process automation in Denmark, UK (Ingold et al., 2024; Jørring, 2025) E.g., statistical profiling, in Austria, Belgium, Denmark, Italy, Poland, Sweden, OECD (Ball et al., 2023; Gallagher & Griffin, 2023; Berman et al., 2024; Sacchi & Scarano, 2024; Jørring, 2025; Sztandar-Sztanderska, 2025; Eppel et al., 2026)	E.g., programmed process automation in Finland, UK, Sweden (Bennett et al., 2024; Germundsson et al., 2024; Heikkinen et al., 2026) E.g., statistical profiling, in Netherlands (Haitsma, 2025)
	Digital transformation	"Remote interaction-programmed profiling-predictive analyses" in Italy (Sacchi & Scarano, 2024) 'Virtual communication-process automation-profiling service needs' in Belgium, Denmark, UK (Ball et al., 2023), Italy	/
Consequences/ Impacts	Uptake by public agencies	Generally, a wide and growing uptake by public service agencies across Europe (Gallagher & Griffin, 2023; Sacchi & Scarano, 2024)	
	Uptake by citizens/ Service accessibility	Reduced travel time and physical barriers indicate improved accessibility in European countries (Ball et al., 2023)	Age Russian-speaker migrants have low uptake in Finland (Buchert et al., 2022)

	Efficiency	Streamlined operation in case management in Denmark (Jørring, 2025)	Saved processing time and improved internal processes in Sweden (Ranerup & Svensson, 2022); But also, cumbersome adoption process and increased administrative workload in Sweden (Germundsson, 2024)
		Not efficiently allocated employment service resources in Austria (Eppel et al., 2026)	Expected to save administrative costs during service provision in Sweden (Ranerup & Svensson, 2022)
	Rational Changes	Enabled client-case worker interaction and service co-production in Norway (Breit et al., 2020)	Undermined caseworkers' engagement and under-evaluated clients' situation, in Denmark and Sweden (Andersson et al., 2022; Germundsson et al., 2024; Jørring, 2025).
Consequences/ Impacts	Service Quality	Relatively accurately predict jobseekers' reemployment prospects in Sweden (Berman et al., 2024) and Belgium (Ball et al., 2023) But across OCED, the prediction accuracy is overstated (Gallagher & Griffin, 2023), and varies across jobseeker groups in Sweden (Berman et al., 2024)	/
		Helped target who needs what specific services to return to the labour market (Ball et al., 2023).	Provide citizens with a more active role in decisions that fit their needs via enhanced interaction with the technology and caseworkers in Sweden (Ranerup & Henriksen, 2020)
		Shrinks human participation, making services far from user-centric in Sweden (Berman et al., 2024),	Make service more de-individualised in Finland (Heikkinen et al., 2026)
	Transparency and Accountability	Documented client-caseworker online interactions make transparent and accountable service delivery, as in Norway (Breit et al., 2020)	Rule-based programs instead of human subjective judgements make transparent and accountable service delivery , as in Sweden (Ranerup & Henriksen, 2020).

		Decision-making through digitalisation lacks explainability for its and opportunities to contest it (Berman et al., 2024).	Limited human control with and visibility into decision-making and backstage processes leave claimants no way to complain, as in the UK (Bennett et al., 2024)
	Discretion and professionalism	Caseworkers are instructed to primarily follow the automated recommendation in Sweden (Berman et al., 2024)	Professional discretion remains but only shift to 'hard cases', in Sweden (Ranerup & Henriksen, 2020)
		Caseworkers face pressure not to align with automated decisions in Italy (Sacchi & Scarano, 2024)	Automated standardisation supports professional discretion by being more rule-based, reducing human factors and unethical behaviour, in Sweden (Ranerup and Henriksen 2020).
	Social Connection	Digitalisation does not clearly and effectively increase opportunities to return to labour market and improve labour market integration in several European countries (Berman et al., 2024; Eppel et al., 2026).	It is argued that citizens may become less dependent on social assistance through digitalisation, which improves their social interaction and connection.
		Virtual communication may dehumanise jobseekers, making them experience alienation, isolation, or loss of connection, in several European countries (Ball et al.)	
	Social equity	Digitalisation might contribute to equitable and fair service allocation by involving less humans' arbitrary, biased, and discriminatory decision-making (Sztandar-Sztanderska, 2025), and more adherence to rules (Ranerup & Henriksen, 2020).	
		Evidence more consistently suggest that digitalisation can preserve ethnicity-, disability-, age-, income-, and gender-based exclusions in employment services and social assistance delivery (Breit et al., 2020; Buchert et al., 2022; Haitsma, 2025; Eppel et al., 2026).	
Institutional Conditions	*The need of activating implementation networks*	The profiling algorithm depends on caseworkers' judgement upon data provided by the claimants, in Poland (Sztandar-Sztanderska, 2025)	Individuals play central role in decision making in digital communication, while 'hard cases' still need human judgement, as in Sweden (Ranerup & Henriksen, 2020). The third-sector organisations have increasing involved in helping migrants to access and use digital services, but their capacity and legitimacy

		Agency managers can intermediate how caseworkers use and interact with digital technologies, as in Poland (Sztandar-Sztanderska, 2025). Technology companies' priority to cost saving motivates them to produce standardised digital products that insignificantly drive innovation and reforms of public service delivery, as in UK (Ingold et al., 2024)	are constrained, as in Finland (Buchert et al., 2022). Journals can play extra audit sources to improve transparency of automated decision making, as in Sweden (Kaun, 2021)
	The need of technical, ethical and legal, guidelines	Model or data inadequacies due to unstandardised data collection schemas and methods (Giovanola & Tiribelli, 2023) lead to systemic errors and bias, as in Netherlands (Alon-Barkat & Busuioc, 2023)	
			EU legal framework requires service agencies to address ethical risks cause by irresponsible use of digital tools, without provide practical guidelines, as in Netherlands (Haitsma, 2025).
		Automation of decision-making found not explainable and appealable as regulations require, as in Sweden (Berman et al., 2024)	Automated decision making not supported by legal regulations for municipalities, as in Sweden (Kaun, 2021).

The first one is that although specific technological practices and progresses may vary between different countries, Europe has overall initiated and accelerated the deployment of digital technologies in delivering various social services (Gallagher & Griffin, 2023). A more noteworthy trend is that, as Belgium, Denmark, UK, and Italy have illustrated, Europe has moved from discrete digitisation practices and strategies to more radical, transformative changes at multiple stages of the service delivery process through advanced, intelligent digital technologies (Ball et al., 2023; Sacchi & Scarano, 2024).

The second pattern is that despite similar policy ambition and technological strategies, the consequences of digitalisation across European countries are mixed, inconsistent, and far inconclusive, based on our evidence systemises. Regarding the *uptake*, we notice that public service agencies in Europe have rapidly deployment digital technologies in service delivery. While this might also lead to an increasing uptake of digital services by citizens in general (we don't have direct evidence), the high share of the aged Russian-speaking migrants in Finland without appropriate access to and use of digital services indicates uneven uptake across citizen groups, and a mediocre improvement of service accessibility in general. As for the ***efficiency***, the evidence from Denmark and Sweden has suggested that digitalisation can improve service procedural efficiency by streaming operation and accelerating internal handling process on one hand but may also cause a cumbersome adoption process without significant contribution to reducing administrative workload, on the other. Moreover, while digitalisation has been widely believed as a solution to save cost of public service delivery by guiding social assistance applicants to be self-support in Sweden, the results of using statistical profiling to predict jobseekers' reemployment prospects and therefore accordingly allocate employment service resources in Austria suggest low efficiency gains (Eppel et al., 2026).

When it comes to the *quality* where we focus on the accuracy and user centricity, the debate is between the compliments that digital technologies could highly accurately predict, e.g., jobseekers' reemployment prospects, in Sweden and Belgium (Ball et al., 2023; Berman et al., 2024), and the argument that the accuracy across Europe has been found overall overstated (Gallagher & Griffin, 2023). Meanwhile, digitalisation shows potential in providing user-centric services by targeting user needs and enhancing user' main role in the user-professional interactions in e.g., the UK, Belgium, Denmark, and Sweden (Ranerup & Henriksen, 2020; Ball et al., 2023), many criticise that the digitalised delivery process shrinks human participation, therefore making services far from user-centric and de-individualised in Sweden and Finland (Berman et al., 2024; Heikkinen et al., 2026). Looking at broader *societal consequences*, we have noticed more consistent evidence that digitalisation of social service delivery, at this stage, may risk worsening citizens' social connections, and preserve or reinforce ethnicity-, disability-, age-, income-, and gender-based biases and exclusions in service delivery and distribution. Other consequences concerning relational changes between service users and professionals, the transparency and accountability of service delivery, and the discretion and professionalism, are likewise mixed and conflicting across European countries, as the evidence suggests.

The third pattern is that despite different problems and challenges in practice, European countries share some comparable core issues that need to be addressed to achieve envisioned digitalisation in social services. The first one, among others, is that the collaboration, or configuration, and integration between human (including service users/frontline providers) and technology for maximum gains seem to have not been sufficiently discussed and effectively facilitated (Germundsson, 2024), since more attention have been given to whether the former has been or will be hollowed out by the latter, or vice versa. Meanwhile, there is a broader network with a wider range of stakeholders from the government, market, and civil society, which also significantly shape the service delivery outcomes. In practice, their engagement and motivation are evidently not always inconsistent, which may deviate the service design and delivery from expectations. Hence, mechanisms to enhance the two implementation networks and foster the interaction and coordination across actors need to be considered by European countries.

Moreover, digitalisation in social services have continuously raised ethical, technical, and legal issues in different social service domains in Europe, as observed in e.g., Sweden (Kaun, 2021; Berman et al., 2024), Netherlands (Haitsma, 2025), UK (Bennett et al., 2024). These issues are very often related to the lack of ethical, technical, and legal guidelines and regulations that can strengthen a responsible adoption of digital technologies in service delivery (Kaun, 2021; Berman et al., 2024). In some cases where relevant regulations may be in place, further actionable guidelines on how to carry out those regulative requirements are still missing,

7. Concluding comments

This paper, using a scoping literature review design, discussed the digitalisation of two specific social services, namely public employment services and social assistance, in Europe, mostly in the EU and EEA countries. It focused on three aspects of the digitalisation: technological strategies and practices, consequences, and challenges and conditions for implementation. In general, we found that despite variations, the European countries still share certain common patterns in the three themes.

First, we found that the use of digital technologies in many countries has commonly been moving from digitising service users-provider communication and service navigation, increasingly digitalising part or most working routines, including decision-making, to comprehensively transforming and public administration and social service delivery. Unlike many that see digital transformation as envisioned outcomes of digitisation and digitalisation practices, we see it as a complex or 'digital ecosystem' (Verdin et al., 2023), consisting of and mediated by, multi-level and -dimensional policy initiatives and technologies practices, as a whole, to reform public service delivery. More attention ought to be given to how these ecosystems work and the consequences for social services in future research.

Second, we discussed the consequences of digitalisation in social service delivery from practical, organisational, and societal levels, which we argue are rather mixed, inconsistent, and far inconclusive, among the European countries. Across the three levels of impacts, we have noticed the uptake of digital technologies by public service agencies in many countries has been expanding. However, the findings on whether and how digitalisation can facilitate the uptake by individual citizens, the accessibility and quality of various services, the efficiency and transparency of service delivery, and how it may shape the use of discretion, are divided across the European countries. In a more consistent sense, the evidence does not clearly suggest that digitalisation contributes to citizens' social connection and integration and an equal, fair distribution and allocation of social service resources. Notably, this paper has limitations in conducting rigorous cross-country comparison, as the indicators are not strictly conceptualised and operationalised and each of the reviewed studies has their unique research contexts and analysis units. Moreover, so far, most impacts identified in the literature have been qualitatively described. Very little statistical evidence has been provided to indicate the extent to which, for example, the use of algorithmic profiling tools is associated with changes in the prospects of employment and employment rates, or whether robotic process automation affects the efficiency of social assistance benefit application in measurable terms. Future research may address the operationalisation and measurement of outcomes associated digitalisation by quantitative approaches.

Last, we identified several similar challenges that many European countries are facing, which need to be addressed to foster the implementation of relevant digitalisation initiatives and responsible adoption of digital technologies in the service delivery. The first one is to acknowledge the prevailing trend of digital transformation in the public sector, with particular attention to how to foster the collaboration and integration between service users, providers, and technology for maximising gains. Meanwhile, a broader implementation network where diverse stakeholders across the government, market, and civil society, needs to be activated and well-coordinated. The second is that, with the raising legal, ethical and technical issues after digitalising service delivery, many European countries lack policy frameworks and actionable guidelines to resolve them and thus instruct a legally-, ethically-, and technically compliant development and deployment of digital technologies.

We believe that this working paper contributes to the SWINS project and beyond in several ways. First, SWINS aims to achieve its ambitious research objectives through methodological diversity where a wide range of quantitative methods are adopted but backed by qualitative designs. The discussion on the impacts of digitalisation in this paper, especially those regarding the uptake, accessibility, quality and efficiency of social services and their provision, may provide explanatory insights for the following project tasks that seek more statistical investigation on social and economic returns of social service delivery. Moreover, this working paper identified multiple indicators regarding policy strategies, goals, impacts, and issues, emerged in the previous empirical studies. This helps to conceptualise and operationalize the impacts of social service delivery in a digital context and beyond, and together with other task deliverables, to build an assessment framework that measures the impacts of social service investment (including the investment in digitalisation of service delivery), as SWINS's overall objective and main research question concern. Last, the findings of this working paper can be societal and policy relevance. Digitalisation has been widely believed across the globe, including the EU/EEA, as one of the promising solutions to achieve more cost-effective and sustainable social service

investments and provision. This working paper identifies key actors and implementation networks in digitalisation, which may inform an effective stakeholder engagement strategy that SWINS is committed to implementing. Moreover, it maps what policy strategies and objectives have been in place in European countries, what we have achieved so far, and what challenges we must address to achieve further through what possible institutional designs. The knowledge can be insightful for future formulation of policy recommendations, and illuminate the EU and EEA's transition towards a sustainable wellbeing economy.

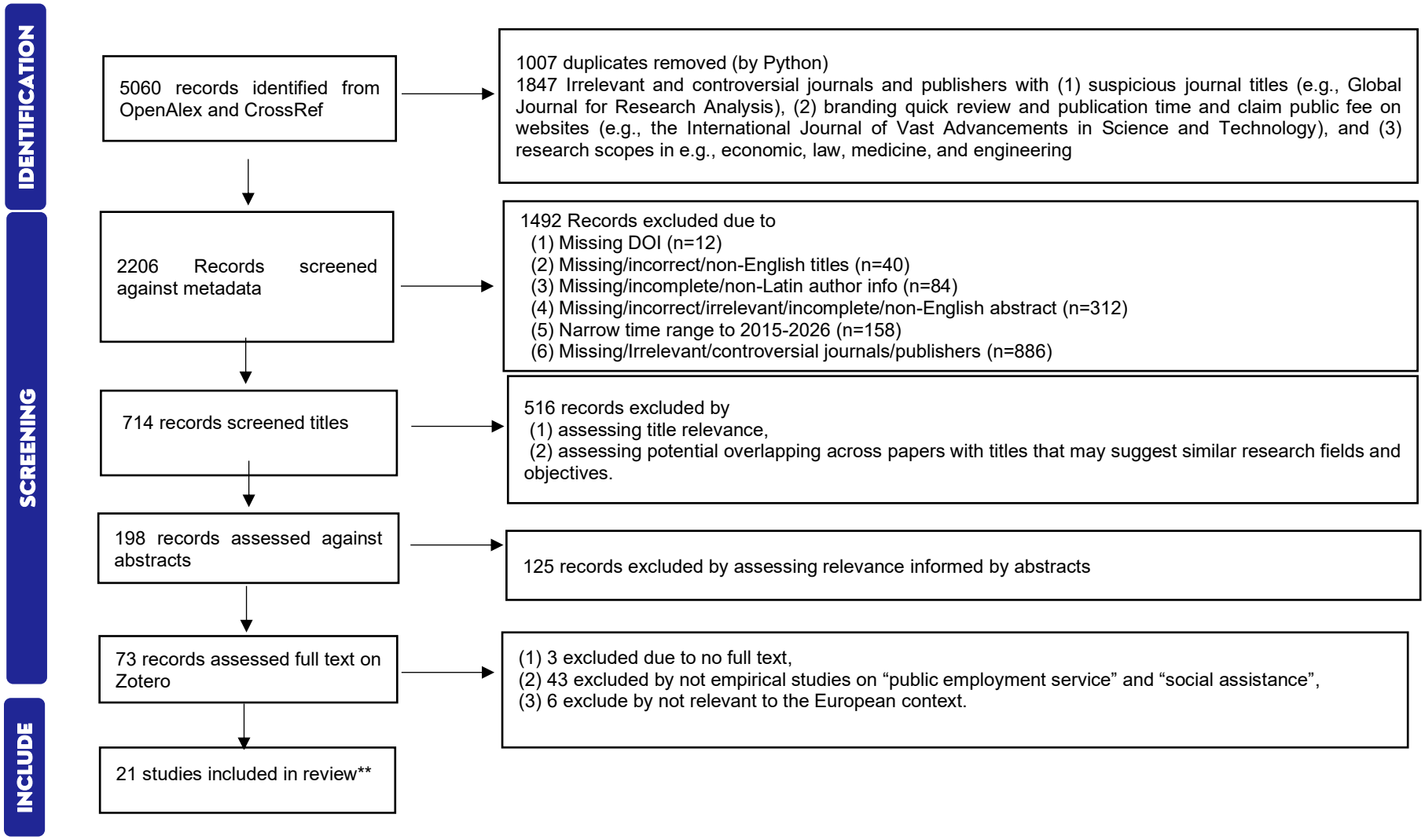
Several limitations of this paper, regarding research design and scope, should be noted. As marked earlier, this paper seeks to comprehensively narrate the debates around certain themes, at times using a comparative way to review evidence across European countries. However, this does not indicate a rigorous comparison. Future research may bridge this gap by a rigorous comparative design. Methodologically, this study adopts an experimental literature search strategy. Using metadata databases, while helping identify cross-disciplinary sources, can return massive low-quality or irrelevant results which require a considerable amount of time to screen, assess, and filter the sources. Future studies may consider comparing the use and outputs of the current and conventional literature search strategies, and help develop the current one. Last, this paper uses Gemini Notebook, specifically as a Retrieval-Augmented Generation (RAG) tool, for navigating and retrieving relevant original text chunks from the reviewed articles. Due to technical limitations in for example, parsing PDF files, structurally chunking texts, the tool does not always accurately locate relevant texts across a large number of files and may return text chunks of low relevance. The retrieved texts were used only as navigational aids, and the authors carefully reviewed the original sources, and independently evaluated the relevance of the texts and determined whether and how these texts were used during the analysis.

Appendix 1 Overview of search terms, queries, and results

	'DIGITALISATION'	'SOCIAL SERVICES'	QUERIES (N=)	UNIQUE RESULT (N=)	PRELIMINARY KEPT (N=)
1st round	'Digitalisation', 'Digitalization', 'Digital Transformation', 'Digital', 'Automated', 'Artificial Intelligence', 'AI', 'Technologies'	'Social Services', 'Social Protection', 'Social Care', 'Social Work', 'Employment', 'Social Assistance', 'Labour Market'	56	397	233
2nd round	Previous terms: (n=8) New terms (n=5): 'Information systems', 'Technology', 'Automation', 'Machine learning', 'Robotic'	Previous terms: (n=7) New terms (n=3): 'Disability', 'Social security', 'Child welfare'	74	546/469	264
3rd	Previous terms: (n=13) New terms (n=5): 'Information system', 'Chatbot', 'Digital tools', 'Digital platform', 'Algorithmic'	Previous terms: (n=10) New terms (n=7): 'Income support', 'Cash transfer', 'Social insurance', 'Long-term care', 'Family benefits', 'Child benefits', 'Unemployment benefits'	176	1126/988	586
4th round	Previous terms (n=18): New terms (n=6): 'Digital services', 'Digital government', 'Digital systems',	Previous terms (n=17): New (n=7): 'Employment services', 'Long term care', 'Social welfare',	270	1679/1335	683

	‘Automated decision-making’, ‘Online service delivery’, ‘Automated tools’,	‘Disability services’, ‘Elder care’, ‘Foster care’, ‘Independent living’			
5th round	Previous terms (n=24): New (n=2): ‘Online services’, ‘Digital technologies’.	Previous terms (n=24): New (n=6): ‘Care services’, ‘Social workers’, ‘Caseworkers’, ‘Employment support’, ‘Aged care’, ‘Housing assistance’	204	1312/864	440

Appendix 2 Flowchart of the literature search and article inclusion based on PRISMA



Appendix 3 Overview of the reviewed articles

No	Titles	Author(s)	Year	Research Site	Social Service Domain	Digital Technologies
1	Human-AI interactions in public sector decision-making “automation bias” and “selective adherence”	S. Alon-Barkat & M. Busuioc	2023	Netherlands	Public employment service	Prediction by machine-learning algorithms
2	Unpacking the digitalisation of public services: Configuring work during automation in local government	C. Andersson, A. Hallin & C. Ivory	2021	Sweden	Social assistance	Robotic process automation by pre-defined/programmed algorithms
3	Emerging modes of digitalization in the delivery of welfare-to-work: Implications for street-level direction	S. Ball, M McGann, P. Nguyen & M. Considine	2023	Belgium, Denmark, UK, International	Public employment service	Various digital technologies mentioned
4	Universal Credit: administrative burdens of automated welfare	H. Bennett, M. Currie & L. Podoletz	2024	UK	Social assistance	Robotic process automation by pre-defined/programmed algorithms
5	Trustworthy AI in the public sector: An empirical analysis of a Swedish labor market decision-support system	A. Berman, K. de Fine Licht & V. Carlsson	2024	Sweden	Public employment services	Predictive profiling by machine-learning algorithms
6	Digital coping: How frontline workers cope with digital service encounters	E. Breit, C. Egeland, I. B. Løberg & M. T. Røhnebæk	2021	Norway	Public employment services	digital encounters
7	Is digitalisation of public health and social welfare services reinforcing social exclusion? The case of Russian-speaking older migrants in Finland	U. Buchert, L. Kemppainen, A. Olakivi, S. Wrede & A. Kouvonen	2023	Finland	Social assistance	Not specified
8	Algorithmic Profiling: Effective Tool for Targeting Active Labour Market Policies?	R. Eppel, U. Huemer, H. Mahringer & L. Schmoigl	2026	Austria	Public employment services	Predictive profiling by machine-learning algorithms

9	(in) Accuracy in Algorithmic Profiling of the Unemployed – An Exploratory Review of Reporting Standards	P. Gallagher & R. Griffin	2023	OECD	Public employment services	Predictive profiling by machine-learning algorithms
10	Configuring social assistance: conceptualizations and implications of the adoption of robotic process automation in the Swedish personal social services	N. Germundsson	2025	Sweden	Social assistance	Robotic process automation by pre-defined/programmed algorithms
11	Reducing administration? Examining the alignment of robotic process automation and social assistance in Swedish Personal Social Services	N. Germundsson, H. Stranz & Å, Bergmark	2024	Sweden	Social assistance	Robotic process automation by pre-defined/programmed algorithms
12	Addressing discrimination in algorithmic profiling: Examining risk governance in Dutch public social security agencies	L. M. Haitsma	2025	Netherlands	Social assistance	Predictive profiling by machine-learning algorithms
13	From Discretion to Calculation: How Analog Automation Shaped Digitalization of Finnish Social Assistance	A. Heikkinen, M. van Gerven, & R. Koulu	2026	Finland	Social assistance	Automation
14	Varieties of digitalisation? A comparison of employment services digitalisation in the UK and Australia	J. Ingold, C. Forde, & D. Robertsshaw	2023	UK, Australia	Public employment service	Various digital technologies
15	Digitalisation and meaningful frontline work: insights from the Danish public employment services	L. Jørring	2026	Denmark	Public employment service	Robotic process automation by pre-defined/programmed algorithms; Predictive profiling by machine-learning algorithms
16	Suing the algorithm: the mundanization of automated decision-making in public services through litigation	A. Kaun	2022	Sweden	Social assistance	Robotic process automation by pre-defined/programmed algorithms
17	Value positions viewed through the lens of automated decision-making: The case of social services	A. Ranerupa & H. Z. Henriksen	2019	Sweden	Social assistance	Robotic process automation by pre-defined/programmed algorithms
18	Digital Discretion: Unpacking Human and Technological Agency in Automated Decision Making in Sweden's Social Services	A. Ranerupa & H. Z. Henriksen	2022	Sweden	Social assistance	Robotic process automation by pre-defined/programmed algorithms

19	Value positions in the implementation of automated decision-making in social assistance	A. Ranerup & L. Svensson	2024	Sweden	Social assistance	Robotic process automation by pre-defined/programmed algorithms
20	Digital transformation of public employment services in the post-pandemic era. Evidence from Italy as a latecomer country	S. Sacchi & G. Scarano	2025	Italy	Public employment service	Various digital technologies mentioned
21	How context matters: Human oversight of automated-decision-making systems in welfare administration	K. Sztandar-Sztanderska	2025	Poland	Public employment service	Predictive profiling by machine-learning algorithms

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