

Lee-Archer, Brian

Working Paper

Effects of digitalization on the human centricity of social security administration and services

ILO Working Paper, No. 87

Provided in Cooperation with:

International Labour Organization (ILO), Geneva

Suggested Citation: Lee-Archer, Brian (2023) : Effects of digitalization on the human centricity of social security administration and services, ILO Working Paper, No. 87, ISBN 978-92-2-038619-4, International Labour Organization (ILO), Geneva, <https://doi.org/10.54394/PMPD3825>

This Version is available at:

<https://hdl.handle.net/10419/278319>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.



<https://creativecommons.org/licenses/by/3.0/igo/>



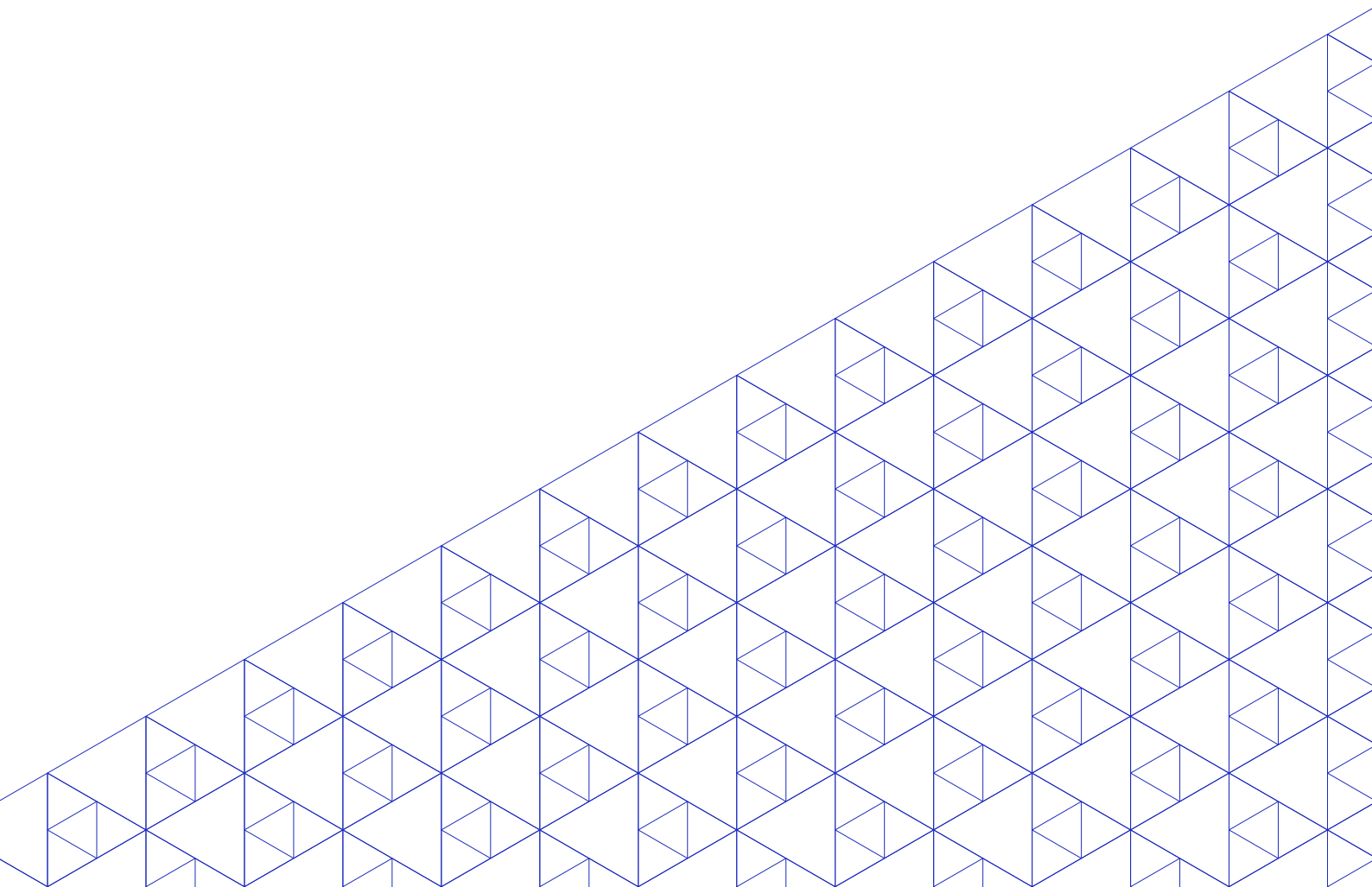
International
Labour
Organization

► ILO Working Paper 87

February / 2023

► Effects of digitalization on the human centrality of social security administration and services

Author / Brian Lee-Archer





This is an open access work distributed under the Creative Commons Attribution 3.0 IGO License (<https://creativecommons.org/licenses/by/3.0/igo/deed.en>). Users can reuse, share, adapt and build upon the original work, even for commercial purposes, as detailed in the License. The ILO must be clearly credited as the owner of the original work. The use of the emblem of the ILO is not permitted in connection with users' work.

Translations – In case of a translation of this work, the following disclaimer must be added along with the attribution: *This translation was not created by the International Labour Organization (ILO) and should not be considered an official ILO translation. The ILO is not responsible for the content or accuracy of this translation.*

Adaptations – In case of an adaptation of this work, the following disclaimer must be added along with the attribution: *This is an adaptation of an original work by the International Labour Organization (ILO). Responsibility for the views and opinions expressed in the adaptation rests solely with the author or authors of the adaptation and are not endorsed by the ILO.*

This CC license does not apply to non-ILO copyright materials included in this publication. If the material is attributed to a third party, the user of such material is solely responsible for clearing the rights with the right holder.

All queries on rights and licensing should be addressed to ILO Publishing (Rights and Licensing), CH-1211 Geneva 22, Switzerland, or by email to rights@ilo.org.

ISBN: 9789220386187 (print)
ISBN: 9789220386194 (web-pdf)
ISBN: 9789220386200 (epub)
ISBN: 9789220386217 (mobi)
ISBN: 9789220386224 (html)
ISSN: 2708-3446

<https://doi.org/10.54394/PMPD3825>

The designations employed in ILO publications, which are in conformity with United Nations practice, and the presentation of material therein do not imply the expression of any opinion whatsoever on the part of the ILO concerning the legal status of any country, area or territory or of its authorities, or concerning the delimitation of its frontiers.

The responsibility for opinions expressed in signed articles, studies and other contributions rests solely with their authors, and publication does not constitute an endorsement by the ILO of the opinions expressed in them.

Reference to names of firms and commercial products and processes does not imply their endorsement by the ILO, and any failure to mention a particular firm, commercial product or process is not a sign of disapproval.

ILO Working Papers summarize the results of ILO research in progress, and seek to stimulate discussion of a range of issues related to the world of work. Comments on this ILO Working Paper are welcome and can be sent to leearcher.brian@gmail.com.

Authorization for publication: Changhee Lee, Director of CO-Beijing

ILO Working Papers can be found at: www.ilo.org/global/publications/working-papers

Suggested citation:

Lee-Archer, B. 2023. *Effects of digitalization on the human centricity of social security administration and services*, ILO Working Paper 87 (Geneva, ILO).

About the author

Brian Lee-Archer is an industry advisor, practitioner, consultant, and thought leader in the social security industry, covering policy, process, and technology. His career spans 40 years in the social security industry. He commenced his career as a civil servant for the Australian Government in the Department of Social Security. He led social protection technical assistance teams for the World Bank in Romania and, Kyrgyzstan. From 1996 onwards he worked as a management consultant and researcher with global technology companies – IBM, SAP, Cúram Software, and Accenture. He made regular visits to China during the period 1999-2008 and 2012-2014, supporting IBM-led initiatives with the Ministry of Labour and Social Security (MOLSS). From 2008-2010 he worked as a full-time independent advisor to the CEO of Centrelink, Australia's national social security administration. In 2015 he established the SAP Institute for Digital Government. Brian's current role is Chief Executive for Strategy and Consulting at Surround Australia, a small-medium enterprise (SME) servicing government clients in semantics, ontology platforms, and data fabric.

Table of contents

About the author	01
Executive summary	04
<hr/>	
► Introduction	06
<hr/>	
► 1 People-centred social security systems	07
<hr/>	
► 2 Digitalization and integrated social security	11
<hr/>	
► 3 Digitalization and adaptive social security	12
<hr/>	
► 4 Automated decision making and its risks	14
<hr/>	
► 5 Responsible artificial intelligence	17
<hr/>	
► 6 Managing the risks of automated decision making	20
<hr/>	
► 7 Automation and legal frameworks	22
<hr/>	
► 8 Data driven policy, digital capabilities, and public trust in social security	23
<hr/>	
► 9 Data driven policy and service delivery integration	26
<hr/>	
► Conclusion	29
<hr/>	
References	31
Acknowledgements	36

List of Boxes

Box 1 – Services Australia Naturally connected systems	07
Box 2 – Belgium e-Government data exchange platform	08
Box 3 – Shanghai Social Security Integrated Digital platform	09
Box 4 – Tennessee Department of Human Services (DHS) – AI powered chatbots – USA	14
Box 5 – Netherlands – lack of transparency in child benefit provision	15
Box 6 – Automated Online Compliance Intervention (OCI) program – Australia	17
Box 7 – Denmark – A digital state, social security to citizenship	18
Box 8 – Legislation as code	22
Box 9 – Universal Credit – United Kingdom – digitalisation with unintended impact	23
Box 10 – Social sector wide reform through digital leadership – Finland	24
Box 11 – National Disability Insurance Scheme (NDIS) – Australia – digital driven policy reform	26
Box 12 – Affordable Care Act – USA – Health Insurance Reform	28

Executive summary

Social security institutions are applying emerging technologies, such as data analytics, big data, artificial intelligence (AI), blockchain, biometrics, mobile platforms, and robotic process automation (RPA). Deployed across the full range of social security administrative processes, they facilitate compliance with social security legislation and policy and enable the exercise of the peoples' rights to social security by improving registration, contributions, and claims processes. They prevent and detect incorrect payments and fraud. They record through digital data, a living history of people's experiences of social risks. Thus, people's interactions with social security administration have become a critical element of the design of digital technologies. Accordingly, a key feature of people-centric design of social security administration and services is the capability of digital technologies to connect users to the relevant part of operations or services, in real-time, from anywhere, in the most direct possible way, at a low cost, and provided there are alternative communication channels when someone is not able to use them. Indeed, leveraging emerging technology for human-centered services is the next phase of automation in social security administration.

To date, automation programs are still largely directed at efficiency and productivity improvements in service delivery operations - *the digitization approach*. In the latter part of the 20th century, attention shifted to raising service quality. In many administrations, this signalled a focus on placing the needs and wants of citizens, users, or members of social security institutions at the centre of the service response - *human centrality*. Today, innovation and systems thinking are made possible through the insight and knowledge gained by the combination and analysis of refined digital data - *the digitalization approach*. With a digitalization mindset comes a new capability to transform the traditional approach to social policy and social security administration to a human-centered model supported by automation. These capabilities include modelling policy intent, visualizing customer experience, and forecasting program outcomes across multiple and concurrent social risks, at community, cohort, and individual levels, within the temporal dimensions of time and space.

Digital technology provides a pathway for addressing fragmentation in the way policymakers and social security administrators operate. This fragmentation leads to neglect what is going on in adjacent fields of social protection. However, no social security scheme or system stands by itself when considering the goal of providing human centric administration and services (Pieters, Schoukens 2006). New and emerging technology including AI create the capability to reframe the concept of human centrality. This reframing elevates human centrality from single administration-centred service delivery to an integrated multi-faceted social policy response addressing multiple and concurrent social risks impacting the whole person.

The approach to addressing whole-person circumstances is often referred to as case management. While more commonly associated with health and social care coordination, it is becoming a more common practice within the social security administration. In practice, case management is applied at the service delivery level. This occurs through human-led decision-making, informed, and enhanced through specialized case management ICT systems, by collating needs and assembling interventions and supports across multiple programs towards achieving a desired social outcome. These systems facilitate the integration and sharing of data across approved actors, both internal and external to the accountable organization, who are responsible for contributing to the achievement of social outcomes. Case managers, however, remain largely constrained by the fragmentation imposed by the statutory parameters and boundaries of the various social programs (Lukersmith, Millington, Salvador-Carulla, 2016).

There is an increased risk of further entrenchment of this fragmentation as the administration of social security schemes is automated. Automation can lead to new forms of exclusion as it is not always possible to codify every situation. Often, it is people already experiencing disadvantage who are faced with circumstances falling outside the rules of the automated system. Rather than benefiting from the efficiencies of digital automation, the fallback is manual intervention with the administrative burden falling back on the disadvantaged person. Rather than simply working towards covering the diversity of people's circumstances by adding more granular codified rules to each iteration of the system, more value can be achieved in these circumstances by examining the root causes of social disadvantage. This leads to identifying the policy and

administration gaps which result in some people's circumstances not fitting standard rules and regulations and modalities of implementation of social programs (Larsson, 2021).

Support for public policy initiatives delivering better social outcomes through smart and innovative use of digital data is dependent on human accountability in decision making. As AI based systems are deployed, raising the bar for further automation and efficiency gains, humans should decide when and how AI enabled machines are used. While it is reasonable to see automation in social security administration as having a high degree of failsafe properties¹, they are only so to the extent that people have adequately instructed the machines to perform according to policy intent and to the extent that the policy intent is effectively written in executable computer code.

The objective of human centrality stands out as a highly desirable quality criterion for consideration at each stage of the quality management lifecycle in social security administration. The quality management process must extend to the human-engineered computer code and related systems (including AI) and to the data that feeds the machine. The human dimension in terms of needs, the likely impact of interventions, and the desired experience for the eligible population(s) should be examined from the economic, social, and population research phase through to the development of social policy and social programs, and finally to frontline service delivery. The development of such knowledge and insight, which can be gained through digital data requires new capabilities related to modelling policy intent, visualizing customer experience, and forecasting policy outcomes.

For example, addressing the human and social impact of climate change against geospatial factors and time calls for new forms of social policy. The impacts of climate change are experienced around the world through an increasing number of extreme weather-related events with people already experiencing social disadvantage bearing the additional burden. Notwithstanding the necessary attention given to the immediate loss of life and damage to property as these severe events occur, addressing the enduring impacts at the community level presents a significant challenge for traditional social security policy and administration.

Digital data and the social license² governing its use are fundamental to a new wave of digital technology innovations needed to address the looming social policy challenges. More digitization in social security administration will not suffice. To address these modern social policy challenges, social security needs to reinforce the capabilities for **digital enabled human decision making**. To enable the latter, digital data, once collected in raw form is refined and transformed as it moves through the **data lifecycle of research, policy, program design, service delivery and evaluation**. Social policy thinking and decision making is informed by these new and **innovative data products** emerging at each phase of the data life cycle.

The ability to understand the relationship between humans and machines in the process of building these digital data products is thus essential for the future of social policy and service delivery. The human dimension, guided by insight and knowledge from a dynamic evidence base of digital data, is essential for managing the risks (i.e., privacy, security, ethics) while achieving the benefits (i.e., better social outcomes for stronger societies). The performance and integrity of human decision-makers in managing these risks for the public good will determine the direction of public trust and confidence in the social security administration.

¹ Here, failsafe means a design feature that will maintain or result in a safe condition in the event of malfunction or failure of a component, or control device.

² The social license to operate or simply social license, refers to the ongoing acceptance of a company or industry's standard business practices and operating procedures by its employees, stakeholders, and the general public.

► Introduction

Social security administrations are applying emerging technologies, such as data analytics, big data, artificial intelligence (AI), blockchain, biometrics, mobile platforms, and robotic process automation (RPA). Deployed across the full range of social security administrative processes, they facilitate compliance with social security legislation and policy and enable the exercise of the rights to social security by improving registration, contributions, and claims processes. They prevent and detect incorrect payments and fraud. They record through digital data, a living history of people's experiences of social risks.

This paper starts by examining the journey of social security administration from digitisation, defined as making a business process digital without material change to intent or purpose, to digitalisation, defined as making material changes to business processes based on insight and knowledge gained through the analysis of digital data. While digitization of social security administration has delivered significant benefits by enabling to place people's needs at the centre of the service response, digitalization has the potential to deliver better social outcomes for all, by pooling information, resources, and initiatives to address complex social problems. Investing in digital data however brings additional risk as human oversight and involvement in decision-making is partially replaced by machines driven by algorithms.

Human-centered social security administrations keep the human dimension in control of decision-making. This is made possible through the insight to be gained from digital data-driven innovation in policy and governance and managerial reforms. Moreover, there are risks associated with collecting and analysing people's digital data analysed and using it to further automate business processes. Human centrality is examined in this paper, through a human + machine approach³ (Daugherty & Wilson 2018), starting with social policy through to service delivery. Machines using AI and related technologies are designed to augment rather than replace human decision-making capability. This augmentation approach is essential in matters where discretion, compassion, reasoning, judgement, and empathy are essential for equity, fairness, and fiscal responsibility within social security administration. This working paper presents a series of vignette style case studies (13) as examples of digitisation and/or digitalisation in the context of human centrality in social security administration.

The terms social protection, social policy, social security, and social services are used throughout the paper. Social protection is used in an inclusive form covering policy, programs, services, and benefits addressing the full spectrum of social risks. Social security is made up of programs to address each of the social risks through forms of income replacement, support, rebates, supplementation, and preventative services. Social services are usually designed to address specific needs through support or human delivered services such as counselling, care, and rehabilitation.

³ According to Daugherty and Wilson (2018), the implementation of automated decision-making through Artificial intelligence embeds all business processes in an organization—whether related to innovation, customer service, or personal productivity. This requires that humans and smart machines collaborate more closely in fundamentally new ways.

► 1 People-centred social security systems

Automation has transformed the way social security is managed. Social security administrations were early adopters of automation to facilitate social program delivery since the era of information technology (1960s). The scale required to manage traditional social programs addressing the major social risks was ideally suited to the automation of clerical tasks such as tabulating contributions and producing payment cheques. Thus, automation efforts in the 20th century were largely directed at efficiency and productivity improvements within the administrative agencies responsible for the service delivery of social programs. The resulting productivity improvements, as paper-based processes were replaced with telephony and on-line services, lowered delivery costs and improved the quality of the service experience – a win-win outcome for the government, social security administration, and the public.

The social security system reaped the benefits of productivity gains through the final decade of the 20th century. From the simple digitization of business processes, attention shifted towards service quality and excellence, following on from the service excellence culture emerging in the 1980s from the commercial sector (Maney, Hamm, O'Brien, 2011) (Kaufmann, 2012). Within social security administration, the service excellence trend resulted in a broader view of the social needs and wants of individuals beyond the policy boundaries of a single social program and making this central to the service response. Putting the person at the centre of the service response, emerged as a dominant administrative paradigm across government.

The establishment of Centrelink (now Services Australia) by the Australian Government in 1997 as a one-stop-shop for accessing federally funded social security programs, drew extensive international attention as a showcase for what was possible and desirable in terms of customer or people centricity (Halligan, 2008) (see Box 1).

► Box 1 – Services Australia Naturally connected systems

Services Australia – Naturally connected systems

Services Australia has a long history, dating back to the mid-1980s, of automation involving online access to digital data. A feature of the automation program is naturally connected systems. A naturally connected system is where data is transferred between systems without the need for human intervention. Services Australia has responsibility for delivering the income support system covering pensions, benefits and allowances. Income support is tax funded. The major social programs within the income support covering retirement, disability, unemployment, and family allowances are means tested with entitlements subject to an income and assets test. People in receipt of income support are required to regularly report employment earnings to Services Australia.

Employers report payroll information to the Australian Tax Office through an automated single touch payroll (STP) facility. Information is sourced digitally from employers payroll systems removing the need for customers and employers to provide information about employment income. The earnings information is passed from the ATO to Services Australia. Income is reported each time employees are paid, providing regular and accurate earnings information with automatic reassessments, reducing the risk of under or over and under payments of the means tested income support payments

This is an example of a naturally connected system where information is shared and exchanged between agencies and processed with minimal or no human interaction (Services Australia, 2021).

A similar model was adopted in Canada in 2007 with the establishment of Service Canada (Kwang, 2007). The Crossroads Bank for Social Security in Belgium, established in 1990 demonstrated how service quality

could be radically improved by facilitating the sharing of information between agencies without changing the structure of the actors or core business processes within the social security system (Robben, 1993) (see Box 2).

► **Box 2 – Belgium e-Government data exchange platform**

The Crossroads Bank for Social Security (CBSS), Belgium – e-government data exchange

In total about 3,000 actors are responsible for the execution of the Belgian social security system. More than 10,000,000 socially insured persons and 220,000 employers have regular contacts with those actors to claim against their rights, provide information and/or pay contributions. To improve the service delivery to the citizens and the employers, the Crossroads Bank for Social Security (CBSS) created in 1990. The CBSS is the backbone for e-government in the social sector. CBSS is not a bank in the traditional sense but rather an institution operating as a data exchange hub. Through a digitisation approach, the Crossroads Bank manages daily the secure transfer of millions of items of personal information on a need-to-know basis across the 3000 plus actors.

The electronic data exchange amongst the actors in the social sector, employers and citizens takes place by way of an integrated functional and technical interoperability platform, which complies with strict security standards and is based on modern technologies such as service and object orientation, component-based development, multi-channel service provision, communication from application to application wherever possible, and through open standards. The e-government program of the Belgian social sector was prepared, developed and implemented in close co-operation between all involved actors, and with the support of political decision makers at the highest level. Use was made of existing formal consultation organs within the social sector for this purpose, such as the National Labour Council, and the General Co-ordination Committee of the CBSS, in which all actors in the social sector are represented. (Robben, 1993).

The CBSS won the 2006 United Nations Public Service Award in the category of "Application of information and communication technology (ICT) in Government: e-government. A more detailed case study - *Belgium: Towards frictionless social security in the digital age*, published April 2022, can be accessed at:

https://sp-convergence.org/wp-content/uploads/2022/06/DCI_Learning-Brief_Belgium.pdf

At the state and local government level in the USA the **no-wrong door client service**⁴ model emerged to bring forward a human centric approach to the administration of social services by multiple agencies. The no wrong door services model emerged as an administrative approach to address a key structural problem in US social services administration where it was becoming difficult to match the government's administrative agency structure and supporting IT systems to the problems it is charged with solving. The mismatch, in turn, produced cascading performance problems as people were confused on where to go to seek help (Kettl 2006). No wrong door meant that a person could approach any part of the social services delivery ecosystem and be connected to the right provider(s). The No wrong door approach gained prominence through the Affordable Care Act of 2010 (a national health insurance reform program). It evolved due to a broader structural issue of rigid boundaries within the US welfare state between who delivers, who pays for, and who regulates the social service sectors (Evans, 2019).

There is a diversity of business models for social security administration in the world reflecting varying social, cultural, and governance norms. Australia's Centrelink approach, while an international reference, reflected Australian social policy and governance and as such could not be readily transferable to other countries. The same applies to the Crossroads Bank in Belgium, which was designed as a response to a highly

⁴ "No Wrong Door" is a people-centered solution for human services that provides a universal gateway to community and government programs in the United States. The approach aimed that people should be able to complete a single application to determine their eligibility for and enroll in programs such as Medicaid, the Children's Health Insurance Program (CHIP), the Supplemental Nutrition Assistance Program (SNAP), Temporary Assistance for Needy Families (TANF) and community-based resources. See [No Wrong Door: A Holistic Approach to Human Services \(governing.com\)](https://www.governing.com/story/news/health/2019/01/15/no-wrong-door-holistic-approach-human-services)

disaggregated administrative structure across multiple social programs. Social security business models range from ministries or departments of state, solely responsible for both policy and service delivery and addressing a narrow range of social risks to multiple social policy agencies addressing one or more social risks separated from service delivery actors. Some business models involve multiple levels of government, non-government, and private sector actors. This variety in business models has a direct impact on how the principle of human centrality is applied.

Social security administrations in New Zealand, the UK, USA, Austria, Brazil, and Norway also demonstrated good practice in human centric service delivery in the 1990s and 2000s. A common feature of these approaches was some form of institutional separation of social policy from service delivery. This was largely done to ensure a strong institutional capability to transform service delivery towards greater human centrality and to leverage digital technology. There was also a view amongst some administrators that dramatic improvements to service delivery in line with human centric principles were a necessary step to build public confidence and trust in the social security administration before structural reform at the policy level could be initiated (IBM, 2005). During the period 2010 to 2020, the level of institutional separation between policy and service delivery was reduced in Canada, the UK, New Zealand and to a lesser extent, Australia. This occurred largely because of rising concerns of a widening gap between policy and service delivery design, an unintended by-product of the structural separation. The government in those countries deemed it necessary to address this through greater oversight to ensure service delivery remained aligned to policy intent.

To date, the principle of human centrality started to appear in social security administration through digitisation and automation of service delivery. For individuals this resulted in joined-up, personalised and efficient service responses, like the experience people expect in the commercial sector. In addition to this, the International Social Security Association (ISSA) reports that institutions are re-engineering business processes to create digitally enabled workflows in the back office to make them more responsive to clients' needs as well. Organisations such as the Ministry of Human Resources and Social Security, China are providing joined-up services, integrating with institutions and data beyond their own agencies' walls (ISSA, 2022) (see Box 3).

► Box 3 – Shanghai Social Security Integrated Digital platform

Ministry of Human Resources and Social Security (MOHRSS) China - Integrated Platform

The Shanghai Social Insurance Centre, under the Ministry of Human Resources and Social Security (MOHRSS), China launched in 2020 an integrated online platform to deliver better coordinated and more efficient services. The platform integrated several front-end and back-end functions to consolidate formerly separate processes for basic pensions, retirees' medical insurance benefits, lump-sum family planning reward, housing provident fund entitlement, and hospitalisation insurance plan benefit.

Key elements of the integration approach within the platform are:

- cross-departmental data sharing to reduce information requirements
- an online single window for submission of all applications
- back-office coordination between departments for joint decision-making
- integrated decision notification for all schemes via the online single window
- an all-in-one card that consolidates information requirements at application.

Further information see <https://www1.issa.int/>

The extent of human centrality and replicability of a digital best practice from another social security administration is largely constrained by the social policy/program architecture (i.e., the social risks the administration

is accountable and/or responsible for). For example, a social security agency responsible for retirement pension is only human centric in terms of the pension needs of persons retiring or retirees. As people age, they experience other social risks, such as health and housing, yet a dedicated retirement pension agency is not competent to address these needs. Moving forward, the wider availability of digital data creates opportunity to extend the principle of human centrality across the policy and service delivery layers. This means human centrality can be applied in a broader manner through data sharing and standardised application program interfaces (APIs⁵), independent of the underlying business model of a specific or single unit of social security administration. This federated data-driven approach and application integration is an enabler of digitalization across the policy and service delivery layers of the social security administration.

More automation leading to faster or more convenient social security administration does not necessarily equate to better social outcomes. Some agencies may be approaching the point of diminishing returns having largely digitized the bulk of their public-facing administrative operations. There is now a debate emerging on the ongoing contribution of technological innovation to aggregate productivity. Productivity growth has slowed in many OECD countries over the past decade, igniting a spirited debate on the future of productivity (OECD 2019, Pisu et al 2021)⁶. Techno-pessimists argue that the current economic slowdown in productivity reflects a “return to normal” effect after nearly decades of exceptional IT-fuelled gains (Andrews, Criscuolo, Gal, 2016).

A case is emerging for directing investments in automation towards digitalization initiatives that address widening gaps in achieving better social outcomes for all. Closing the gap to achieving better social outcomes such as addressing the inequality gap and social exclusion requires more refined use of digital technology. On the contrary, further investment in some forms of digital technologies without consideration for the human dimension of digital data and technologies, may exacerbate the complexity and unintelligibility of welfare decision making and can make it harder for administrators and citizens to navigate social security systems. This may compound social disadvantages and create new barriers and harms (Park and Humphry 2019; Henman 2022).

⁵ API stands for Application Programming Interface. In the context of APIs, the word Application refers to any software with a distinct function. The interface can be thought of as a contract of service between two applications. This contract defines how the two communicate with each other using requests and responses. In other words, APIs are a set of functions and procedures allowing the creation of applications that access the features or data of an operating system, application, or other services. They involve definitions and protocols for building and integrating application software.

⁶ OECD 2019 Digitalisation and productivity: a story of complementarities <https://www.oecd.org/economy/growth/digitalisation-productivity-and-inclusiveness/>

► 2 Digitalization and integrated social security

The digitisation of business processes, which accelerated in the 1990s, facilitated human centrality of social security administration through a personalised service approach covering one or more social risk(s). Over the same period, the ways to measure and evaluate the effectiveness of social programs delivered in the context of the trend towards human centrality, became more challenging. Achieving key performance indicators as measures of individual program success when cohorts of the target population have sub-optimal outcomes due to other social factors and risks, represents an institutional rather than a human-centric response. The persistent nature of social disadvantage for some cohorts and how to address this in a human-centric manner is a structural policy issue requiring new ways of thinking.

Since the birth of modern social security in the late 19th century, social policy has evolved around pillars of social risk such as old age/survivor, disability, unemployment, labor accident, health, and family/maternity. These pillars are addressed through a broad range of social protection programs including specific programs which make up the social security system. A milestone in social policy thinking was William Beveridge's plan delivered to the UK Government in 1942 for a new and stronger social security. The intent behind the plan was to "slay the giants" – want, disease, ignorance, squalor, and idleness (Beveridge, 1942). The giants remain relevant today notwithstanding. However, the basic needs in modern life are also manifestations of greater complexity, involving inequality, chronic disease, insufficient skills and education, homelessness, discrimination, and barriers to decent work. Social risks expressed single-handedly do not reflect the complexity and intricacy of the circumstances people experience. Missing is the intersection of social risks and the combined effects for people experiencing them concurrently.

The traditional approach to social policy is specialization according to social risks, leading to social programs to address each risk. Social security administrations were in the main, vertically aligned to address a single social risk and program response. Often this meant the social security administration was primed to respond to a person's needs once they experienced a social risk. Preventative interventions managed through social security administration such as occupational health and safety programs within labour accident schemes are a relatively modern development. While this approach has contributed to significant improvements in social outcomes for large sections of the population, there are significant cohorts of people where this is not the case. In all countries, there are people experiencing multiple social risks, often concurrently with devastating cumulative effects over the life course.

This multiple-risk situation is illustrated against the background of structural unemployment resulting from technology-led change. When someone is seeking to enter the labor market after losing a job due to a factory shutdown, the person faces one or more social determinants as barriers to be addressed before she or he is ready to rejoin the labour market. A lack of education, obsolete skills, caring duties, a disability, chronic health problems, and housing stress, are examples of social determinants the person may be experiencing. These determinants have a cumulative effect on the likelihood of getting a job and a desired social outcome. A public employment service agency may not be equipped or funded to address many of these social determinants. Various other agencies, services, and supports need to be engaged. Addressing social determinants to ensure better social outcomes in this employment example requires elements of a proactive or preventative response, representing a paradigm shift as the attention shifts from 'unemployment - fixing failure' to 'Employment Ability - managing for success' (Gibbon, Brailey, Schnitzler, 2021). Addressing the social determinant barriers as a pre-requisite for achieving a desired social outcome applies to several other areas of social risk including old age, child, disability, and health care. From the technology perspective, more digitisation-inspired automation is not a complete solution. Digitalization can provide insight and knowledge for finding solutions addressing relevant social determinants through coordinated human and technology-based interventions.

► 3 Digitalization and adaptive social security

The long-term impact of the COVID-19 pandemic on social security administration cannot be overlooked when considering human centrality. COVID-19 is a global health crisis with long term impacts in economic and social terms. In this time of crisis government agencies were a last line of defence against economic and social hardship for vulnerable populations (IBV, 2022). Social security administrations scaled up their operations as governments leveraged the social security infrastructure (people, process and technology) to provide temporary relief in the face of the massive disruption to people's ability to earn income. Substantial investments in digitisation provided social security administrations with 'ready-to-go' capability and scale to respond in a human centric manner, in line with government policy and direction. Notwithstanding, the pandemic continues to place enormous pressure on social security administration across many countries.

The pandemic period has reignited the centrality of the solidarity principle in the organization of social security – the collective sharing of social risks. This has occurred in two dimensions. First, high levels of public support for the direct intervention by governments during lockdowns through economic stimulus measures. The severe conditions of the pandemic provided ideal conditions for policymakers to undertake natural experiments through policy settings that would otherwise have been difficult to justify or at least test (Fuchs-Schündeln, Hassan, 2016). The public has generally accepted the significant costs on state budgets and social funds and given up personal freedoms as necessary valued contributions to the common good, despite the increases in public debt and the long-term economic implications. The public has also accepted significant technology creep in terms of the use of personal digital data, digital surveillance, and monitoring to control to spread of the pandemic (Budd et al, 2020). This is an institutionalized approach to solidarity where collective decisions were made by governments on behalf of the people. Second, despite high levels of vaccine hesitancy in some countries, the weight of numbers coming forward to be vaccinated shows a further side of solidarity as people exercised individual choice for the common good.

As solidarity came to the fore during the pandemic, it provided an opportunity for policy makers to rehearse new approaches to social policy. More investment in human-centric service delivery initiatives within the social security administration will not be enough. Reform will need to address both traditional and the fast-growing non-traditional ways of work and the challenges for people experiencing multiple social risks in parallel. Reform will require a delicate balancing act of right-sizing collective action by governments for the common good, solidarity amongst the population to protect each other economically, socially, and environmentally, and the rights and needs of individuals. Digitalisation can help increase the capability to achieve an acceptable balance of competing interests, in line with cultural norms and fiscal settings.

Human centric social security policy and administration emphasizes the principles of fairness, equity, inclusion, and efficiency. This cannot be achieved solely through service excellence initiatives or more digital investment at the service delivery level. It requires a systems thinking approach. The aim is to address the social determinants serving as barriers to a person, family, or a community in achieving a desired social outcome through insight and knowledge from digital data. This means examining the interconnections across the extended ecosystem of actors collectively involved in social security administration with a disciplined approach to understanding whole system structures – policy, process, governance, and technology, that underlie these complex situations (GOS, 2022). This co-ordinated and parallel innovation approach to social policy and service delivery occurs through activating an extended ecosystem of actors including government agencies from across the various levels of competency, non-government and for-profit providers and civil society. The ecosystem can be dynamically connected through a digitally integrated case management approach where data and information are shared and made readily accessible by authorised actors for analysis, planning, action, and measurement.

Digitalisation supports an adaptive governance model for social security in which institutional arrangements evolve to satisfy the needs and expectations of the community in a changing environment. A more formal definition of adaptive governance is the evolution of the rules and norms that promote the satisfaction of underlying human needs and preferences given changes in understanding, objectives, and the social,

economic, and environmental context (Hatfield-Dodds, Nelson & David Cook, 2007). Provisioning, funding, and delivering interventions, supports and direct investment for communities and individuals is enabled by digital insight and knowledge gained through access to shared and linked digital data. The insight and knowledge make up the evidence base for human led decision making as it balances proactive and preventative initiatives with the proven features of the safety net and social security. Rapid advancements in cloud-based computing, identity management and related security and access controls are providing improved access to curated, linked, and shared digital data. This data provides opportunity for deeper insight and knowledge enabling social policy makers to make informed evidence-based decisions. Modern case management systems are providing ever increasing capability to collect, collate and analyse this data in real-time across various the channels people interact with the social security administration including in-person, call centres, internet/web based applications, mobile apps, and paper forms. While these many moving parts represent complexity, it is the digitalisation mindset for innovation and transformation through data collection, sharing, management with real-time analysis, which enable multi-dimensional elements to be modelled and tracked over time.

For the past 30 years, the digital revolution in social security administration has largely been directed through digitisation of business processes at the service delivery layer. The most obvious example is the ability to transact social security business via the internet replacing the need to complete paper forms (Duggan, Nichless, 1999). social Security administration has achieved, worldwide dramatic improvements in service quality . However, automation that eliminates human interaction with the social security administration, while administratively efficient, is not always appropriate. People who are vulnerable due to factors such as age, disability, language or any combination of needs require access to human decision makers. Rather than adopting a one size fits all digital first/only policy or providing unlimited access to high-cost face to face service delivery, digitalisation through a dynamic risk analysis approach, focuses automation at those who can benefit while directing face to face interventions to those who need it.

The digitalisation approach lifts the bar for human centricity by reaching beyond service delivery through the intelligent use of data. Reaching out to an increasingly digitally savvy population while addressing the needs of vulnerable people often experiencing multiple disadvantages requiring human expert intervention, requires new policy led approaches including updated forms of social security governance. This includes addressing the increased data management risks in ensuring equity and fairness within this ever-evolving hybrid approach to serving the population. Investment in automation through digitisation will continue to deliver benefits within social security administration, however it is not guaranteed to reach all pockets of disadvantage. Human led decision making where judgment, reasoning, compassion, and empathy are essential for servicing people with complex needs can be provided efficiently and effectively by targeting these high-cost interventions with insight from data.

For example, a targeted cost-effective approach to making human expertise available to those when need it, is the use of internet-based video communication with the social security administration via mobile apps and devices. This approach to face-to-face communication was widely adopted by service industry sectors throughout the pandemic period. The high rates of penetration of smartphones around the world is a strong evidence point for social security administrations to consider this approach. Notwithstanding, the digital divide looms as a potential social determinant. The digital divide is a continuum transcending all population cohorts rather than a binary point of inclusion/exclusion (Holmes, Burgess, 2021).

The transition within social security administration away from claims and benefits processing towards a higher order human centric approach involving case management across social programs and internal/external actors, represents a significant challenge to social security workforce management. Systems thinking is required to address the need for frontline staff to be retrained to address the complexity of cases that present once a sizeable quantum of the traditional work has been automated. It is a double-edged sword situation as automation and AI deskills frontline workers in their traditional work and they may not be able to support people having difficulty using digital channels. They lose confidence in exercising professional judgment in challenging machine-based decisions. These same workers are also at risk of not being retrained with the necessary softer human centric skills.

► 4 Automated decision making and its risks

AI is rapidly emerging as the transformative technology of the information age. AI is a collection of technologies that combine data, algorithms, and computing power (European Commission, 2020). Phenomenal advances in computing power over the past two decades to put information in the palm of our hands (smartphones), and the vast amounts of digital data generated every day, serve as markers in realising the potential of AI to influence the way we live, work, learn, and play. There are many risks associated with AI and these are often expressed in terms of fears, hopes, predictions and sometimes dire warnings. AI however, is a 60+-year-old technology. The term ‘artificial intelligence’ was coined in 1956 (Tate, 2014). AI has come to the fore in recent years as phenomenal advances in computing power, combined with the availability of data, have given rise to machine learning. Machine Learning (ML) is an application of AI where systems can automatically learn and improve from experience without being explicitly programmed (Hao, 2018). Machine learning focuses on the development of computer programs, in particular algorithms, that access and use data to learn for themselves, thereby improving algorithms without direct human intervention. Machine learning offers new ways to solve problems by developing and/or modifying existing algorithms and then training the machine with data captured and observed from the real world. (See Box 4).

The way data is managed to drive AI while protecting the same data from threat actors (cybersecurity), is a consistent feature within new technology. AI and related technologies have much to offer in achieving ever more personalised policy and service responses.

► Box 4 - Tennessee Department of Human Services (DHS) – AI powered chatbots – USA

The DHS addressed the surge in family assistance requests in the early days of the COVID-19 pandemic by scaling up its contact centre response. Once its call volumes became more manageable, the Department sought further efficiencies. The DHS introduced “AVA,” a virtual agent that embeds intelligent automation into the Department’s customer service. Given the urgency for services like supplemental nutrition assistance, pandemic childcare support, food service and more, families wanted easy answers fast, at their convenience. Navigating online portals or waiting on hold for a live agent wasn’t always possible, practical, or desirable. AVA was deployed across various web pages and portals where the agent could proactively engage with customers.

Providing a seamless, end-to-end conversational experience, the AI powered chatbot technology uses natural language understanding to address common queries and service requests. The digital platform provides reporting and tracking capabilities that give DHS insights into the conversations users have with AVA. These real-time analytics allow the Department to make evidence-based decisions and identify ways to improve the overall user experience (Accenture, 2021).

The risks of overreach in the use of personal data or unauthorised access raises the potential to rapidly erode people’s confidence and trust in social security administration. Left unchecked, investment in these technologies will be counterproductive and rather than addressing the last mile for those currently left behind, social outcomes may be diminished for all.

The new applications of AI can generate unexpected and unintended consequences through embedded bias within data and algorithms yielding discriminatory and unethical outcomes. These include unlawful racial profiling and false positives/ negatives in identifying children at risk of serious harm. To enhance the benefits from AI while minimising the adverse risks, social security administration needs to understand better the scope and depth of the risks posed and develop regulatory and governance processes and structures to address these challenges (Taeihagh, 2021).

Social security administrators have generally demonstrated a willingness to pursue the potential benefits of technology, including AI. They are also aware of the risks and generally adopting a conservative approach. A range of factors including cost, internal capability, existing technical debt and a lack of access to markets

has held many administrations back from investing in these new and emerging technologies. With AI and related technologies this conservative approach is prudent as the downside risks are potentially life changing for people experiencing social risks. To address these risks, leading social security administrations are pursuing a deeper understanding of the respective roles of humans and machines in all aspects of decision making. The human dimension, guided by a dynamic evidence base of digital data, is required to manage the risks i.e., privacy, data protection and ethics, while achieving better social outcomes leading to stronger and harmonious communities. AI offers the capability to extend the digital boundary beyond digitising business processes to automated decision making. It raises questions about what is meant by human centricity when machines are programmed to make decisions with the potential to impact people's social outcomes. More importantly, it raises questions around the type of society we want to live and protecting people against social risks (see Box 5 – Netherlands).

A culture within social security administration that routinely exhibits a responsible approach in exercising its power to use people's data in a human centric manner is more likely to create public value over one that puts a priority on using automation to leverage people's data for tighter compliance and productivity gains. The term public value has many interpretations. In this instance, it is expressed in terms of social development and increasing trust and confidence in the institutions of government. (Jørgensen, Bozeman, 2007). A responsible approach requires strict adherence to personal data protection laws and rights. Coupled with transparency in how personal data is used, including the explainability of computer-generated decisions and actions, are confidence building moments of truth which collectively build up trust between individuals and the social security administration. People personally experiencing the value proposition from sharing their data may continue or not to support expanding data sharing initiatives. When the value proposition is more aligned towards benefiting the abstract and opaque administration systems and not directly and visibly its members or beneficiaries, resistance to further data sharing provisions is likely to increase (ISSAc, 2021).

► **Box 5 - Netherlands – lack of transparency in child benefit provision**

When a family in the Netherlands claim the government funded childcare allowance, they needed to file a claim with the Dutch tax authority. The claims were processed through a self-learning algorithm (AI and machine learning), initially deployed in 2013. In the tax authority's workflow, the algorithm would first vet claims for signs of fraud, and humans would scrutinize those claims it flagged as high risk. The algorithm developed a pattern of false positives which were 'rubber stamped' by the human reviewers. This means people were incorrectly labelled as likely to commit fraud. For several years, the tax authority baselessly ordered thousands of families to pay back their claims, pushing many into debt and causing significant distress and hardship. On closer inspection, the false positives showed evidence of bias in the algorithm. Many of the victims had lower incomes, and a disproportionate number had ethnic minority or immigrant backgrounds. The model placed an excessive risk weighing on not holding Dutch citizenship.

The tax authority's algorithm lacked oversight and review. It was a black box, with no transparency into its inner workings. For those affected, it was impossible to tell exactly why they had been flagged. The civil servants working on the cases simply divested themselves of moral and legal responsibility by accepting the results of the algorithm – the moral hazard effect. In January 2021 the government of Netherlands resigned over the so-called *kinderopvangtoeslagaffaire*: the childcare benefits affair. This came after a Netherlands court ordered the Dutch government to halt its use of the AI program. The ruling affirmed that individuals who need social security support should be treated as rights-holders whose privacy matters, and not suspects to be constantly under surveillance. The Court's ruling was clear that transparency is needed to guard against technology-enabled abuses of privacy and related rights. During the hearing, the government refused to disclose meaningful information about how the algorithm used personal data to draw inferences about possible fraud.

The Court was not persuaded that authorities had to hide how the system's risk calculation model works. Without this information, it was nearly impossible for individuals under suspicion to challenge the government's decisions to investigate them for fraud. This lack of transparency was particularly troubling given the algorithm had been exclusively deployed in so-called "problem" neighbourhoods

– a potential proxy for discrimination and bias based on individuals' socio-economic background and immigration status (Toh, 2020).

► 5 Responsible artificial intelligence

Society has reached a phase of rapid expansion in capability in addressing big problems using AI and machine learning. The potential benefits of more automation in social security administration are expanding at an incredible rate with AI; however, so too are the risks, including the misuse of personal data, ethics, cyber security, algorithmic bias and the moral hazards of decision making with artificial intelligence (Alston, 2019) (Lee-Archer, Boulton, Watson, 2015). This new class of risk is troubling for public administrators and the public alike. It is the 'without human intervention' aspect of machine learning and AI which gives rise to some of the most troubling predictions of the unintended consequences of AI. In recent years, the terms 'responsible AI' and 'responsible use of AI' have risen to prominence (Dignum, 2019). The ever-increasing volume of personal data coming into the hands of social security administration is a source of great power, and with that comes great responsibility in ensuring data is managed correctly and is used to create public value. From addressing social security policy to delivering social security payments, public value derived through leveraging personal data at an individual or group level is also contingent upon the level of confidence people have in the institutions charged with managing the risks.

AI, in particular the way in which it exploits a person's digital footprint, is shifting public opinion towards the risks over the potential benefits. The positive image of digital technology is under threat as the risks become more evident, and potential misuse of personal data by governments and commercial entities becomes a significant public policy issue. As a result, the discussion about risks in the ways personal data is used are likely contributors to widespread falling levels of trust in government (see Box 6). There are three broad themes that can be articulated in relation to AI ethics - safety, data privacy and bias (e.g., welfare related stigma) (Sloan 2022).

► Box 6 - Automated Online Compliance Intervention (OCI) program – Australia

The OCI, unofficially referred to as 'Robodebt' outside of government, was conducted by Centrelink, an agency of the Australian Department of Human Services in the period 2015-19. The OCI program matched income data reported to the Tax Office by employers and to Centrelink by individuals. The OCI program incorporated standard data matching routines already in use over many years. The data matching routines were not based on new AI technology notwithstanding the AI like colloquial arising in the public domain to describe the program, Robodebt. Possible matches were manually reviewed to remove false positives.

What was new was automation of the follow-up action where the onus of proof was placed on the customer to show a debt did not exist. After a significant public backlash at what was seen as overreach by government in terms of automation, there was a A\$1.8bn settlement between the Commonwealth to a class action on behalf of the nearly 400,000 people affected. This was a failure in human decision making to fully automate the follow-up actions despite being aware the matching algorithms produced false positives in significant volume. There was sufficient evidence available which was largely ignored by social security administrators when making the previous manual process fully automated without human oversight or intervention (Rinta-Kahila et al, 2021) (Park, Humphry, 2019).

AI extends the digital boundary beyond digitising business processes to automated decision making. This raises questions about what is meant by human centricity when machines are programmed to make decisions with the potential to impact people's social outcomes. It is not unreasonable for governments of advanced economies with very high levels of internet and smart phone penetration to expect their citizens to use digital channels as a first-choice option. While physical channels may still be made available, they may not be as convenient or as efficient as they once were. This digital first approach to social security administration is a component of wider digital economy and digital citizen strategy (see Box 7 – Denmark).

► **Box 7 – Denmark – A digital state, social security to citizenship**

Denmark is a modern state with a high standard of living supported by a generous social security system. Like all countries of the Nordic region, Denmark has very high levels of digital literacy and digital adoption. The administration of social security in Denmark operates within the overall e-government architecture. From November 2014, it became mandatory for all Danish citizens to communicate with the Danish state through a digital infrastructure entitled 'Digital Post'. This system is designed to act as an official digital mailbox. Danish citizens are expected to be 'digital by default'. This means people are required to use the digital channels to maintain contact with core parts of the public sector and secure their social security benefits. Digital is not an optional part of the welfare state but rather a mandatory legal and symbolic component in national citizenship. To this end, a range of different digital technologies have been implemented within and across major parts of the public sector. Coinciding with the directive towards a digital economy, the welfare state has gradually transformed to be fully digital. The state seeks to help citizens be competitive, flexible, and active, while enforcing mutual obligations via digital means such as activation for unemployment benefits.

The establishment of a 'digital society' challenges the traditional understanding of citizenship. Digitalisation is not merely the deployment of technology to improve social security outcomes, but rather is part of an emerging set of political considerations concerning what is a 'good' society and the meaning of citizenship in a digital economy (Schou, Hjelholt, 2019).

Despite the enormous benefits of digitalization, a digital first approach poses a reputational and confidence risk for social security administration if it scales back the human based front office capacity and capability based on incorrect assumptions regarding the extent to which people needs can be satisfied through the digital channels and/or people are capable and prepared to use them. People need the option of direct human interaction with social security administration even when digital channels are available. Indeed, there are times when human interaction is required either during or using digital channels. People also expect human interaction in situations when digital channels are not appropriate such as when experiencing multiple social risks and/or are in vulnerable or high-risk situations such as domestic violence, homelessness or insufficient means to meet basic needs.

A hybrid approach between fully human interaction and digital only approaches offers the means to augment human interaction. This approach offers differential and personalized responses backed by data driven evidence and supported by AI and other automation techniques such as robotic process automation (RPA) (Lee-Archer, 2012). A data driven differential approach requires the consideration of legal, ethical and human rights concerns to deliver human driven digital transformation (Pieters, Schoukens, 2013).

Philip Alston UN Special Rapporteur on extreme poverty and human rights in his report to the UN General Assembly cautioned against the consequences of using digital technologies without adherence to human rights concerns (Alston, 2019):

►► *The digital welfare state is either already a reality or emerging in many countries across the globe. In these states, systems of social protection and assistance are increasingly driven by digital data and technologies that are used to automate, predict, identify, surveil, detect, target and punish. (In some instances) big technology companies (frequently referred to as "big tech") operate in an almost human rights-free zone, and (this is) problematic when the private sector is taking a leading role in designing, constructing and even operating significant parts of the digital welfare state."*

The Special Rapporteur went further in his report, by describing the risks of the unscrutinised use of digital technologies in social welfare for individual rights. He went on to say:

►► *"(E)vermore refined surveillance options enable around-the-clock monitoring of beneficiaries; conditions are imposed on recipients that undermine individual autonomy... and highly punitive sanctions are able to be imposed on those who step out of line."*

Nevertheless, digitalisation and digital technologies, create opportunities for policy reform leading to a deeper human centric experience with social security administration. Rather than being a negative hurdle that cannot be overcome, well governed risk is essential to the modernization of social security administration. The responsible use of AI involves using machines to add, enhance, and complement the ability of people and to managing its emerging and multifaceted risks.

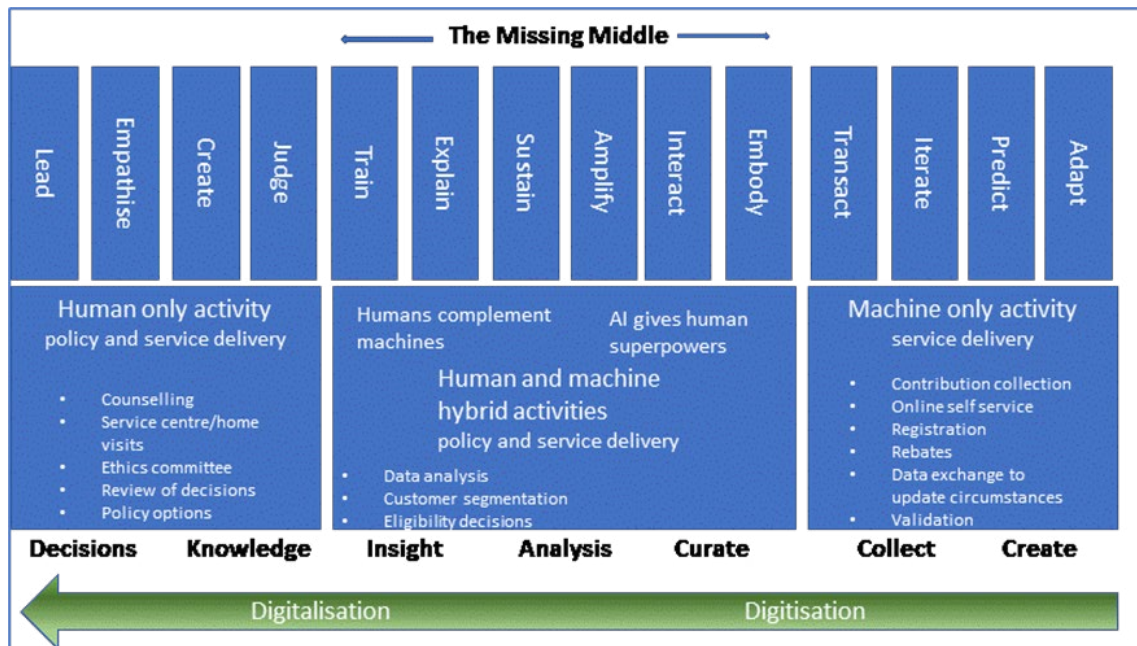
► 6 Managing the risks of automated decision making

Automation through digitisation is a well-established discipline inside social security administration. At the same time, social security administration has many areas of activity where the human-to-human interface remains an enduring feature. While social security programs are defined and bound by legislation, policy and rules, there are many elements where discretionary decision making is required. These areas of discretionary decision making are in the middle of the two extremes of automation and human-to-human interaction, where machines can augment human capability (Daugherty, Wilson, 2018).

Despite concerns surrounding the use of AI, there are examples where humans have high levels of confidence in machines operating autonomously. For example, processing claims for a one-off emergency payment due to a natural disaster using scanning technology where information is extracted and processed against a set of rules. Conversely, there are areas where there is a general agreement humans should retain control of decision making such as assessing the range and types of supports to be funded for a person with a disability. Human interaction is vital in meeting with the person or their carer and discussing their personal needs and aspirations. The increased use of automation with machines using algorithms to make decisions on eligibility and entitlement to social programs with minimal or limited human oversight has not however always delivered the desired results and in some cases have created significant legal and administrative problems. Cases of significant administrative failure arising from the overreach in the use of AI in social security administration have been emerging since the middle of the previous decade. These incidents result in social distress, financial loss and inconvenience for the people impacted leading to public pressure on government and administrators to wind back the use of AI based technology (Lee-Archer, Boulton, Watson, 2015; Rao 2022) .

Figure 1 below represents the scope and boundaries for machine only and human only activity. The 'missing middle' represents those areas of activity where machines and humans complement each other. The diagram represents the role of data management and data governance in the transition from digitisation to digitalisation covering the three domains of machine only, human + machine and human only. Examples of activities within social security administration are listed for illustrative purposes, against each of the groupings.

► Figure 1 - Adapted from Human + Machine – Reimagining Work in the Age of AI (Daugherty, Wilson, 2018)



An important consideration for social security administration, when examining where and how to use AI based technology, is that AI is a tool for automation to augment, rather than replace human decision making. AI is the continuation of the ongoing automation journey that began at the dawn of the IT age in the middle of the 20th century. Humans and machines should not be seen as adversaries, fighting for each other's jobs. Instead, they are symbiotic partners, who together can achieve higher levels of performance (Daugherty and Wilson, 2018). The concept of Human + Machine reinforces the important role of human control, oversight and guidance in where machines are used and how they are trained including how to deal with false positives and false negatives⁷. Social Security administrations in countries including Brazil, Uruguay, Argentina, Canada, Austria, Belgium, Estonia and Saudi Arabia are already establishing guardrails within quality assurance frameworks to ensure machines perform as expected (ISSAd, 2020).

⁷ A false positive is an error in binary classification in which a test result incorrectly indicates the presence of a condition (such as a disease when the disease is not present), while a false negative is an opposite error, where the test result incorrectly indicates the absence of a condition when it is actually present.

► 7 Automation and legal frameworks

The demand for increased transparency, ethical behaviour and flexibility in modern regulatory and compliance practices by government has led to the development of Regulated Technology (RegTech). RegTech aims to simplify regulation and streamline compliance processes by translating complex regulations into code. RegTech is the application of various new technological solutions that assist highly regulated industry stakeholders, including regulators, in setting, effectuating, and meeting regulatory governance, reporting, compliance and risk management obligations. The goal of RegTech is to prioritise and improve the effectiveness of regulations and governance while reducing the cost of compliance through modern technology. Technologies supporting RegTech include AI and blockchain (WEF, 2022). The Danish government, for example, has a stated goal that all future regulation in Denmark must be 'digital-ready' and 'agile'. Digital-ready regulation must be drafted in a way that is both easily manageable and enables digital administration, including ethical use. The assumption that regulations can be crafted slowly and deliberately – and remain in place, unchanged – has been upended in today's environment (Petersen, Mathias, Christiansen, 2020) (see Box 8).

► Box 8 - Legislation as code

Deutsche Rentenversicherung Bund – (DRV Bund), Germany

The Federal Pension Fund of Germany (DRV Bund) is following a digital strategy with the aim of establishing a digital DRV Bund. Initiatives include an automated data exchange between agencies to enable clients to only need to provide data once. A feature of the digital strategy is the intent to systematically consider digitalisation during the policy development and legislative process. This includes digital-ready legislation (a RegTech approach). To facilitate this the DRV Bund developed the "DigitalCheck" process.

The aim of the DigitalCheck is to examine proposed legislation and policy from a digitalisation perspective. This means looking at the bigger picture in terms of the potential impact on other government programs and legislation of proposed changes to the pension program. The Agency actively advocates for the early and systematic consideration of digital enabling policy initiatives. When obstacles to digitalisation are found within existing political initiatives/ draft laws, the Agency reaches out to the decision-makers to explore digitalisation friendly and value adding alternatives (Weigel, 2022).

► 8 Data driven policy, digital capabilities, and public trust in social security

Addressing social disadvantage across the range of socioeconomic, cultural, gender and geographical cohorts, requires the capabilities of new technology to draw insights from the already large and growing quantities of data, to influence decision making. Rather than replacing humans, the aim of digital technology and AI is to give insight into what does and does not work (Daugherty, Wilson, 2018). To succeed, social security administrators need to commit to designing for human intelligence and to optimise the relationship between people and machines. This includes empowering frontline workers to exercise their professional judgment and take over from machines in decision-making when they believe the machine has not or will not deliver the best or desired outcome. This is necessary to counter a potential moral hazard effect where frontline workers hold back from intervening against automated decision-making systems due to a false sense of security insurance-like) of the machines' infallibility (Baker, 1996). Digitalisation in a social policy context represents a combination of human ingenuity and the power of new technology such as AI, where human decision-making traits such as empathy, compassion, discretion, and reasoning are exercised using evidence through digital data. Social security administrations are adopting a digitalisation mindset that capacitates officials to decide when and how machines are used, how data is collected, managed and stored, the boundaries machines operate within, the rules they follow and the ethical principles that cannot be compromised.

Digital data passes through a data lifecycle of research, policy, program delivery and evaluation. In raising the human centric bar to the policy level, the fundamentals of social policy delivered through social security do not change. Social policy makers must address the diversity and complexity of people's lived experiences through a policy/program response to social risks, including those people experiencing multiple social risks concurrently. This approach however is not without risk (see Box 9).

► Box 9 - Universal Credit – United Kingdom – digitalisation with unintended impact

Universal Credit is a comprehensive social security reform in the United Kingdom, announced in 2010, addressing policy, processes and digital technology. The new programme was designed to replace and combine six benefits for working-age people who have a low household income: income-based Employment and Support Allowance, income-based Jobseeker's Allowance, and Income Support, Child Tax Credit and Working Tax Credit, and Housing Benefit. The intent was to make the social security system fairer to claimants and taxpayers. A key feature of the proposed new benefit was a tapering of benefits as people moved into work avoiding a "cliff edge" effect that was said to "trap" people in unemployment. Universal Credit has been progressively rolled out since 2013 with people still on the older legacy benefits not expected to transfer to Universal Credit until 2024. Universal Credit is the [first](#) major government service in the UK to become "digital by default". That means that the application and most subsequent communication with the authorities take place [online](#). (DWP, 2010) (Brewer, Browne & Jin 2012).

Evaluations using longitudinal study data found the introduction of Universal Credit led to increases in psychological distress, a measure of mental health difficulties, among cohorts affected by the policy. It is suggested that future changes to government welfare systems should be evaluated not only on a fiscal basis but also on their potential to affect health and wellbeing. (Wickham et al, 2020; Brewer, Dang, Tominey, 2022).

Recent advances in data collection and linking of different data sources throughout the data lifecycle have an enormous potential for better evidence-based policymaking. Improved access to public, research and administrative data and tools such as web-based surveys offer powerful new ways of identifying the needs of different population groups and following their pathways through multiple systems (OECD, 2019).

Understanding and addressing the needs of people as they navigate the pathways of multiple systems, and the cumulative effects, defines the human centric policy paradigm.

The principle of human centrality in policy extends to transparency of the source, provenance, quality, scope and relevance of digital data used in modelling and optimising policy parameters, in the same spirit social security administration should be transparent in the use of personal data in decision making. Policy making is occurring against a background of dynamic social, economic and environmental change and the public have the right to ask ‘what evidence was used in support of a new policy position?’ Public confidence and trust in policy and service delivery is essential for maintaining the social licence for personal data collection. Excellence in service delivery is predicated on a series of confidence building experiences for people, leading to enduring trust in social security administration. As policy makers adopt a digitalisation inspired human centric approach, they should be operating to a similar code of practice. A more transparent approach towards digital evidence used in policy making, can ameliorate the short-term pressures on policy makers as they address political, social or economic expectations. To maintain support for a broader reform agenda, ideas and proposals need to be backed by evidence, with digital a primary source of information, knowledge and insight. This requires new and higher order data literacy and data management skills in curating, analysing and interpreting data to create new knowledge and insight for moving beyond correlations and patterns to informed human decision making on causality and enduring policy based solutions. (see Box 10).

► **Box 10 - Social sector wide reform through digital leadership – Finland**

The Finnish welfare state emphasises full employment, tripartite negotiation, a wide range of free or heavily subsidised social benefits and services available to all and a high share of GDP social expenditure. The structure of social security and health care in Finland is decentralised. The largest national institution is the Social Insurance Institution of Finland (Kela) which offers a large variety of benefits and services. Municipalities are responsible for basic healthcare services and jointly responsible (through hospital districts) for specialised healthcare services. Other social security benefits and services are administered by other providers.

Social security institutions were among the first to adopt computer-based technology in Finland. Finland was an early leader in digital adoption measured against global peers (Duggan, Nichless, 1999). An example of digital enabled innovation at the municipal level is the Apotti program in Finland's capital region, moving forward with a data-driven and evidence-based service delivery model in which the various health and social services organisations are closely coordinated and have access to integrated information through a combined social and patient record (Apotti, 2018). The Apotti program is an example of the need for cooperation and the exchange of data between autonomous institutions operating at the national and municipal levels. The overall picture of public e-services remains somewhat fragmented due to the large number of institutions involved. The application of digital platforms facilitates the on-going autonomy of these organisations by providing them with capability for joined-up human centric services.

In 20+ years of digital adoption there have been no major scandals, such as data breaches. There remains a positive view on technology and its possibilities in creating value for customer service and operations within social security administration. Trust in the institutions and in the protection of data remains strong. The State has supported the digital development by creating common pathways that form the core of the national digital architecture. Low adoption of AI in decision-making represents a cautious approach and is a sign that digitalisation of Finnish social security is advanced in its thinking through sound governance.

A reform commission (2020-2027) is preparing a comprehensive social security reform. One of the aims of the reform is to enhance co-operation and the mutual exchange of data to ensure better customer services. The main challenges are related to the legal framework that is not fully in line with the methods that the institutions wish to apply, as the example on automatic decision-making shows. (Väänänen, 2021)

To achieve this requires a strong evidence-based decision-making culture backed by digital data. Evidence is made up of many sources such as scientific research, statistical and administrative data, benchmarking, best practices, collective experience, personal experience, and intuition. The wise investments needed to reconstruct economic and social systems need to be based on the presentation of evidence and evaluated by the collective wisdom. Most importantly, new policy makers also need new skills to be able to explain their policy positions and the digital evidence behind them, in ways the public can understand and appreciate.

► 9 Data driven policy and service delivery integration

Establishing human centric social policy starts with policy formulation. This means examining the needs of people through their life journeys as they experience social risk in the context of the communities where they live. For example, the 2.5 billion people living with a disability need one or more assistive technology products to participate in the workforce, secure an education and maintain independence and dignity throughout their life course (WHO, UNICEF, 2022). Traditional social security programs and social security administration, need to be better coordinated and integrated with the assisted technology industry to further round out a human-centric response to social disadvantage for people living disabilities. For some people with a disability, the preferred or dominant community is a digital space where physical, virtual, and augmented (extended) realities are brought together in digital spaces with many of the same properties as the physical world such as companionship, the primary source of information and marketplaces, including the assisted technology community (Gurov, 2022). People interact with providers of social programs to gain the supports they need to enable participation in their community - either in the physical or digital communities in which they live. Achieving human-centric outcomes in a hybrid world of digital reality requires a policy that is adaptable while continuing to support coordinated and connected service delivery through a range of providers and funding mechanisms. Whilst digital data and exchange is vital to create such support ecosystems, social security organizations are trying to find the best balance in the level of automated decision making systems (see Box 11).

► Box 11 - National Disability Insurance Scheme (NDIS) – Australia - digital driven policy reform

The NDIS was launched in 2013. The NDIS is a comprehensive structural policy led reform changing the way support and care are provided to people with permanent and significant disability. The NDIS represents breakthrough thinking for the provision of disability support by placing people with disability at the center of decision-making through the principles of reasonable and necessary support and individual choice and control.

Using the insight derived from comprehensive social and economic analysis, this policy reform was designed to deliver economic and social benefits through a service delivery ecosystem involving actors and private for-profit and not-for-profit providers. It fundamentally changed the disability support system architecture from a welfare and entitlement approach to a rights-based insurance scheme. This includes predictive analysis of lifetime costs through actuarial methods to assist in managing the fiscal aspects of the scheme.

The administrative agency, the National Disability Insurance Agency (NDIA) adopted a data-driven approach in operationalizing the scheme. This involved a pattern-based approach to the individual planning process guided by data-driven algorithms. While not found to be an error of law, this approach placed undue weighting on equity and efficiency goals over the preferences and needs of individual participants. This could be ethically problematic in unduly elevating ethics of justice (impartial planning based on abstract principles applied consistently to all participants) over the ethics of care that views each participant as unique, as arguably the NDIS was designed to promote (Carney et al, 2019)

The NDIS continues to evolve. There have been numerous reviews covering all aspects of the scheme including ICT. These reviews have led to policy, governance and ICT improvements to raise the level of consistency and quality of decisions and to reduce significant pain points experienced by participants (Tune, 2019).

A key to achieving coordinated service delivery is having policy makers and service providers be aware of the range of other services an individual is accessing (or not accessing) and of the information about the

nature of services/assistance being provided. Social security administration from its traditional central position within government is sometimes not well equipped to reach out to the broader local communities. This gap in capability was exposed as the smart city concept (also referred as smart communities) emerged in the early 2000s (UN Habitat 2022⁸). Smart cities are urban areas that use digital data (including Big data⁹) and communication systems from government and private providers, including new sources of geo-spatial linked data from the internet-of-things connected devices, for the purpose of improving the quality of government services and citizen welfare. Smart cities remain an evolving model with a dominant technology-driven approach being supplemented through a data-driven decision-making approach (Sarv L, Soe R-M, 2021). With some exceptions, the centralised nature of social security administration with a national or occupational perspective may not be aligned with the horizontal nature of smart city planning and data sharing. Overlooked can be the potential for social security administrations to make a highly valuable contribution to smart city ideals in developing social capital¹⁰, through responsible sharing of its data assets. As smart city development adopts a more data-driven decision-making approach, the social security administration is well-positioned to address the data gaps, notwithstanding the need to maintain strict adherence to data protection and privacy laws and guidelines.

Social capital supports the subsidiarity principle where local communities play a role in helping people navigate their lived experience of social risks. Communities are not all the same and the traditional top-down approach to social policy and delivery will not serve everyone's needs. The potential for wider success comes from program and service delivery disaggregation across many providers, funded at different levels of government – both not-for-profit and for-profit organizations (Gray, 2022). This can only be made possible through efficient and effective data sharing combined with appropriate risk mitigation for data protection and security. Beyond cash benefits, people require services and forms of in-kind support to address the social determinants impacting their capacity to address the social risks they may experience. It requires social investment as a preventative component within a dynamic social security policy approach¹¹. How these services are provisioned and funded in a fair, equitable and sustainable manner on a country-wide basis are critical policy questions. For policy makers seeking to be human centric, these decisions need to be made based on evidence, largely informed through digital data. This requires new data analysis and modelling approaches and techniques to optimise the capacity of the social security system to achieve a particular outcome (Phillips, Webster, Gray, 2018) (Gujral, Lee-Archer, Fuhrer, 2020).

While retaining the standard pillars of social policy, the deep insight and knowledge from digital data analysis can facilitate decisions on where, when, and how to harmonise and/or co-ordinate policy, processes and digital technology to address people needs when more than once social risk and social determinants are involved.

It is not technology holding us back, but rather the knowledge and insight of when to harmonise or coordinate policy intent. Digitalisation alone is not the core instrument of social policy reform. It enables reform of social policy through knowledge and insight. An example is a data fabric, to address islands of data, structured and unstructured, within an organization. Traditional data management for business intelligence involves setting up large data warehouses and data lakes¹². The data fabric¹³ links data across platforms and users via knowledge graphs, making data available, readable and ready to be interrogated (Hogan et al, 2021). With inbuilt analytics reading metadata (data describing what is in a dataset), standardized through

⁸ See UN Habitat 2022 People Centred Smart Cities. In [fp2-people-centered_smart_cities_04052020.pdf](https://unhabitat.org/wp-content/uploads/2020/04/fp2-people-centered_smart_cities_04052020.pdf) (unhabitat.org) See also [People-Centered Smart Cities | UN-Habitat](https://unhabitat.org/people-centered-smart-cities/) (unhabitat.org)

⁹ Big data can be defined as the aggregation of very large data sets that may be analysed computationally to reveal patterns, trends, and associations, especially relating to human behaviour and interactions.

¹⁰ Social capital can be defined as 'the networks, norms, relationships, values, and informal sanctions that shape the quantity and co-operative quality of a society's social interactions' (Iyer, Kitson, Toh, 2005).

¹¹ Dynamic social systems are accessible, sustainable, adequate, socially inclusive, and economically productive (McKinnon, 2007).

¹² A data lake is a centralized repository designed to store, process, and secure large amounts of structured, semistructured, and unstructured data. It can store data in its native format and process any variety of it, ignoring size limits.

¹³ A data fabric is an architecture and set of data services that provide consistent capabilities across a choice of endpoints spanning hybrid multicloud environments. It is a powerful architecture that standardizes data management practices and practicalities across cloud, on premises, and edge devices.

an ontology, a data fabric exposes the hidden connections within data holdings¹⁴. Its real value exists in its ability to curate data leading to knowledge to inform next actions leading to more, different, relevant, and better data holdings, reducing data management by up to 70% (Gartner, 2022).

While maintaining institutional independence, policy and service delivery integration must occur from a data design perspective. **Unlike the human centric service delivery reforms of the 1990s and 2000s where organisational constructs and business models were a key feature for achieving human centricity, a digitalisation approach enables the social security administrative apparatus from policy to service delivery to be kept separate or it can be integrated.** Data flows are boundaryless, leaving human centricity as achievable across the full range of administrative structures (see Box 12)

► **Box 12 - Affordable Care Act - USA – Health Insurance Reform**

ACA is an example of a wide-reaching structural reform of health insurance coverage in the USA. As a structural reform, it was made possible through a digitalisation approach leading to the deployment of new integrated IT systems involving the exchange of data across multiple agencies.

The ACA was enacted in 2010 with the major components of the reform - online health insurance exchanges, commencing in 2014. While the law's focus was expanding health coverage for the uninsured, the intent was to also address the social determinants of health such as education, job training, access to food and housing, and financial stability.

“No wrong door” eligibility is a key feature of the Affordable Care Act’s (ACA) statutory design. They involved the deployment of new IT systems integrating processes and data across multiple agencies. Whether people seek health coverage from a marketplace, a Medicaid program, or the Children’s Health Insurance Program (CHIP), they are supposed to be enrolled immediately into the coverage for which they qualify, even if that coverage is sponsored by a different agency than the one to which they applied.

The reform program experienced substantial political led opposition leading to amendments and compromise which occurred on a state-by-state basis. As such the “no wrong door” vision was not fully realised. The statutory requirement has been fulfilled in the District of Columbia and 11 states, which operate their own marketplaces and use integrated IT eligibility systems covering all health insurance programs. The remaining 39 states use eligibility systems that remain fragmented. The intent of a single eligibility determination and enrolment process was to ensure people no longer had to navigate multiple agencies and systems to secure the various benefits they were eligible for.

Nearly a decade after these regulations were finalised, they have proven ineffective in protecting families from onerous paperwork requirements, delays, and confusion that obstruct enrolment. (Gordon, Dorn, 2021).

Despite the fragmentation and the barriers to fully adopting the key principles of the ACA there remains scope for on-going digitisation inspired automation as states continue to improve the experience for people.

¹⁴ Data holdings are generally the storage methods used in the past when data has been lost due to environmental and other historical disasters.

► Conclusion

Years of digitisation initiatives have delivered significant benefits for governments, social security administration and individual members and recipients of social security programs. The quality of social security administration has advanced through realising significant benefits from the widespread use of digital technology. In the main these benefits remain productivity or efficiency dividends. Better social outcomes have also been achieved as issues are addressed more quickly thereby preventing more substantial social problems occurring.

Leveraging digital data at both the policy and service delivery layers provides new opportunities to address long term disadvantages and the barriers people experience in addressing the social determinants that exacerbate the social risks they face. As social security administration adopts a broader and inclusive approach to achieving better social outcomes for all, the ingredients for knowledge needed for success is deep within the data.

While early days for many jurisdictions in terms of broad-based data sharing and linking of data beyond an agencies administrative data holding, delivering human centricity is primed to move beyond the domain of service delivery integration.

The gains to date from digitisation have generally been achieved with strong public support. This support community wide in terms of government and commercial services during the IT revolution of the second half of 20th century. While there were individual risks arising from the labour market disruptions from automation and process reengineering, these were generally acceptable at a societal level in terms of gains in efficiency and effectiveness. More jobs were created which were more value adding the ones they replaced.

However, society is approaching a tipping point, where the rush to collect more digital data to power new and emerging technologies including AI and ML will decrease its productivity and increase the personal risks of undue use of individual data, in the absence of adequate governance and legal frameworks. The value proposition for addressing societies' most complex social, economic, and environmental problems through digital data is strong. However, the downsides are equally compelling and need to be avoided. Going forward is highly dependent on how humans' use the power of machines for the good of society. This requires strong governance and leadership that mandates and regulates a machine augmentation approach to human led decision making.

Leveraging the vast supply of digital data to model and optimise social policy options in a dynamic and transparent manner is only possible with the confidence of the public at large. Confidence is key to maintaining the social licence for personal data collection. At the same time, there is the paradox of people prepared to share information with commercial entities with minimal protection but resist sharing their information with government agencies. This is largely a matter of the value obtained from sharing data with an entity versus the risk – actual or perceived.

Building confidence, leading to enduring trust through the responsible use of AI is a steppingstone for the scale of structural social policy reform required to meet the social and economic challenges ahead. This can occur through data informed decisions for harmonisation and coordination within the social security ecosystem in provisioning and delivering people the services they need to address the social determinants contributing to multiple and concurrent social risks.

It is no longer a matter of how efficient social security administration can be through digital service delivery. There is no substitute for sound evidence-based policy development to support a human centric approach. Human centric social policy through digitalisation, addressing the parallel questions of community needs and individual needs, is possible through insight and knowledge that detects hidden and unknown correlations in the data, which in turn is interpreted with human expertise to understand causality. In this context the potential data sources extend well beyond the boundaries of social security administration including geospatial, population surveys, consumer spending, credit applications, and social media sentiment.

Human centric in the policy context is doing things differently to reach everyone in a way that is contextual to their circumstances, rather than more digitisation for doing the same things faster, cheaper, or more conveniently via digital channels. For social security administration this means adopting a different and adaptable role within the social policy to service delivery ecosystem. Rather than positioning at the centre of the ecosystem based on competence for a social risk(s), social security administration re-positions as a contributor to the overall success of the communities they operate within. As custodians of personal and administrative data, they can keep it to themselves citing privacy and data protection or they can be proactive and engage in governance and public forums to enable it to be shared responsibly, in collaboration with other actors, and create public value, safely.

The rise of AI in recent years has accentuated the risks in terms of data protection and ethical use of data. These cannot be ignored as doing so increases the potential for public backlash leading to deeper falls in people's trust in government (Kehoe, 2022). Rather than talking about data sharing as an action without governance, what is needed is a commitment by social security administration to establishing respectful governance and management of people's personal data, consistent with international human rights conventions and the right to privacy.

References

- Accenture (2021) Meet "AVA": The State of Tennessee's family support virtual agent Accenture published at Accenture.com
- Alston P (2019) Report of the Special Rapporteur on extreme poverty and human rights 19-17564 (E) 291019 UN General Assembly A/74/493
- Andrews D, Criscuolo C & Gal P (2016) The global productivity slowdown, technology divergence and public policy: a firm level perspective - OECD Background paper
- Apotti (2018). Apotti in figures. Retrieved from <http://www.apotti.fi/en/for-media-2/>
- Baker, T (1996) On the Genealogy of Moral Hazard University of Pennsylvania Carey Law School
- Beveridge W (1942) Social Insurance and Allied Services - His Majesty's Stationery Office, London
- Brewer M, Browne J & Ji, W (2012) Universal Credit: a preliminary analysis of its impact on incomes and work incentives, Fiscal Studies, 33(1), 39-71.
- Brewer M, Dang T & Tominey E (2022) Universal Credit: Welfare Reform and Mental Health IZA Institute of Labor Economics
- Budd J, Miller B, Manning E, Lamos V, Zhuang MD, Edelstein M, Rees G, Emery V, Stevens M, Keegan N, Short M, Pillay D, Manley E, Cox I, Heymann D, Johnson A, McKendry R (2020) Digital technologies in the public-health response to COVID-19 Nature Medicine VOL 26, 1183-1192
- Carney T, Then S-N, Bigby C, Wiesel I, Douglas J (2019) National Disability Insurance Scheme Plan Decision-Making: Or When Tailor-Made Case Planning Met Taylorism and the Algorithms?, Melbourne University Law Review, 42:3, 2019 Sydney Law School Research Paper No. 19/69
- Daugherty P, Wilson H (2018). Human + Machine: Reimagining Work in the Age of AI. Harvard Business Press.
- Dignum V. (2019). Responsible Artificial Intelligence. Umeå University. https://ec.europa.eu/jrc/communities/sites/jrccties/files/03_dignum_v.pdf
- Duggan M, Nichless, J (1999). E-business Utilisation in European Social Security Systems. New York: IBM.
- DWP (2010) Universal Credit: welfare that works, UK Government
- Evans E (2019) The No-Wrong-Door Approach: Antidote to Boundaries within the American Welfare State, Health and Social Work Feb 2019 DOI: 10.1093/hsw/hly042
- European Commission (2020) White Paper on Artificial Intelligence: a European approach to excellence and trust. https://ec.europa.eu/info/sites/info/files/commission-white-paper-artificial-intelligence-feb2020_en.pdf
- Frelle-Petersen C, Hein A. Christiansen M (2020) The Nordic social welfare mode - Lessons for reform, Deloitte Insights, Deloitte, Denmark
- Fuchs-Schündeln N, Hassan T (2016) Natural Experiments in Macroeconomics, Ch12 Handbook of Macroeconomics Science Direct Vol 2, 923-1012
- Gartner (2022) Top Strategic Technology Trends for 2022, 12 Trends Shaping the Future of Digital Business, Gartner

Gibbon, C, Brailey C & Schnitzler M (2021) EmploymentAbility: A proactive paradigm for resilience and sustainability in employment IBM Watson Health New York

Gordon R, Dorn S (2021) Health Care's Fragmented Eligibility Systems: What Happens When Uninsured Families Enter Through the Wrong Door? National Center for Coverage Innovation, Families USA

GOS - Government Office for Science (2022) Systems thinking for civil servants - How to use systems thinking to drive improved outcomes in complex situations. UK Government GOV.UK

Gray M (2022) - Better data for the delivery of grant funded social services ANU Centre for Social Research and Methods, Canberra

Gujral G, Lee-Archer B & Fuhrer S (2020) Policy Agility in volatile times - A new approach to modelling social policy impact – Accenture in collaboration with ANU Centre for Social Research and Methods

Gurov O (2022) Metaverse—Flight From Dusk to Darkness? The Art and Science of Television, 18 (1), 11–46. <https://doi.org/10.30628/1994-9529-2022-18.1-11-46>

Halligan J (2008) The Centrelink Experiment: Innovation in Service Delivery ANU Press

Hao K (2018). What is machine learning? MIT Technology Review. <https://www.technologyreview.com/2018/11/17/103781/what-is-machine-learning-we-drew-you-another-flowchart/>

Hatfield-Dodds S, Nelson R & Cook D (2007) Adaptive governance: An introduction, and implications for public policy Paper presented at the 51st Annual conference of the Australian Agricultural and Resource Economics Society, Queenstown NZ, 13-16 February 2007 CSIRO Australia

Henman, P. (2022). Digital Social Policy: Past, Present, Future. Journal of Social Policy, 51(3), 535-550

Hogan A, Blomqvist E, Cochez M, D'amato C, Melo G.D, Gutierrez C, Kirrane S, Gayo, J.E.L, Navigli R, Neumaier S.; et al. Knowledge graphs, ACM Comput. Surv. 2022, 1, 54.

Holmes H, Burgess G (2021) New Horizons: Digital exclusion and the importance of getting online, Cambridge Centre for Housing and Planning Research, University of Cambridge

IBM (2005) The Social Sector in the 21st Century Report of the International Social Security Forum, Tokyo, IBM Japan

IBV – IBM Institute for Business Value (2022) Government transformation in tumultuous times IBM New York

ISSAa (2022) Priorities for social security trends, challenges and solutions – Asia and the Pacific – International Social Security Association, Geneva

ISSAb (2022) Digital transformation for customer-centric services in Asia and the Pacific Geneva, International Social Security Association. Published online article at ww1.issaa.int

ISSAc (2021) The ISSA's Behavioural Insights Framework - A recommended approach International Social Security Association, Geneva

ISSAd (2020) Artificial Intelligence in Social Security: Background and Experiences, International Social Security Association, Geneva

Iyer S, Kitson M, Toh B (2005) Social Capital, Economic Growth and Regional Development, Regional Studies Vol39.8 pp10115-1040

Jørgensen T, Bozeman B (2007) Public Values An Inventory Administration & Society 39(3):354-381

Kaufman R (2012) Uplifting Service: The Proven Path to Delighting Your Customers, Colleagues and Everyone Else You Meet Ron Kaufman Pte Ltd Singapore

Kehoe S, (2022) Trust in Government: A Stark Divide Edelman - published online <https://www.edelman.com/trust/2022-trust-barometer/trust-government-stark-divide>

Kettl, D (2006) Managing boundaries in American administration: The collaboration imperative. Public Administration Review, 66(S1), 10–19.

Kwang C (2007) Service Canada – A New Paradigm in Government Service USA: John F Kennedy School of Government

Larsson KL (2021) Digitization or equality: When government automation covers some, but not all citizens - Oslo Norway 0740-624X Elsevier Inc.

Lee-Archer B (2012) RightServicing A new business approach to enabling a differential response in social program management Curam Research Institute, Dublin

Lee-Archer B, Boulton T & Watson K (2015) Social Investment In The Digital Era - Improving social outcomes through predictive analytics and managing the emerging moral hazard and ethical challenges - SAP Institute for Digital Government Canberra

Lukersmith, S, Millington, M and Salvador-Carulla, L (2016) What is Case Management? A Scoping and Mapping Review. International Journal of Integrated Care, 16(4): 2, pp. 1–13, DOI: <http://dx.doi.org/10.5334/ijic.2477>

Maney K, Hamm S & O'Brien, J (2011). Making the World Better - the Ideas that shaped a century and a company. New York: IBM.

McNight J, Russell R (2018) The Four Essential Elements of an Asset-Based Community Development Process - Asset-Based Community Development Institute, DePaul University

McKinnon R (2007) Dynamic Social Security: A framework for directing change and extending coverage International Social Security Review, Vol 60 No 2-3

Ministry of Social Affairs and Integration (2011) The general framework of social policy in Denmark ISBN: 978-87-7546-281-0 Copenhagen

Ministry of Social Development (MSD) (2022) Historical timeline <https://www.msd.govt.nz/about-msd-and-our-work/about-msd/history/index.html>

OECD (2019) OECD Employment Outlook 2019: The Future of Work, OECD Publishing, Paris, <https://dx.doi.org/10.1787/9ee00155-en>.

OECD (2019) Harnessing new social data for effective social policy and service delivery OECD, Paris Workshop background paper

Park S, Humphry J (2019) Exclusion by design: intersections of social, digital and data exclusion, Information, Communication & Society, 22:7, 934-953, DOI: 10.1080/1369118X.2019.160626

Petersen C, Mathias H & Christiansen M (2020) The Nordic Social Welfare Model – Lesson for reform – Deloitte Insights, UK

Pisu, M, von Rüden C Hwang H Nicoletti G (2021) Spurring growth and closing gaps through digitalisation in a post-COVID world: Policies to LIFT all boats OECD

Phillips B, Webster R & Gray M (2018) Optimal Policy Modelling: a microsimulation methodology for setting the Australian tax and transfer system ANU Centre for Social Research & Methods.

Pieters D, Schoukens P (2006) Social security quo vadis? Interviews with social security administration CEOs in 15 Western European countries - European Institute of Social Security, Leuven

Pieters D, Schoukens P (2013) RightServicing A Lawyers Perspective. European Institute of Social Security, Leuven

Rao R (2022) The Dutch Tax Authority was felled by AI - What comes next <https://spectrum.ieee.org/artificial-intelligence-in-government>

Rinta-Kahlia T, Gillespie N, Indulska M, Gregor S (2020) Algorithmic decision-making and system destructiveness: A case of automatic debt recovery – European Journal of Information Systems Vol 31, 2022 Issue 3

Robben F (1993) 10 years of computerization of Belgian social security 17 p

Santos H, Varnum M & Grossmann I (2017). Global Increases in Individualism. Psychological Science. 28. 10.1177/095679761770062

Sarv L, Soe R-M (2021) Transition towards Smart City: The Case of Tallinn, Sustainability 2021 13, 4143 <https://doi.org/10.3390/ssu13084143>

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, DOI: [10.1080/19460171.2017.1333441](https://doi.org/10.1080/19460171.2017.1333441)

Schoukens P (2020). Digitalisation and social security in the EU. The case of platform work: from work protection to income protection European Journal of Social Security. 22. 434-451. 10.1177/1388262720971300.

Services Australia (2021) Annual Report 2020-21 Commonwealth of Australia

Sloan, M (2022) The Global Politics of Artificial Intelligence - Ch 1 Threading Innovation, Regulation, and the Mitigation of AI Harm: Examining Ethics in National AI Strategies Edited Tinnirello, M 1st ed, CRC Press, Boca Raton

Taeihagh A (2021) Governance of artificial intelligence, Policy and Society, 40:2, 137-157, DOI: [10.1080/14494035.2021.1928377](https://doi.org/10.1080/14494035.2021.1928377)

Tate K (2014) History of A.I.: Artificial Intelligence. Live Science. <https://www.livescience.com/47544-history-of-a-i-artificial-intelligence-infographic.html>

Toh, A (2020) Dutch Ruling a Victory for Rights of the Poor. published online by Human Rights Watch - available at <https://www.hrw.org/news/2020/02/06/dutch-ruling-victory-rights-poor>

Tune, D (2019) Review of the National Disability Insurance Scheme Act 2013 – Canberra

Wickham S, Bentley L, Rose T, Whitehead M, Taylor-Robinson D & Barr B (2020): Effects on mental health of a UK welfare reform, Universal Credit: a longitudinal controlled study The Lancet Public Health, 5(3), e157se16

UN (2021) The Sustainable Development Goals Report, Unite Nations, New York

Väänänen N (2021) The digital transition of social security in Finland. Frontrunner experiencing headwinds? Ubezpieczenia Społeczne Teoria i praktyka (Social Security Theory and Practice) NR 4/2021 (151) Social Insurance Institution (ZUS)

Weigel, S (2022) Tanker meets speedboat - The digital strategy of DRV Bund, Deutsche Rentenversicherung Bund (DRV Bund) Germany – Presentation to ISSA ICT Conference in Estonia

WEF (2022) Regulatory Technology for the 21st Century – World Economic Forum,

WHO, UNICEF (2020) Global Report on Assistive Technology, World Health Organisation and the United Nations Children's Fund, Geneva

Acknowledgements

The author would like to thank Veronika Wodsak, ILO Social Protection Policy Specialist, Rodrigo Assumpcao, ILO Social Protection Management Information Systems Specialist, and Luis Frota, EU-China Project Manager for their contribution to the paper.

This working paper is produced under the EU-China project “Improving China’s institutional capacity towards universal social protection”, funded by the European Union. The views expressed in this publication do not express the opinions of the European Union.



**Funded by
the European Union**

► Advancing social justice, promoting decent work

The International Labour Organization is the United Nations agency for the world of work. We bring together governments, employers and workers to improve the working lives of all people, driving a human-centred approach to the future of work through employment creation, rights at work, social protection and social dialogue.

Contact details

ILO Regional Office for Asia and the Pacific
CO-Beijing

ILO Country Office for China and Mongolia
1-10 Tayuan Diplomatic Office Building
Beijing 100600
China
T +86 10 6532 5091
beijing@ilo.org



I S B N 9789220386187



9 789220 386187