Robodebt: A Socio-Technical Case Study of Public Sector Information Systems Failure

Roger Clarke
Xamax Consultancy Pty Ltd, Canberra, UNSW Law, Sydney, and
ANU School of Computing, Canberra, Australia
Roger.Clarke@xamax.com.au

Katina Michael
School for the Future of Innovation in Society and School of Computing and
Augmented Intelligence, Arizona State University, Tempe, USA

Roba Abbas
School of Business, University of Wollongong, Australia

Abstract

Large-scale public sector information systems (PSIS) that administer social welfare payments face considerable challenges. Between 2014 and 2023, an Australian government agency conceived and implemented the Online Compliance Intervention (OCI) scheme, widely referred to as Robodebt. The scheme's primary purpose was to apply digital transformation in order to reduce labour costs and increase recovery of overpayments. Among its key features were a simplified, but inherently erroneous, estimation method called income averaging, and a new requirement that welfare recipients produce documentation for income earned years earlier. Failure by welfare recipients to comply with mandates resulted in the agency recovering what it asserted to be overpayments. This article presents a case study of Robodebt and its effects on over 1 million of its clients. The detailed case study relies on primary data through Senate and other government hearings and commissions, and secondary data, such as media reports, supplemented by academic sources. Relevant technical features include (1) the reliance on the digital persona that the agency maintains for each client, (2) computer-performed inferencing from client data, and (3) automated decision-making and subsequent action. This article employs a socio-technical systems approach to understanding the factors underlying a major PSIS project failure, by focusing on the system's political and public service sponsors; its participants (users); the people affected by it (usees); and the broader economic, social, and political context. Practical and theoretical insights are presented, with the intention of highlighting major practical lessons for PSIS, and the relevance of an articulated socio-technical frame for PSIS.

Keywords: IS failure, Socio-technical systems, Case study, Public sector IS, Digitalisation.

1 Introduction

This article presents a detailed case study of the Online Compliance Intervention (OCI) scheme, commonly referred to as Robodebt. The Australian government agency responsible for the OCI was the Department of Human Services (DHS). The project was intended by as a form of transformative digitalisation. This study spans the period 2014-23, from the conception of the OCI scheme, to the pilot in 2015, the launch in 2016, the operational phase in 2016-19, through to a series of official reviews and examinations that commenced in 2017

Received 7 Sep 2023, accepted 4 July 2024 after 1 round of review with Karlheinz Kautz as accepting Editor

but concluded only in 2023. A significant element of the scheme was debt recovery letters that were, in a large proportion of instances, inappropriately, sent to more than 1 million clients and ex-clients, in most cases generated automatically, with media reports of as many as 10 follow-up letters. Debts were raised against 433,000 individuals, about 2% of the Australian adult population. After the government was eventually forced to admit that the scheme was illegal (Carney 2019), it undertook "reimbursement of [AUD] 746 million to some 381,000 affected individuals ... writing off claimed debts amounting in total to [AUD] 1.751 billion" (RCR 2023, p.xix).

1.1 Previous Work

We present in this preliminary section a chronological account of peer-reviewed publications on Robodebt between 2017 and 2023. Not long into the operation of the scheme, two articles appeared that raised awareness of the issues plaguing the Australian Government initiative. Miller (2017, p.54) wrote the first case study on Robodebt focusing on affected communities, identifying multiple stakeholders active on the issues, including "journalists, community activists, Centrelink payment recipients, lawyers, legal assistance organisations, industry and professional peak bodies, academics and citizens". In Macleod (2017), a senior executive in the Commonwealth Ombudsman's Office shed light on some of the preliminary "lessons learnt". The five major themes were the need for: (1) better design of digital platforms, (2) transparency, (3) user support, (4) external perspectives, and (5) guidance and oversight. In the same year, Hogan-Doran SC (2017) wrote on the relationship between automation, algorithms, and artificial intelligence (AI). She posed these questions about Robodebt: "who is the decision-maker?" and "to whom has authority been delegated?". To the latter, she identified the following possibilities: (a) the programmer, (b) the policy-maker, (c) the authorised decision-maker, or (d) the computer itself. In relation to (c), Hogan-Doran (2017) suggested grounds on which outcomes from an algorithm can be challenged, such as that the decision-maker "breached a mandatory statutory procedure or obligation" (pp.7-9).

During 2018, peer-reviewed articles on Robodebt were scarce. The scheme was fully operational and expansion had been announced. Sufficient consideration had not, however, been given to the many issues that were already attracting media attention, many featuring first-person accounts of unwarranted debt recovery letters being received.In 2019, Park & Humphry published a piece entitled "Exclusion by Design" that focused on the social, digital and data inequalities in two cases, one of which was Robodebt. Among the important findings was that an over-reliance on data, inadequate user testing, and the "re-delegation of tasks and responsibilities through automation" can by-default exclude some people eligible for welfare payments (p.946). In Carney (2019), a long-serving member of the Administrative Appeals Tribunal (AAT) called Robodebt illegal, unlawful and unethical, claiming that the scheme was fundamentally flawed at seven levels including its inadequate attention to standards; accountability measures; ethics; transparency; "independence and funding security" (p.5); testing and advocacy; and rights of individuals.

During 2020-2021, many socio-political and legal perspectives were published on Robodebt. Some emphasised the "automated welfare state" (Whelan 2020, Noone 2020, Braithwaite 2020, Mann 2020). Whiteford (2021) published "Debt by Design" (p.340), and Hanks (2021) & White (2021) wrote on administrative law and welfare rights with respect to Robodebt. White (2021) focused on the idea of "authorization and accountability of automated government decisions" (p.84). Marjanovic et al. (2022) described the "social consequences of

automated algorithmic decision-making" and addressed the issues of "algorithmic harm" and "algorithmic injustice" (p.269), while Akter et al. (2021) emphasised algorithmic bias in data-driven innovation, focusing on data, method and societal biases referring to the result of Robodebt's attempted scheme as "algorithmic fallout" (p.8).

In 2022, automated decisions were the focus of two papers on "digital inclusion", and intersectionality with respect to the "disadvantaged" and those living with disability (Goggin & Soldatić 2022, Ng & Gray 2022). With the scheme now withdrawn, post-mortems on Robodebt began to surface, with calls for access to algorithms used in such schemes, and demonstrations of the legacy issues that the scheme had caused with respect to subsequent process changes within the agency (Ray et al. 2022, Wright & Ng 2022). Another paper pointed to the bureaucracy and the stigmatisation of citizens (Graycar & Masters 2022). Rinta-Kahila et al. (2022), completed in mid-2021, prior to the conclusive court-case and the Royal Commission hearings and Report, adopts algorithmic decision-making (ADM) as its theoretical frame.

By 2023, official reviews and examinations of Robodebt were coming to an end, but academic articles continued to appear. Lindebaum et al. (2023), for example, argued that algorithms in government services would cause the withering of human values. Cornish (2023) summarised record-keeping deficiencies, and Mead & Neves (2023) focused on the critical public response to algorithmic decision-making, comparing the UK and Australian contexts from a sociological perspective. Naylor (2023) linked Robodebt to Kafka and called out the "institutional absurdism" that took place. Nikidehaghani et al. (2023) examined the question of algorithmic accountability, and Twomey (2023) identified the loss of "government integrity" as a major concern.

1.2 Objectives

While the above studies shed light on various facets of Robodebt, the need exists for a comprehensive account of the scheme, in the form of a detailed case study. A theory-agnostic approach would be highly beneficial; but, in practice, theory-laden views and words are unavoidable. Many different approaches can be taken, and many theoretical frames and lenses are possible. We chose to focus on socio-technical dynamics and considerations, and to present the story largely chronologically rather than thematically, with the intention that the story-telling reveal socio-technical challenges and lessons that can inform the design of future public sector information systems (PSIS). This is critical because the scale and scope of 21st century IS in general, the increasing incidence of automated decision-making and action, and the lack of transparency of some of the forms of information technology (IT) being applied, particularly Machine Learning aspects of Artificial Intelligence (AI/ML), give rise to far more substantial impacts and implications than was the case during the second half of the 20th century. The breadth of vision of IS practitioners and researchers must change accordingly, to adopt a comprehensive socio-technical view that allows for systems risks to all affected parties to be identified and assessed, and then avoided, prevented or at least mitigated, and system designs to be improved based on lessons learned from the Robodebt experience.

This article accordingly presents a detailed, socio-technical case study of substantial changes made to a large-scale PSIS. The objectives of the study are as follows:

1. To apply socio-technical systems theory to a complex public-sector information system.

2. To understand the factors, decisions, events, and corresponding dynamics that resulted in the OCI scheme failing to achieve its objectives.
3. To present the key socio-technical lessons toward enhanced public sector information systems design that can be utilised by researchers and practitioners alike to inform future PSIS design decisions, and as an educational resource pertaining to PSIS.

With some important qualifications, the authors have endeavoured to present evidence, and provide access to the primary sources, drawing on socio-technical theory with direct relevance to IS practice and practice-oriented IS research.

In section 2, we present literature reviews relating to digitalisation in the public sector and public sector information systems in the Australian context. The theoretical backdrop in socio-technical systems (STS) theory is then presented, which is subsequently utilised as the basis for framing the case study. The method is presented in section 3, including the case study setting, research approach and data collection and analysis details. Section 4 offers a comprehensive Robodebt socio-technical case study analysis spanning a 7-year period culminating in the scheme's collapse. Section 5 identifies practical and theoretical implications in the form of socio-technical lessons contributing to enhanced public sector information systems design, followed by future research opportunities in section 6 and concluding remarks in section 7.

2 Literature Review

2.1 Digitalisation in the Public Sector

Applications of IT in business and government began in the 1950s with the automation of existing systems, traditionally known as manual systems. The focus quickly shifted to the rationalisation of existing processes, to take advantage of the new possibilities that technologies had created. Over time, the emphasis shifted to business process reengineering (BPR) (Hammer 1990), and then to organisational and sectoral transformation (Venkatraman 1994). Most recently, the capacity of IT to achieve organisational disruption has been championed (Bower & Christensen 1995, Lyytinen & Rose 2003, Christensen et al. 2015).

In parallel, the combination of computing and telecommunications enabled the scope of IT-supported systems to broaden from organisational sub-units, via cross-organisational functions, to enterprise systems spanning entire organisations. It then broke beyond the boundaries of a single organisation into inter-organisational systems (1-to-1), and to multi-organisational systems in star, chain and network configurations. An often-overlooked development was the emergence of extra-organisational systems (Clarke 1992b), which extended beyond organisational boundaries to encompass independent individuals. At first, those people had to be provided with access to network-connected devices. During the last decades of the 20th century, however, increasing numbers of people acquired desktop and laptop devices that could be harnessed into organisation-managed systems, and the first decades of the 21st century have seen the proliferation of handheld mobile phones and tablets and their exploitation as an extension of organisations' own information infrastructure. During these stages of maturation, the technical challenges in systems development came to encompass organisational and individual human behaviour, such that system sponsors needed to adopt a socio-technical view (Clarke & Davison 2020, p.489, Abbas & Michael 2022). It was no longer solely about hardware facilitating network connectivity or storage, nor the software that could be deployed on the infrastructure at

scale, but also about the interplay of business structures, business processes, and humans and their corresponding relationships, behaviours, beliefs and values in the context of a social subsystem (Bostrom & Heinen 1977, p.25, fig. 2; Abbas & Michael 2022). The socio-technical systems perspective is discussed in greater detail in 2.3 below.

A concomitant development throughout the growth of such systems has been the digitisation of data, initially through the purposeful capture of data of specific relevance to an objective, and progressively as a by-product of other actions. Data capture has also been increasingly outsourced, so that organisations benefit from data-input by unpaid participants in systems, referred to in Abbas et al. (2022, p.78) as "customer work". By about the turn of the current century, a large proportion of the data desired by organisations was digital by default, rather than having to be converted from other paper-based formats.

The availability of vast quantities of data has enabled organisations to achieve efficiencies by no longer dealing directly with other entities, and particularly not with individual people. Organisations find it far more economical to transact with, and impose surveillance on, a digital persona in preference to a person (Clarke 1994a, 2014). The term datafication was coined by Cukier & Mayer-Schönberger (2013) as part of those authors' inculcation of excitement about big data as the harbinger of a post-rationalist world (see also, Lycett 2014, and Newell & Marabelli 2015). The steadier concept associated with the term digitalisation describes the shift from the interpretation and management of the world by means of human perception and cognition of phenomena, to processes that are almost entirely dependent on digital data (Brennen & Kreis 2016). Where the entities being interpreted and managed are people, the term carries overtones of objectification, as the human aspects of interactions are abandoned.

For-profit business enterprises are largely unconstrained in their application of digitalisation by public policy considerations. This reflects their role as drivers of growth, and the assumption of markets being sufficiently competitive that consumers have alternatives among which to choose. Public sector organisations, on the other hand, operate in an environment in which there is an expectation that greater care will be taken about the direct impacts of transformative and disruptive IT-based interventions, and about their indirect implications or potential for unintended consequences among stakeholders. Those impacts and implications are commonly felt by users, who are the people inside and outside the organisation who are direct participants in the system. Too often overlooked are people who are indirectly but materially affected, usefully referred to as usees (Berleur & Drumm 1991 p.388, Clarke 1992b, Fischer-Huebner & Lindskog 2001, Wahlstrom & Quirchmayr 2008, Baumer 2015). Examples of usees include people who have entries in criminal intelligence and credit reporting databases, and those who are dependants of welfare recipients.

The term stakeholder was coined as a counterpoint to shareholder, to bring into focus the interests of parties other than the corporation's owners (Freeman & Reed 1983, Laplume et al. 2008). In corporate and government practice, the term stakeholder is commonly narrowed to sub-organisations of the sponsor of an intervention. Its appropriate interpretation, however, encompasses organisation-external users and usees. The stakeholder notion has been subjected to further analysis and discussion. Importantly, stakeholder salience theory distinguishes stakeholders based on power, legitimacy and urgency (Mitchell et al. 1997). An approach based on ethics might dictate that legitimacy has primacy. On the other hand, a strong tendency has been evident, in industry and government practice, and in research

publications, for attention to be paid only to the interests of those stakeholders that are capable of significantly affecting the success of the project – as perceived by the project sponsor (Bryson 2004). The interests of the sponsoring organisation are treated as paramount, whereas the interests of users and usees that have power are relegated to the role of constraints on the achievement of the primary organisation's objectives, and the interests of users and usees that lack power are commonly marginalised or ignored.

In Clarke & Davison (2020), stakeholder theory was applied and extended, to present a theory relating to the researchers' perspective. Research into real-world phenomena involves carefully-conducted observation of some object of study. Objects of study relevant here, such as large-scale, data-rich IS, involve multiple entities, each of which perceives the phenomena in their own way. A stakeholder perspective is the viewpoint adopted by a stakeholder in a particular activity, reflecting that stakeholder's perception of phenomena within the relevant context, the stakeholder's value-set, and the interests that the stakeholder seeks to protect and advance.

The central proposition of researcher perspective theory is that research is seldom conducted in a holist or universalist manner, reflecting the interests of all stakeholders at once. Much more commonly, the perspective of one party is adopted. Systematic studies of IS research literature have shown that the large majority of published IS research adopts the perspective of a single stakeholder, and that, in the large majority of that research, the favoured stakeholder is the IS sponsor (Clarke 2015, 2016, Clarke et al. 2020). Researcher perspective theory identifies benefits arising from single-perspective IS research that reflects the interests of a stakeholder other than the system sponsor. Further, even greater benefits are achievable by dual-perspective research designed to benefit both members of a dyad. Broader, multi-perspective research is challenging, but highly desirable, and, in some circumstances at least, it is feasible.

The contemporary context of IS includes reach well beyond organisational boundaries. It involves substantial impacts on users and implications for usees, overlaid with reliance on digital personae and data analytics. This is combined with increasing degrees of automation of inferencing, decision-making and even action. We contend that the nature of systems is now such that it is essential to apply broad interpretations to the scope of IS, IS practice, and practice-relevant IS research. An adequate understanding of large-scale systems is impossible if personal, group, organisational, inter-organisational, extra-organisational, regulatory or policy factors are excluded from the field of view.

2.2 IS in the Australian Public Sector

Digitalisation depends on data not only being in digital form, but also being reliably associated with particular real-world entities or identities. A considerable amount of public sector activity is accordingly concerned with the administration of relationships between government agencies and people, with governments striving to establish and maintain workable identification schemes (Michael & Michael 2006). Some countries have general-purpose identifiers; others use identifiers across a cluster of related functions; while many depend primarily on agency-level or program-level identifiers (Lunde 1980, Michael & Michael 2006). In Australia, successive attempts to establish a national identification scheme have failed (Clarke 1987, Michael 2003). However, a multi-purpose identifier called a Tax File Number (TFN) was established in 1988, under the administration of the Australian Taxation Office (ATO, Clarke 1992a). The TFN is in ongoing use in public sector financial programs,

and in a range of private sector contexts that have continued to expand throughout its first 35 years of operation.

Organisations began by gathering data for specific purposes, but have long since resorted to the consolidation and re-purposing of data gathered by many organisations for many different purposes, often with little account taken of incompatibilities among datasets, and the impacts and implications of such activities. One use of the TFN is for data-matching schemes, which involve the comparison of machine-readable records from separate sources that contain personal data that is purported to relate to the same person. Data-matching is a longstanding dataveillance technique much-used by government agencies in various countries since the mid-1980s, particularly to help in addressing financial waste and fraud (Clarke 1994b). In Australia, many such schemes are largely unregulated, and subject only to a non-binding guideline published by the data protection oversight agency. One series of very large-scale programs caused considerable public concern, and as a result was subjected to a modestly formalised regulatory environment, the Data-Matching Program (Assistance and Tax) Act 1990 (DMP).

Since about 1990, there has been a strong trend in Australia towards large-scale government initiatives, concentrating programs within super- or mega-portfolio agencies, but also with some degree of attention to purchaser-provider relationships. Both are evident in the social welfare context, where policy has been separated from the operational aspects (Podger 2023). The operational scale is vast, with total social security and welfare expenditure representing over 30% of the Australian Government's budget (Klapdor 2020). The major schemes assist 2.6 million people of working age (13 percent of those age-groups and 10 percent of the population) and 2.5 million people eligible for Age Pension (a further 10 percent of the population). To underline the social significance of this, "[f]or the poorest 20% of Australian households, social security payments provide more than 70% of their income", and most recipients' earned incomes are highly variable across each year (Whiteford 2022).

Policy in relation to the more than 100 support programs continues to rest with specialist agencies, in a variety of portfolios. The primary policy agency, the Department of Social Services (DSS), is responsible for unemployment benefits (including Newstart and Jobseeker), the age pension, disability support and crisis payments in relation to fires, floods, the COVID pandemic, etc. Military service pensions policy rests with the Department of Veterans Affairs, and childcare subsidy was at the time with the Department of Employment and Workplace Relations, whereas student support (Austudy and Abstudy) rested with the Departments of Education and of Social Service, and farm household allowance policy with the Department of Agriculture, Water and the Environment (SA 2022).

Although policy responsibility vests in specialist agencies, the administration of social security is the responsibility of a dedicated agency called Centrelink, formed in 1997. It is a services-, data- and identifier-hub, handling all payments to welfare recipients, all interactions with them, and associated oversight activities. In 2011, Centrelink and the national health insurance service, Medicare, were combined into a new super-agency, the Department of Human Services (DHS), branded since 2019 as Services Australia. An enormous diversity exists, of programs, needs, clientele, and personal and regional circumstances. DHS delivers critical financial support to Australia’s most vulnerable populations, such as people with significant physical disabilities or mental health conditions, and single parents. Some people are in multiple such categories. Those living in remote and

rural Australia (about 2.5 million people or 10% of the population) have limited access to local services that allow for direct human interfacing with services personnel. Successive generations of technology have been harnessed in support of Centrelink's work, with the agency having operated one of the nation's largest IT facilities since the 1960s. The scale of the IS and database supporting client management, entitlements, payments and financial management is very large by world standards.

The scores of complex, longstanding and frequently-modified welfare schemes are designed to protect against waste and fraud perhaps as much as to address economic needs. Centrelink operates distributed, outsourced call-centres, physical service-centres (publicly declared as numbering more than 300), plus hundreds of access points and agents, together with some mobile services. Frontline staff are beset with enormous challenges. They are expected to master an array of disparate policy and legal details and interact with large numbers of individuals in need, some with complex life stories. Diseconomies of scale and scope are in play. The complexities, ambiguities, inconsistencies, conflicts and discretions within written policies, and the diversity of circumstances, combine to give rise to misunderstandings and errors, and inevitably to recriminations, requests for review and appeals. There are many assumptions made when large-scale public sector IS are rolled out, including that each relevant person in Australia (1) has access to electronic communications, and in particular the Internet, when they need it; (2) knows how to, or can quickly learn how to, navigate each specific online service to request support for the needs they have and to comply with agencies' demands for data; and (3) has the language proficiency, cognitive capacity and educational level needed to fill out forms online, and scan and attach copies of documents, without direct human support.

Not only does broad scope exist for mistaken assumptions, misunderstandings, inefficiencies and errors, but fraudsters are also naturally attracted by opportunities the scheme offers them, and some genuine recipients are tempted to take advantage of loopholes. Considerable effort is accordingly invested in preventing unjustified and excessive payments, in discovering where overpayments have occurred, and in seeking restitution. Official estimates of the scale of overpayments have generally been in the range AUD 1.5-4.0 billion p.a. (i.e., 1.0-2.5% of about AUD 160bn p.a. total payments) (Podger 2023, p.16)). This is contested, however, with estimates ranging down to less than one-tenth of those of the agency.

2.3 Socio-Technical Systems Framing

Despite considerable investment in IT and IS, there have been notable examples of public sector information system failures in Australia. This is widely assumed to be due to excessive emphasis on technology and its purported benefits, and lack of attention to social and societal factors and implications. Socio-technical approaches going beyond the technical system and incorporating social subsystems are essential to adequately capture system complexity and account for the multitude of stakeholders. Socio-technical systems theory and related design methods are built on open systems thinking (von Bertalanffy 1950) and acknowledge that systems comprise technical components working in combination with social and/or human elements (Emery 1959, Abbas & Michael 2022). The theory offers a principled approach to the implementation of socio-technical interventions and (re)-design initiatives by seeking balance between humanistic values and technological capabilities (Cherns 1976, Bostrom & Heinen 1977, Cherns 1987, Trist 1981, Mumford 2000, Mumford

2006). Socio-technical theory has been embedded in various methods (e.g., Checkland 1981, Avison & Wood-Harper 1990). The authors have elsewhere shown that developers of public sector information systems need to adopt design methods that reflect socio-technical insights (Abbas et al. 2021). In assuming this broader stakeholder perspective, as noted by Miller (2017), rather than defaulting to the viewpoint of the IS sponsor, the socio-technical perspective calls for a balanced approach considering the interactions between the social and technical elements comprising the system in question.

Socio-technical thinking therefore places emphasis on the human-centered approach that is key to socio-technical studies (Norman 2013, ch.6; IxDF 2021). Bostrom & Heinen (1977) drew attention to the narrowness of focus inherent in the technical-system approach to an MIS as a 'work system', in that only technology and tasks were treated as being within the scope of IS design. Those authors proposed that the social-system aspects of people and organisational structure have a significant impact on the effectiveness of an IS design, and that IS designers therefore need to consider all four aspects in an integrated manner.

The Bostrom & Heinen insights emerged within the context of intra-organisational systems. Nearly five decades later, however, inter-organisational and extra-organisational IS demand an enhanced model. The people within the intra-organisational component of the overall system are users and their managers. In contemporary open systems, extra-organisational users perform 'customer work'. Further, beyond the overall system's boundaries, usees are affected by its behaviour. Impacts on external users (part of the extra-organisational system), and on usees (external to the system as a whole), also need to be defined as being within-scope for system designers. Figure 1 presents an enhanced version of such an open socio-technical system, showing those additional entity-categories, and their locations relative to the organisational boundary and the system boundary. Although some exclusively technical problems were identified, it was through a socio-technical examination that problems were observed relating to (1) the interaction of intentions, (2) behaviours of various stakeholders, (3) the absence of any apparent application of well-known design principles, (4) contextual considerations, and (5) program implementation.

A range of techniques exist that assist organisations to ensure effective designs reflecting socio-technical and human-centred principles. The field of participatory systems design has a long history (Land & Hirschheim 1983), with occasional revivals in such forms as co-design (Liu et al. 2002, Piller et al. 2004) and co-creation (Zwass 2010). The involvement of users is challenging, not least due to their diversity and their lack of familiarity with design processes. For many organisations it has proven impractical to include users, at least in part because of entrenched technocratic and other deep-seated values within design teams, and the resource investment required to involve users in the system design process. Usees, meanwhile, are usually disregarded as being inconsequential to design processes.

The increased emphasis in recent years on design science does not appear to have eased the predominance of organisation-centricity and technocracy. Participation is not non-existent, but it remains marginalised, with language tending to depict designers and users as being on opposite sides of conversations rather than collaborating as team-members. Clarke & Davison (2020) have drawn attention to the possibility of, and need for, participative design science: "Beyond asking 'What is a feasible and effective process for the design of a particular system or category of systems?' (cf. Guideline 3 of Hevner et al., 2004), research questions of the following form can be investigated: 'What is a feasible and effective process for reflecting

the perspectives of all parties in the design of a particular system or category of systems?" (p.492).

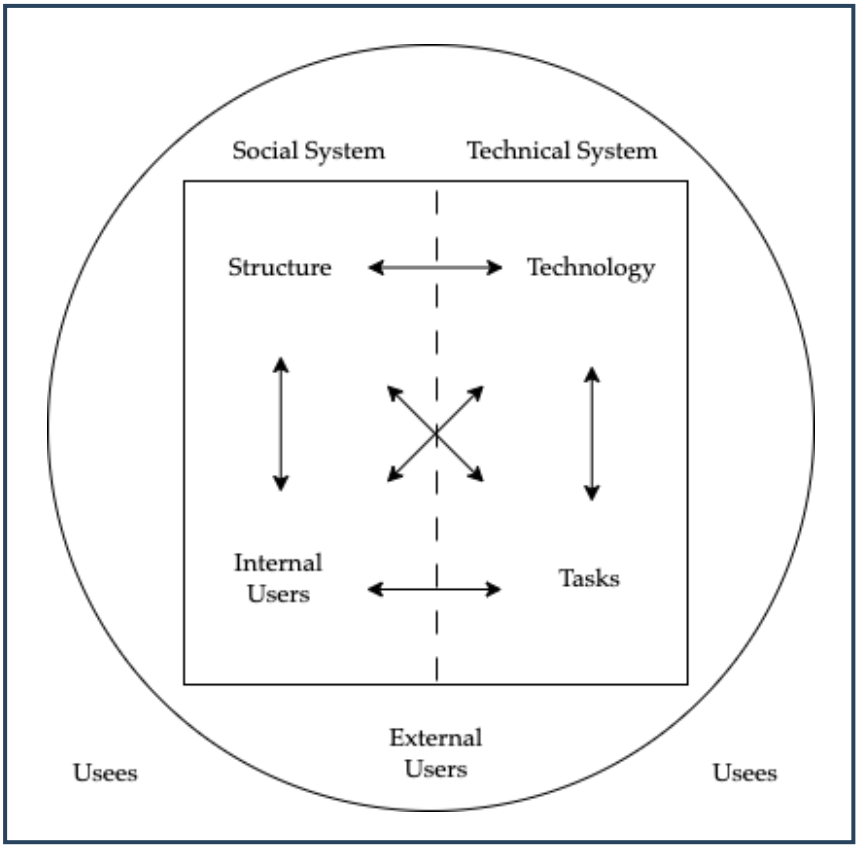

Figure 1: An Open Socio-Technical System incorporating all stakeholders.
Extended version of Bostrom & Heinen (1977, p.25, Fig.2)

We now describe the research method that we adopted in order to present a case study within the socio-technical framing outlined in this section.

3 Method

3.1 Case Study Setting

The research reported here employs a case study of the Online Compliance Intervention (OCI) scheme, more commonly known as Robodebt. A single-case study approach is an effective research method where the primary intention is to work within a theoretical frame and seek to explain or interpret a single historical episode, and care is taken in drawing inferences about the applicability of the outcomes beyond the individual case (Yin 2017). The scheme's purpose was officially depicted as being "to protect the integrity of government expenditure through income support payments" (Omb 2017, p.4) or, less vaguely, to save labour costs (Omb 2017, p.5) and increase recovery of overpayments (SCA 2017, p.2). The OCI was to harness the power of automation by applying algorithms that would overcome the need for human intervention by government staff in the determination and communication of debt recovery demands to clients.

In choosing a theoretical approach to underpin the qualitative study, we sought a theory that had previously been applied to organisational systems, that would incorporate relevant social, technical and environmental factors, and that would thereby shed light on the comprehensive failure of a major adaptation of a large-scale PSIS. The socio-technical systems approach satisfied those requirements. It was used to evaluate the amended system that operated 2016-19, including comparison against the system that operated prior to 2016 and that was reverted to at the end of 2019.

3.2 Research Approach

A study of a project intended to enhance a large-scale PSIS needs to cope with considerable complexity. The typical approach would involve observation through significant fieldwork, which would require government permission and substantial human resources. However, the Government was not transparent about its practices, and the more it became known that major errors had been made in relation to the program, the less observers were able to learn. The final Report of a Parliamentary Committee on the matter concluded that the Government not only made many errors in relation to the program itself, but also on multiple occasions practised "the deliberate withholding of information" (SCA 2022, p.17). Access to DHS records was not feasible, because the agency's operations are not transparent. Aided by the dysfunctionality of the country's Freedom of Information mechanism (Knaus & Bassano 2019, CPI 2022, Bajkowski 2023), DHS actively resisted requests for access to information not only by its clients, but also by advocates and lawyers acting on their behalf, by the Ombudsman, and by a Parliamentary Committee (e.g. SCA 2017, pp.39,40,57; as noted in RRC 2023, pp.88-89,166,208,214,461).

A case study method (Yin 2017) was adopted, because it allowed for the incorporation of a diverse range of qualitative sources that offered a multi-perspective view of the design, course and impacts of the project over time. We situate the project within a frame of the application of transformative digitalisation in a government agency, adopt the socio-technical approach as discussed above, and use a narrative style of presenting evidence on a chronological timeline to provide a sequence of events that culminated in project failure, court cases and a Royal Commission. The unit of study is a project, OCI, which made major modifications to the social welfare administration system operated by a large Australian government agency, which system is a PSIS that involves many stakeholders, many of whom are external users and usees. By adopting a socio-technical approach, a technical view of the project is avoided. A technical approach would have a strong focus on automation and overlook or even preclude humans-in-the-loop.

3.3 Data Collection

Although quantitative data needs to be used to the extent practicable, research of the nature of this study is dependent largely on qualitative data, employing qualitative analysis techniques (Creswell & Creswell, 2018). The study accordingly drew on multiple primary and secondary sources of evidence, listed in Table 1. A Royal Commission and even Senate Committees can rely on gaining access to substantial and diverse sources of evidence inclusive of (1) holding formal public and private hearings (2) issuing notices to organisations and individuals to make statements or provide documentary evidence (3) conducting interviews with stakeholders, (4) commissioning primary research, and (5) inviting public submissions. Preference was given to the most authoritative sources. Where no such sources were available, sober news media have been cited to supplement the

evidence. The data collection and analysis process commenced in January 2018, and was conducted iteratively as sources became available. The final Report of the Royal Commission in July 2023 confirmed and provided some further articulation of that analysis. Stylistically, the narrative relies on thick descriptions and elucidations (Ponterotto 2006).

	Official Sources of Evidence (in chronological order)
1	Report by the Australian Ombudsman, April 2017 (Omb 2017)
2	Report by the Senate Community Affairs References Committee (SCA), June 2017 (SCA 2017)
3	Response by the Government to SCA's 2017 Report (GR 2017)
4	Prygodicz v Commonwealth of Australia (No 2) [2021] FCA 634 (Pry 2021)
5	Report by the SCA, May 2022 (SCA 2022)
6	Report of the Royal Commission into the Robodebt Scheme, July 2023 (RCR 2023)

Table 1: Primary Sources

The first published report was on investigations by the Ombudsman (Omb 2017). It was limited to the purported debts raised and excluded consideration of the policy rationale, the debt raising and recovery program, procedural fairness, and the use of external debt collection agencies. The Ombudsman's Report was expressed in a manner noted by media reports to be very sympathetic to the agency and the project, despite the litany of problems that it uncovered. This was further evidenced by the very positive reaction by DHS to the Report (Omb 2017, pp.45-46), and use of the document by that agency as a major part of its defence against the subsequent Senate Committee Report (GR 2017). The Royal Commission found that "DHS and DSS [senior executives] engaged in behaviour designed to mislead and impede the Ombudsman in the exercise of his functions" (RCR 2023, p.208). A lengthy description of the two agencies' exercise in regulatory capture of the Ombudsman is on pp.208-226. The conclusion was that "... the circumstances ... give rise to a reasonable perception that the Ombudsman's Office conducted [that] investigation in a way which allowed DHS to influence the content of the resulting Investigation Report in order to further DHS's own interests, thus compromising the independence of the investigation" (p.585). The Ombudsman's Report did, however, provide some information that had previously been suppressed, and it did result in corrections to some of the multiple small-scale deficiencies.

The second authoritative source is a Senate Committee Report (SCA 2017). The Senate Committee had a much broader Terms of Reference than the scope of the study undertaken by the Ombudsman, and encompassed the scheme's error rates, its compliance with legal, regulatory, and public policy requirements, and its impacts. In Australia, the Government is formed in the lower House of Representatives, whereas the Committee reflected party representation in the Senate, with a mix of Government and opposition members and a chair from the cross-bench Greens Party (whose policies, other than in relation to environmental matters, can be depicted as being in the social democratic tradition). However, that first major Report elicited an entirely dismissive response from the Government (GR 2017). Subsequent sources, of less value for the purposes of the case study, include a series of reports from a second Inquiry by the same Senate Committee, in 2020-22, including the final report (SCA 2022).

The third key source is the judgment of a senior court in a subsequent court-case (Pry 2021). In addition, some publicly available sources from the agency itself were used, together with media reports that provided information that assists in understanding the business process and its outcomes. Following the demise of the scheme, and a change of Government, a Robodebt Royal Commission (RRC) was established. Transcripts and some additional documentation emerging from the RRC during 2022-23 shed additional light on a number of aspects, as did the Commission's final Report (RCR 2023).

Case studies, methodologically, can also be considered "stories of change" (Simister 2017). The following section presents the relevant aspects chronologically, from early 2015 to late 2023. Presentation as a narrative allows an anticipatory tone to delve more deeply into particular elements of the story that shed light on the events. The material will show that, as the project unravels, the hopeful application of technology to help the Government improve its promise to Australian taxpayers gives way to: (1) questioning how fundamental flaws went unnoticed and/or unaddressed for so long, (2) an emergent understanding of staff toil and the human toll, and then (3) widespread questioning about the apparent absence of accountability in administration.

3.4 Data Analysis

This article uses a chronological timeline to report on significant events throughout the decade during which the OCI project was conceived, articulated, implemented, operated, withdrawn and autopsied. The chronological approach enables a 'before-during-and-after' sense of the scheme that is emergent, but also facilitates an anticipatory manner. It provides a clear view of the existing mode of operation, and of the design of the future mode of operation, and even allows for backcasting (Dreborg 1996) to the time when the degree of automation was much more limited (Abbas & Michael 2022). Events were analysed using the socio-technical systems approach, whereby the interplay is considered among social, technical and environmental aspects of a PSIS (Abbas et al. 2021). For example, where users and usees were discussed, this was always as part of the social subsystem within the context of the technical subsystem and the environment. When automated decision-making is referenced, it is in the context of its legality and/or the context of the humans it impacted when the algorithm sent debt recovery letters out automatically or inferred a person should be considered a welfare cheat (Nikidehaghani et al. 2023). This article offers the most comprehensive reference list and bibliography on the Robodebt case study, and its tabular and visual representations assist data analysis by capturing and summarising key aspects. In addition, the authors' comments in this case study draw on their backgrounds not only as academics, but also as practitioners, and in two instances also as contributors within consumer advocacy organisations.

4 Case Study Analysis

This section traces the history of the Online Compliance Intervention (OCI) project, in the chronological sequence outlined in Table 2. Further details and analysis are available in the Working Paper from which this article was developed (Clarke et al. 2024). The sources use the terms OCI and Robodebt interchangeably. However, the agency used various names over time for various aspects and stages of the overall project, including Welfare Payment Infrastructure Transportation (WPIT), Strengthening the Integrity of Welfare Payments

(SIWP), Employment Income Confirmation (EIC) and Check and Update Past Income (CUPI).

Year	Activity
2014	Jun – DHS Minute: 'Concepts for Future Compliance Activity' Nov – Internal legal advice the scheme is unsupported by law
2015	May – Budget Appropriation July – Two-Stage Pilot Scheme
2016	**July – Initial Implementation** September – Full roll-out December – Surge of media coverage
2017	Ongoing media coverage and public anger Continued illegal and harmful operation April, June – First formal Reports
2018	Continued illegal and harmful operation
2019	Continued illegal and harmful operation February – First successful court challenge November – Second, decisive court challenge **November – Announcement of the scheme's Withdrawal**
2020	May – Government acceptance that the method was unlawful July – Commencement of repayments
2021	November – Withdrawal of the defence against a class action
2022	May – Change of Government June – Finalisation of the court case August – Commencement of the Royal Commission September – Completion of repayments to clients October – Cancellation of the outstanding 200,000 debts
2023	March – Completion of the Royal Commission hearings July – Publication of the Royal Commission Report

Table 2: Timeline of the Robodebt Project

This section commences by summarising relevant predecessor activities. It then outlines the project's claimed and apparent purposes and the design features intended to fulfil them. The implementation and operational phases are described, followed by evidence of the scheme's impacts, and – despite the Government's sustained denial of the scheme's misconception – its deficiencies, illegality and harmful effects, followed by its eventual demise and the subsequent repercussions. The scope of the case study is very broad, because an intervention of this scale cannot be understood by limiting the field of view to IT, nor to the intra- and inter-organisational elements of the IS, and instead needs to encompass all environmental factors that were material to the process and outcomes.

4.1 Prologue: Data Matching – 1990 to 2014

Data is gathered by DHS from its clients. DHS also has substantial powers to demand information from other sources, such as organisations for which welfare recipients perform work and from which they receive payments. In addition, using specific authority enacted in 1990, "DHS began data matching activities in 1991" (Omb 2017, p.5, fn7), and it "has conducted [Pay As You Go] PAYG data matching activities with the [Australian Taxation Office] ATO since 2004 ..." (p.5).

"Income support payments are subject to an income test which means that a recipient's fortnightly payment may be reduced once their income reaches a specific threshold" (SCA 2017, p.13). The purpose of data matching with ATO is to check data provided to DHS by clients against that available through the taxation system: "payment recipients must report their income fortnightly ... Where it is found that a recipient has incorrectly reported their fortnightly income, and the correct amount would have affected their entitlement to a payment, a ... debt may be raised" (SCA 2017, p.14)). Discrepancies may indicate that overpayments have occurred, many of which are known to be minor. Many discrepancies result from errors, variously by the client, employers, and DHS. Some are fraudulent. Prior to 2016, investigative work conducted by DHS staff had given rise to over 20,000 compliance notices annually (Omb 2017, p.5). However, other evidence suggests that only about one-quarter of those clients were eventually found to be in debt (SCA 2017, p.17), suggesting that the outcome was of the order of 5,000 enforced debt notices p.a., involving perhaps 0.2% of the client-base of about 2.6 million people.

Although the matching itself had long been automated, the process as a whole in early 2016 continued to involve a considerable amount of manual work that had been found to be necessary to reconcile disparate sources of data. In the spirit of digitalisation, DHS initiated a project with the intention of reducing the manual effort through further application of technology. At the heart of the project was apportionment of the ATO's annual data into 26 equal parts, to provide a fortnightly equivalent. This arrangement, based on the implicit assumption that each client earned income at a steady rate through the year, was commonly referred to as 'income averaging'.

4.2 Conception – 2014-2015

"Robodebt originated as an idea from within the Customer Compliance Branch of the Department of Human Services (DHS)" and was articulated across the 2014-15 financial year (RCR 2023, pp.27-118). The Government's Budget Media Release of 12 May 2015 declared that "The Government has zero tolerance for rorting of our welfare system. [The term 'rorting' is Australian vernacular, meaning to take unfair advantage of a public service, in particular to indulge in mostly-small-time cheating on tax or welfare.] We will put a strong welfare cop on the beat focusing on deterrence, detection, investigation and prosecution to track down suspected welfare fraud and non-compliance. From 1 July 2015, the Government will increase DHS's capability to detect, investigate and deter suspected welfare fraud and non-compliance ... It will achieve net savings of around $1.5 billion" (MRR, 2015).

Evidence to the Royal Commission 7 years later showed that the legal branch of the policy agency, DSS, had provided advice as early as November 2014 that the use of income averaging in the manner proposed "would not be supported by law" (RRC 2022c, p.1349-1351). The Royal Commission found clear evidence that the policy and operational agencies, DSS and DHS, were both pressured by the Minister ahead of the 2015 budget, and that the chief executive of DHS and at least three others of its most senior executives contrived to make it appear that the income averaging approach was lawful. Further, the Royal Commission found that the executives and the Minister, in March 2015, had deliberately misled the Expenditure Review Committee of Cabinet (RCR 2023, pp.57-107). The scheme was approved by Cabinet, and proceeded to design and implementation.

What the idea of 'a strong cop on the beat' meant in concrete terms only slowly became publicly apparent. According to the Ombudsman's Report, the main efficiencies were to be gained by (Omb, 2017, p.5, headings interpolated):

- *[Costless outsourcing of data collection to clients:] DHS no longer using its information gathering powers to request information directly from third parties, such as employers. Under the OCI, it is now the customer's responsibility to provide this information;*
- *[Automation of debt generation and the despatch of debt notices:] the OCI system automatically sending letters to tell customers about the income discrepancy;*
- *[Automation of internal processes:] moving much of the debt management and calculation process online; and*
- *[Costless outsourcing of data entry to clients:] customers entering their information directly into the OCI system.*

A DHS Deputy Secretary stated in evidence to the Senate Committee that "we are trying to eliminate the need for anybody [on DHS staff] to [acquire information from the employer] so that it is easier [for DHS]" (SCA 2017, p.16). The efficiencies were argued to encompass reductions in labour costs significantly greater than the ongoing technology costs, combined with substantial improvements in the identification and recovery of overpayments. Together, these resulted in "forecast ... [AUD] 3.7billion worth of [net] savings ... over four years from 2016–17" (SCA 2017, p.4). The interpretation of the Community and Public Sector Union was that: "[OCI] is a fairly obvious consequence of a department that no longer has the resources to provide effective services. The decision to replace the human oversight of debt recovery with automated data matching was absolutely based on a desire and an imperative to save money" (SCA 2017, p.19).

4.3 The OCI Business Process – 2015-16

A brief description of the core of the Online Compliance Intervention scheme was provided in the Ombudsman's Report (Omb 2017, p.4):

> *[After] the OCI matches the [fortnightly] earnings recorded on a customer's Centrelink record with historical pay as you go (PAYG) income data from the Australian Taxation Office (ATO) [which was the total earnings for a lengthy period, in many cases a full year] ... customers are asked to confirm or update their income using the online system. If there is a discrepancy in the data match, this can result in a debt the customer must repay. Parts of the debt raising process previously done manually by compliance officers within DHS are now done using this automated process.*

Three aspects of that description are noteworthy. Firstly, it misrepresents the 'confirm or update' step which actually required the 'customer' to submit very specific evidence in relation to income earned years earlier, which in many cases needed to be first acquired from their then employer(s).

Secondly, it omits mention of the central feature of the process, which was the agency's use of 'income averaging'. Although Omb (2017) mentioned 'averaging' 43 times on 15 of its 113 pages, it did not examine the process in detail, and relegated the explanation to a footnote (fn.13, p.7):

> *'Averaging' refers to the practice of treating income as if it was earned at a consistent rate over a total period of employment rather than applying the precise amounts against the fortnights in which the income was actually earned. DHS currently applies averaging where a person accepts the PAYG data or does not enter data for all fortnights.*

The Ombudsman's Report concluded that (p.7):

> *We are satisfied that if the customer is able to collect the income information required [sic: the requirement was not merely to collect "income information" but to gather and submit very specific supporting evidence] and enter it properly into the system, the OCI is capable of accurately calculating the debt.*

This accepted the inversion of the onus of proof, which was argued by many to be at least inappropriate and unfair. It also failed to address the most critical circumstance, representing what appears to have been about 80% of cases, in which the benefit recipient could *not* gather and submit acceptable evidence.

A third serious inadequacy in the Ombudsman's Report is its vagueness about the period over which each client's income from each employer was averaged. It says only that it was "over the period the employer told the ATO the customer worked for them" (Omb 2017, p.34). However, it was clear to the Senate Committee (SCA 2017, p16) that:

> *... employers must only provide [to ATO] an annual figure paid during that financial year ... [and only about half] of records [from employers] were for a full year employment.*

It therefore appears very likely that, in a great many cases, erroneous periods were used as a basis for the averaging calculation. The Senate Committee and a regional social services advocacy organisation (ACTCOSS) identified multiple further examples of problems with 'averaging', and the Senate Committee concluded (SCA 2017, p.35) that:

> *[This is a] labour market in which people are trying to work and comply with their Centrelink requirements, ... a market in which people get bits and pieces of work; work irregular hours and often spend periods of time across a financial year out of the workforce. This leads to it being way more complicated and extremely onerous to comply with a ... system that assumes that people either have or do not have a job across a financial year.*

The 'income averaging' approach was clearly not a suitable basis for any administrative decision-making, let alone where those decisions impose punitive measures, let alone in relation to vulnerable populations, let alone by automated means unchecked by any appreciation of reality and by 'common sense'. Importantly, DHS's own 'Operational Blueprint' acknowledged "difficulties", including "If employment is for a part of a year only" and "If income varied greatly during the year" (Omb 2017, p.42). The agency also tacitly acknowledged that the "difficulties" were severe, in that, during the 30 years of use since the early 1980s, its application had been "limited to last resort situations" (Omb 2017, p.42). Given that the agency was well aware that averaging was suitable only for "last resort situations", it is difficult not to infer culpability on the part of the DHS executives in adopting the technique. Further, evidence before the Royal Commission showed that the ATO had, in 2017, asked DHS to "cease and desist" using taxpayer data for the Robodebt scheme (Wong 2022). The request was ignored; but the ATO continued to provide its data.

The use of 'income averaging' was unlawful, "because social security legislation [requires] a person's income support entitlement to be calculated on the basis of the income that they had actually 'earned, derived or received' in [the preceding] fortnight. *The average of someone's income over a period was no indication of what they had earned in any particular fortnight, unless there was also evidence that they had earned their income at a regular fortnightly rate over that period"* (RCR 2023, p.37, emphasis added). The unlawful behaviour stemmed from actions either side of Christmas 2014, in which three senior executives suppressed unwelcome legal advice that would have de-railed a policy measure strongly desired by a rising-star Minister – who was promoted to Treasurer nine months later and became Prime Minister 3 years after that (RCR 2023, pp.37-50).

The Federal Court judgment was scathing (Pry 2021, pp.3-4, emphasis added):

> *[I]t is fundamental that before the state asserts that its citizens have a legal obligation to pay a debt to it, and before it recovers those debts, the debts have a proper basis in law. ... Having regard to that, and the profound asymmetry in resources, capacity and information that existed between them and the Commonwealth, it is self-evident that before the Commonwealth raised, demanded and recovered asserted social security debts, it ought to have ensured that it had a proper legal basis to do so. The proceeding revealed that the Commonwealth completely failed in fulfilling that obligation. Its failure was particularly acute given that many people who faced demands for repayment of unlawfully asserted debts could ill afford to repay those amounts.*

The Royal Commission concluded that "[t]he position that income averaging was a long-standing lawful practice was so entrenched within DHS that lawyers at all levels were unable to question it in accordance with their professional obligations" (RCR 2023, p.521). The oversight agency, the Office of Legal Services Coordination (OLSC), also failed to perform its function, in that "there was cause for alarm within OLSC that DHS considered there were no legal issues and that there was no legal advice pertaining to the Scheme" (pp.537-538); but OLSC took no action.

A simplified model of the primary process is in Figure 2. The Report (Omb 2017) provides more detailed descriptions of the manual system (p.31), the pilot (p.32), the interim business process from 2015 (p.33), the live process July 2016 to January 2017 (pp.33-35), and the changes made in February 2017 (pp.35-38).

Until July 2023, none of the authoritative sources made clear whether OCI applied to every means-tested benefits scheme administered by DHS (as could have been inferred from the expression "income support payments" – Omb 2017, p.33), or only some of those schemes (as implied by Government statements in January 2017 that the scheme was to be later extended to age and disability pensions). DSS later provided a list of 15 payment types that were "at different times" subject to the scheme. "Newstart Allowance and Youth Allowance formed the bulk of the payments" (RCR 2023, p.9) – despite it being known that only 2-6% of those recipients had stable earnings flows. All types were subject to policy decisions by DSS, but two, Austudy and Abstudy, were managed jointly with Education.

To submit the required information and evidence, recipients were required to register with an intermediary website called myGov (Omb 2017, p.34). No telephone contact-point was provided. The notification included the statement that DHS "will update [customer] details using the enclosed employment income information" (p.34). This represented less than full

disclosure of the agency's use of that data to compute a liability by the client to DHS, and demand return of the claimed overpayment. Further details were later published (Deloitte 2023a, 2023b), but the description remained incomplete. The Royal Commission concluded that "[t]here may be inaccuracies in the process maps and report leading to the possibility of inaccurate conclusions. If so, they are likely to be the product of DHS's haphazard and inconsistent documentation of its processes" (RCR 2017, p.471).

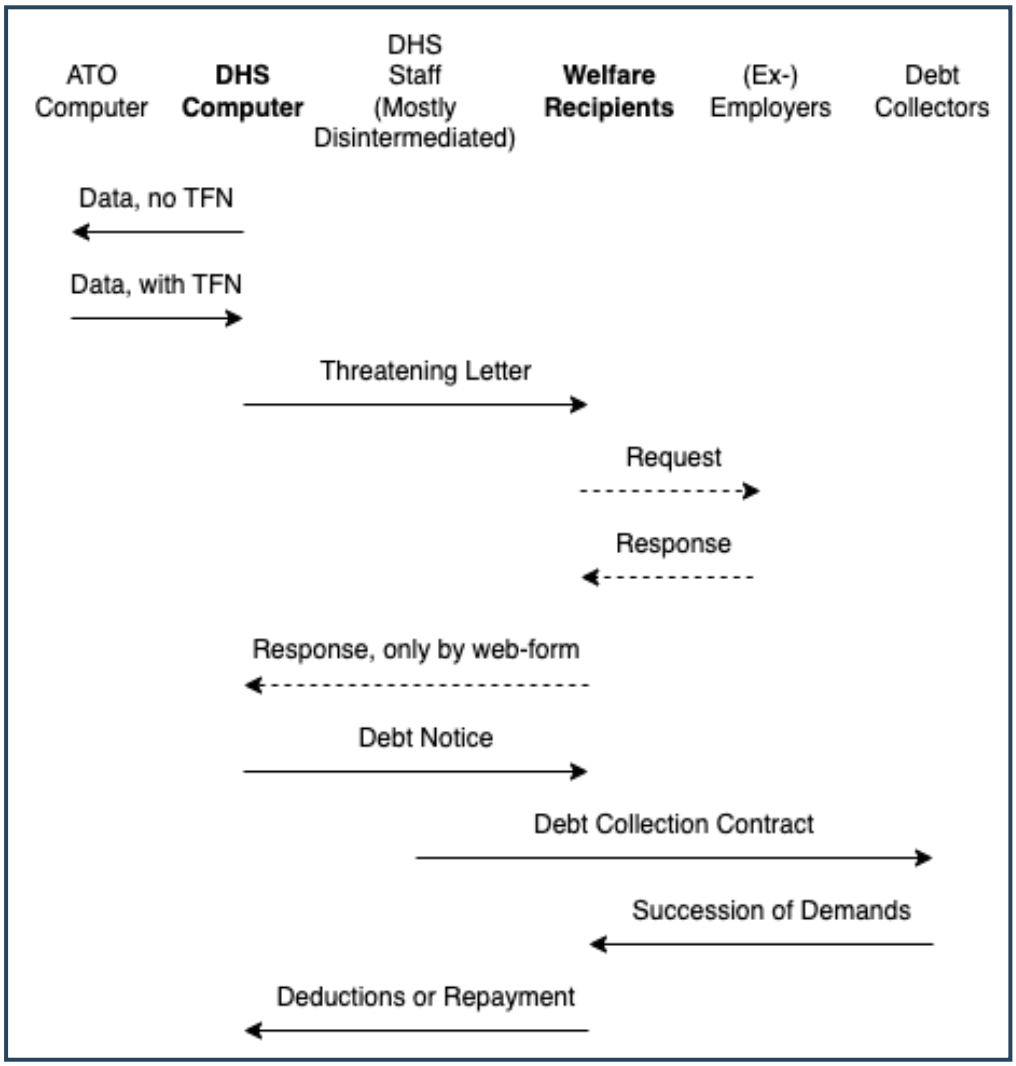

Figure 2: Simplified Model of the OCI Process

A striking feature of the authoritative sources used and cited in this case study resource is the near-invisibility of IS professionals and the managers and junior executives responsible for their work. From the publicly-available evidence, it appears as though the entire process of project framing, conceptual design, implementation and operation, and perhaps even the more technical steps of detailed design and coding, were performed and managed by public servants who had limited IS-professional background. If that is the case, the process lacked key insights that IS professionals could have provided. The absence of involvement may be indicative of low regard by executives for their staff and contractors, or for IS professionals generally. Alternatively, executives may have anticipated unwelcome advice, and even pushback, and hence marginalised IS professionals' input to the project.

4.4 Implementation and Operation – 2016-19

DHS rolled out the measure in three stages (Omb 2017, p.6):

1. *From 1 July 2015 DHS introduced an 'interim process'. It began applying the same approach manually that the OCI was being designed to do automatically. DHS investigated 100 000 discrepancies during this phase.*
2. *From 1 July 2016 DHS began rollout of the OCI, starting with a limited release of 1000 cases into the OCI where there were income discrepancies.*
3. *From September 2016 DHS commenced rollout of the fully automated OCI.*

"The initial group ... included those who received income support payments in the 2010 to 2014 financial years" (Omb 2017, p.33). The staged launch occurred during the first half of the July 2016 to June 2017 financial year, so the demands related to periods as far back as July 2009. No information has been found showing the distribution over those years. DHS was aware that many of the targets "were no longer Centrelink customers" (p.33). No evidence has been found as to whether DHS estimated the proportion whose contact details were no longer current, many of whom would therefore quite probably not have received the letter. For the first year of operation at least, it appears that DHS did not monitor for evidence of non-receipt and did not handle those cases any differently from current clients.

Each recipient was forced to think back to the relevant period(s), and search for specific, old documents. If they failed to find the documents, they needed to contact one or more employers and request copies. The relevant names of the documents varied depending on the employer. The recipients may have had no contact with those employer(s) for quite some time, and they had no standing to demand compliance by those employer(s). The minimum period they had to go back was 2¼ years, but the longest look-back required was 7¼ years, to July 2009 (i.e., the beginning of the 2010 financial year). Particularly where the elapsed time was long, some employers may have no longer had access to the data, and some had ceased business operations. It is unclear whether DHS had any evidence about, or did any studies using, for example, its own staff, or randomly selected members of the public, let alone welfare recipients, in order to establish the extent to which the scheme may have demanded from each benefit recipient an improbably high level of intellectual capacity, online expertise, assiduousness in record-keeping and negotiation skills with ex-employers.

These notices were sent in an automated manner, without a government employee or contractor in-the-loop. The number of debt notices skyrocketed from 20,000 per *annum* to 20,000 per *week* (Sarah 2016). Rather than causing alarm to the Government, it was trumpeted as a success that, after just four months of the scheme, in January 2017, 169,000 debt notices had been sent to some of Australia's most vulnerable individuals. It was credited by the Government as having already "identified close to [AUD] 300 million in overpayments to welfare recipients" (Belot & McGhee 2017) – although the Minister at the time referred to that figure, apparently erroneously, as having been recovered rather than merely identified (Belot 2017a). It was also announced that the Government was considering expanding the OCI beyond Jobseeker unemployment benefits to age and disability pensions (Belot 2017b).

Many recipients were unable to get through to the overloaded call-centres, with many reporting delays of 3-6 hours before a call was answered. During some periods the telephone system was overwhelmed, and calls did not even reach the automated-response system. Evidence has subsequently emerged that Centrelink and other major agencies scale their call-

handling facilities so far below demand-levels that 15-25% of all cases are blocked (Parnell 2024). In addition to clients, carers are a further important example of callers who are greatly inconvenienced by such problems. Many of those who live in outer regional, rural, and remote areas, which includes about one-third of welfare-recipients, have to travel long distances to Centrelink offices. In regional and suburban offices alike, people have to wait in long queues to talk to under-resourced and under-informed counter-staff. Those queues were even longer during the Robodebt period, 2016-19.

Where the alleged debtor was no longer a benefit recipient, recovery could not be achieved by deducting from future benefits payments. In those, many cases, DHS used private-sector debt collectors. The contracted firms included one that was soon afterwards successfully prosecuted for coercion, false representations and unconscionable conduct when dealing with a consumer (Bajkowski 2022). Data provided to the Royal Commission suggests that the "Total number of Robodebts referred to External Debt Collectors" was 305,977 (RCR 2023, p.507), of a total of 794,000 debts in all (p.402), or 38.5%. The total value of those referrals was AUD 955 million (54.5% of the AUD 1,751 million total), and the recovery-rate that was achieved appeared to be about 11.2%.

"In the 2016 calendar year, 126,571 [individuals] ... were sent debt notices under the OCI" (Omb, p.4, fn5), with the vast majority sent in the 4 months from September to December. However, as early as the beginning of December, after only 2 months of the main rollout, complaints about the scheme were rife (TT 2016), and by late December it was public knowledge that the basis on which OCI was built was grossly flawed and the error-rate very high (Knaus 2016). Despite the annual summer slow-down from early December 2016 to late January 2017, media pressure built rapidly. The term Robodebt was coined, and widely adopted by no later than mid-January 2017. The Ombudsman felt it necessary to commence a study, DHS felt the need for some token changes, and a Senate Committee lumbered into existence.

Some changes commenced in late 2016 and early 2017, but they were limited to corrections of obvious blunders in the original detailed design, and not corrected until 6-9 months after rollout commenced. These related to: (1) the absence of the phone number from the letter; (2) exception handling where DHS was aware that the letter had not reached the target person; (3) extension of the 21-day response-time to 28 days; (4) acceptance of bank statements in lieu of payslips; (5) fixing of errors in the UI/UX design; (6) the pausing of recovery action while a matter was under internal review (not previously implemented, in breach of fair process); and (7) easing of the circumstances in which a 10 percent debt recovery fee was automatically applied (Omb 2017, pp.35-38). The correction of greatest substance was the belated recognition that (8) complex cases are unsuitable for automation and need to "fall out for manual intervention" (p.36).

The Government drew even more criticism when, in an endeavour to discredit a complainant who had gone public, the Minister at the time released personal data about that individual from DHS records. "[O]ne of Australia's leading criminal barristers [wrote] "it is reasonably clear that the minister or one of his office's staff has committed an offence ... punishable by up to two years imprisonment if proven in court" (Knaus 2017). No enforcement action was ever undertaken.

4.5 Collapse – 2017-23

By April 2017, the scheme's problems were well-understood and could be clearly explained to the Senate Committee (Barbaschow 2017). The Senate Committee's first report, published in June 2017 (SCA 2017, pp.41, 48, with specifics documented on pp.43-48 and pp.56-59), was scathing:

> *"Communication problems included letters not being received, trouble contacting the department via phone, difficulty in receiving intelligible income data used to calculate purported debts, hard to navigate online communication portals, difficult to understand correspondence and a lack of material translated into other languages". ... The committee notes it is clear there is a significant communication problem when 65,000 from 300,000 people do not respond to requests from the department to engage".*

Inadequacies under the heading 'Communication barriers' were listed as Vulnerability flags, including Literacy, English as a secondary language, Disability-related communication barriers, Geographic barriers, and difficulties people faced with all three communication channels (SCA 2017, pp.48-55 and pp.59-69). The Senate Committee concluded (p.69).

that the key concern was the outsourcing of the income checking process to individuals, thereby reversing the onus of proof:

> *... the department claims an income discrepancy and requires an individual to seek the information required to prove the discrepancy does not exist. If the individual fails, they will owe a debt of potentially many thousands of dollars to the department. The two fundamental resources a person needs to undertake this process is a method of communicating, and once that communication channel is opened, the receipt of information that is both comprehensive and comprehendible [sic]. The department is clearly failing to provide those two necessary tools to allow people to challenge the income discrepancy, and is reaping the benefit through debt payments.*

Inadequacies were also noted in the process to clarify or review a purported debt, the policy on handling queries and its impacts, the challenges posed by reversing the onus of proof, the impact on community legal centres, and even in the subsequent process improvements made by the department (SCA 2017, pp.71-89). The Senate Committee also noted the absence of any obligation on DHS to comply with any guidance in relation to the use of debt collectors, or even to take any responsibility for malpractice by them (SCA 2017, pp.29-32).

Remarkably, it took a further 2½ years before the Government accepted defeat. It had taken no corrective action, despite multiple Tribunal decisions made against it, 10 of which were decided prior to March 2017, within 6 months of the scheme's commencement (RCR 2023, pp. xviii, 239-240, and Appendix 9). DHS was initially assiduous in avoiding test-cases reaching the Federal Court. However, public interest law firms persisted in their endeavours on behalf of welfare recipients, and the agency appears to have inadvertently let two cases, Masterton and Amato, slip through to the courtroom. This resulted in a clear judicial statement of illegality (Amato 2019, released on 27 November 2019. See also RCR 2023, pp.288-317). The imminent judgment forced the then Minister to, on 6 November 2019, instruct DHS to cease raising debts "where the only information we are relying on is our own averaging of Australia Taxation Office income data" (Farrell 2019). An internal memo

unsurprisingly leaked to the media, forcing a rushed media release – which was reported in the media, but suppressed from the Minister's media site (Robert 2019). It then took a further 6 months, until May 2020, for the Attorney-General to concede that "all Centrelink debts raised using the 'income averaging' method were unlawful" (Henriques-Gomes 2020).

A class action was mounted. In breach of the agency's formal public policy obligation to be a 'model litigant' (LSD 2017), DHS resisted the action until immediately before the hearing commenced, whereupon it conceded the illegality of its actions and all claims – although for the pitifully inadequate sum of AUD 100m, representing AUD 250 per member of the class action, plus AUD 12 million in legal costs. The agency agreed to settle the class action only in November 2020, with judicial approval further delayed until June 2021 (Pry 2021, SCA 2022 p.6). Repayments and payments were not completed until the end of September 2022, of the order of 5 years after the agency had unlawfully extracted the payments from its clients under duress.

The Senate Community Affairs Reference Committee commenced a second review of OCI in July 2019. It published a succession of five interim reports from September 2020 onwards and a final report in May 2022. The last of these (SCA 2022) was entitled 'Accountability and justice: Why we need a Royal Commission into Robodebt', and was headlined 'A massive failure of public administration'. The Coalition Government was defeated in the election of May 2022, and the new Labor Government quickly moved to establish a Royal Commission, in August 2022. It had been widely understood that the then Coalition Government had cancelled all OCI-generated debts in mid-2020. However, it was reported in the media in mid-October 2022 that the new Labor Minister had announced the cancellation of about 124,000 cases still under review and another 73,000 where potential debts had been identified but the clients had not been informed (Brookes 2022). The final steps in the ill-fated project occurred during 2023, with the finalisation of refunds and the publication of the Royal Commission's Report (RCR 2023), which included a sealed chapter making a considerable number of referrals of persons for further investigation by four other bodies.

5 Findings

5.1 Summary of Findings

DHS had projected that the number of overpayment reviews processed each year would leap almost forty-fold from 20,000 to 783,000 (Omb 2017, p.5). Yet the agency appears not to have realised that this would give rise to very large increases in the numbers of transactions conducted not only in the online system, but also at the call-centre and physical service-centres. It might have been expected that additional staff would have been assigned, particularly for the inevitably fraught transitional phase. In fact, it appears that the agency was forced to comply with Government-imposed reductions in headcounts from the outset, such that call-centre and front-counter staffing was lower than it had been prior to the scheme being launched. If human resources had been involved in cross-checking notices, as had been the case before the introduction of Robodebt, the volume would have been internally obvious, very likely stimulating precautionary reviews.

The staff union drew attention to the "classic false economy" and the "costly reverse workflows where staff are taken offline to deal with complex and difficult disputes over incorrectly raised automated debts" (SCA 2017, p.19). Staff dissatisfaction, embarrassment, and stress were widespread, as a result of having to deal with clients who were generally ill-

informed and alarmed, and in some cases rude, depressed or disturbed (Belot 2017a). The union submitted that "[OCI] has been an absolute disaster for many Centrelink use[r]s and also for the workers charged with implementing a system they know to be deeply flawed and unfair" (SCA 2017, p.18).

Both the Ombudsman's and Senate Committee's Reports detailed many personal accounts of the stress and distress caused to the benefits-recipients subjected to it, with repeated mentions of "feelings of anxiety, fear and humiliation". "Individuals had spent hours finding the required pay slips and bank statements, some dating back to 2010-11 [sic: 2009-10], often for Centrelink to find that no debt was owed" (SCA 2017, p.38).

Media reports, tribunal findings, court judgments and the Royal Commission transcripts are littered with evidence of the harmful and in some cases devastating impacts on recipients of the mostly erroneous and in all cases non-lawful demands. Some of the tales were harrowing. For example, a Ms Miller gave evidence to the Royal Commission in relation to her son Rhys Cauzzo, who committed suicide on 26 January 2017 after being pursued by DHS and then a debt-collector: "he was very distraught when he made that phone call to me. And - and he said he was feeling suicidal. And so we probably spoke for about two hours on the phone, maybe longer". The five letters of demand induced him to draw "a face with a gun through there and dollar signs just coming out of his head. And it had 'debt life' written on it, I think" (RRC 2023a, pp.P-3256, 3259-60).

On the basis of smatterings of such little data as ever emerged, primarily in media reports and as asides in verbal evidence, it appears that in only about 40 percent of the cases in which DHS commenced an action did the agency pursue the debts in full, with about 20% of debts withdrawn because they were clearly wrong, about 20% reduced, and about 20% deemed not worth pursuing. It later accepted that even the 40% that it pursued in full and the 20% in part had to be repaid, because there was no legal basis for raising the purported debts. DHS appears not to have invested in extraction and analysis of evidence about the proportion of the purported debtors and purported debts that may have been actually legitimate. It is possible that the proportion of over-payment due to errors and fraud is greater than the 0.1% estimated by advocates, perhaps greater even than the 0.4% that DHS has claimed in the past. On the other hand, it appears that the scale of the undiscovered overpayments is a great deal less than the 1.0-2.5% that the Government postulated when it announced the scheme, and the even larger proportion that it claimed to have discovered during the period the OCI operated.

The Senate Committee's Report noted that over AUD 1.7 billion in illegitimate debts were imposed on 433,000 people, of whom 381,000 individuals were pursued, many through private debt collection agencies, resulting in the repayment of over AUD 750m to the Commonwealth. The debts that had been raised were later withdrawn, the payments made in the meantime were eventually refunded, and a further AUD 100m was paid to individuals in damages and AUD 12m to the class action lawyers. Further losses to the public purse included admitted costs of implementation of AUD 600m to mid-2019 alone (Burgess 2019); but many elements of the total cost remain shrouded because the Government refused to disclose such information.

Beyond the financial damage, "The Income Compliance Program impacted hundreds of thousands of people and, for many, resulted in devastating emotional and psychological

harm. It has undermined many people's financial security as well as their willingness to engage with and trust government services" (SCA 2022, p.1; see also, Braithwaite 2020).

The Federal Court judgment included statements of a kind not commonly seen in such documents (Pry 2021, p.7):

> *One thing ... that stands out from the objections is the financial hardship, anxiety and distress, including suicidal ideation and in some cases suicide, that people or their loved ones say was suffered as a result of the Robodebt system, and that many say they felt shame and hurt at being wrongly branded "welfare cheats". Some of the objections were heart-wrenching and one could not help but be touched by them.*

The Royal Commission Report discussed three instances of suicide that were brought to its attention (RCR 2023, pp.181-183), but how many suicides Robodebt threats were associated with was the subject of speculation (Medhora 2019):

> *More than 2030 people died after receiving a [OCI] debt notice ... Of those, 429 - roughly one-fifth - were aged under 35. The figures cover a period from July 2016 to October 2018 ... there were 3139 deaths of people aged between 15 and 35 in 2016 overall.*

The objectives declared for this case study were to apply socio-technical systems theory in order to understand the factors, decisions, events, and corresponding dynamics that resulted in comprehensive project failure, and to present lessons for enhanced public sector information systems design. The following two sub-sections summarise the ways in which the case study fulfils those objectives. The case demonstrates how a largely technical view, motivated by a desire for cost-, wastage- and fraud-reductions through digitalisation, condemned the project to failure. It also identifies established approaches whose adoption enables large-scale projects to succeed. Key precepts include open systems thinking, human-centrism, the reflection of the interests of multiple stakeholders including both users and usees, and processes for detecting problems and adapting the project design to address them.

5.2 Practical Findings: Socio-Technical Lessons

Based on the case study analysis and the summary of findings above, we summarise the major socio-technical lessons toward enhanced public sector information systems design. In the Robodebt case, some primarily technical problems were identified. It was through a socio-technical examination, however, that key problems became apparent relating to (1) the dominance of political desires over rational management processes, (2) behaviours of the various stakeholders, (3) the absence of any apparent application of well-known design principles, (4) contextual considerations, and (5) program implementation. The following aspects appear likely to be relevant to the design and deployment of PSIS generally: human resource and staffing challenges; staff dissatisfaction; user- or client- related concerns; technology-related perceptions; challenges to and misalignment with objectives / values; legal considerations; external stakeholder-related factors; media-related considerations; and financial implications.

This list demonstrates that technology-related considerations form but one facet of the broader system, and that socio-technical challenges and considerations need to be better understood with a view to informing both decision-making and design processes. This applies not only to practitioners but also to those who conduct practice-relevant IS research.

Disregarding such considerations results in inability to appreciate socio-technical dynamics and the implications for stakeholders, particularly external users and usees. Those weaknesses undermine the making of informed choices about the evolution and improvement of the PSIS in its particular context, and increases the chances of PSIS failure.

From the outset, DHS believed in the potential benefits of automation, and positioned the OCI project as a way to reduce operational costs based on assumptions about datafication and digitalisation. This relied on the assumed capability of technology to deliver efficiency, and interpreted its deployment to be an imperative. That represented the abandonment of the basic tenets of human-centred design, which the agency had previously respected. Any system design that is focused purely on cost reductions is likely to fail to reflect the interests of stakeholders and the enormous diversity of their contexts and needs. An overwhelmingly technical view dominated the conception, design and implementation of the OCI scheme, resulting in very serious impacts and implications for users and usees, and ultimately in complete failure of the project.

5.3 Theoretical Implications

In this article, we have applied a socio-technical systems approach to focus on a project that made substantial adaptations to a large-scale public sector information system. Socio-technical systems was used to appreciate the inter-working of IT components with individuals and social processes. Information and communication technologies have enabled, and even driven, transformation in government agencies and business enterprises, particularly since the mid-1990s. This has led to a contemporary context of open systems and porous organisational boundaries. Understanding extra-organisational systems such as social welfare systems depends on the recognition of their socio-technical nature, and definition of the object of study as extending beyond internal and even external users to non-participant usees.

OCI was not conceived with the intention to help welfare recipients. The scheme's motivations were financial, in particular through anticipated labour-savings, the outsourcing of effort to welfare recipients, and increases in overpayment detection and recovery through automated processes. In the Robodebt case study, we see the importance of looking beyond the government agency and its intra-organisational IS, by incorporating inter-organisational dealings (particularly the relationships among government agencies), extending to extra-organisational activities (where external users interact with a government agency in relation to the award and administration of welfare payments), and encompassing non-participant usees (those indirectly affected by the welfare scheme through, for example, financial dependants of welfare recipients, and the social and legal advisers on whom they depend). Socio-technical systems theory allows designers to visualise the complete system, and detect gaps and risks. We suggest that Figure 1, which depicts external users and usees and their relationships to the boundaries of the organisation and the overall system, represents a significant extension of the Bostrom & Heinen (1977) model that is relevant to all IS that have substantial reach, and particularly to all PSIS of large scale and scope.

6 Future Research

The case study resources presented above provide researchers with a digestible overview of the mass of information unearthed over a period of five years, primarily by an audit agency, a Parliamentary Committee, tribunals, a senior court, and a Royal Commission. Presentation

in narrative form has ensured that each item of information is seen within its contemporaneous context, and is hence less likely to be misconstrued than it would be if it were separated from the circumstances prevailing at the time. Many themes are readily identified, some of them static features and functions, and others concerned with the dynamics of business processes.

This article has presented the material within a socio-technical frame. It provides a platform whereby researchers, including ourselves, can readily identify themes to address, appreciate their nature, view them through a particular theoretical lens, access the detail in the source-materials using the citations provided, and thereby make deeper contributions to practice and theory than is possible from a primarily descriptive case study resource.

Examples of theories of potential relevance include stakeholder theory and within that stakeholder salience theory and researcher perspective theory; systems analysis / requirements elicitation theory; IS management theory; strategic IS theory; risk management theory; regulatory theory; new institutional economics; and virtue, consequentialist and deontological ethics theories. Conducting analyses through such lenses might refute, refine or articulate the tentative socio-technical interpretations offered in this article. Alternatively, analysts may adopt rather different approaches, such as comparison and contrast of this case against other instances of complex, large-scale, open socio-technical systems that should serve the public interest.

Research of these kinds is urgently needed. The increasing power of IT has not been matched by advances in the quality of data, the quality of inferencing, and the quality of executive management of PSIS that apply IT to data. Both decision quality and rationality of organisational behaviour are under threat. This case study shows that serious problems can arise even where humanly-understandable, genuinely algorithmic data analytics are used. The much-touted, but opaque and a-rational magic of empirical techniques, such as AI/ML and generative AI, threatens to further lower the quality of data and inferencing, and to undermine replicability, auditability, correctability, and hence accountability. These risks are being exacerbated by the headlong adoption of forms of AI-supported digitalisation that are then extended to automated decision-making and automated action.

It is abundantly clear that the agency responsible for the Robodebt project did not have adequate ways of risk-managing the extension of even well-understood data and simple forms of inferencing to substantially automated decision-making and action. 'Big data' consolidated from multiple, incompatible sources is inherently of far lower quality than carefully-curated, designed-for-purpose data collections. Most forms of AI-supported inferencing, because of their empirical nature and opacity, are antithetical to the expectation of clear decision criteria rationally applied to data of adequate quality. A brave new world is being heavily promoted by technology providers, user organisations, governments and even researchers. Yet these currently fashionable forms of AI preclude humanly-understandable explanations for decisions. If technological and marketing imperatives are blindly followed, effective management of even mainstream cases of error and misunderstanding will have to mature very rapidly from its current, seriously inadequate state, in order to avoid widespread harm, recriminations, and a collapse in public confidence in its institutions.

Beyond using specific theories as lenses through which to consider themes, researchers may also use the resources provided by this case study to identify implications for the socio-technical systems approach more generally. There is evidence, for example, that party-

political factors, the values exhibited by individual Ministers, and the priorities of senior executives, coupled with the near-invisibility in the case study resource of IS professionals and the junior executives they report to, indicate that, in large-scale systems of this nature, the prospects even of stakeholder engagement, let alone participative design, may be entirely swamped by the exercise of power. In such circumstances, what guidance can IS academics provide to IS practitioners about compliance with their ethical responsibilities?

7 Conclusion

This case study has drawn on authoritative sources to analyse a large-scale exercise in transformative IT applied to the administration of social welfare in Australia, which was conceived 2014-15, operated 2016-19, dismantled in 2019-22, and subjected to multiple formal reviews 2017-23. The contribution of this case study is enhanced understanding of the challenges involved in digitalisation in the public sector, within a frame of socio-technical systems theory. The narrative description, and the authoritative sources and academic commentaries it provides access to, enable deep and multi-layered analysis of the factors that resulted in a large-scale, intentionally transformative project failing to achieve its objectives and causing enormous collateral damage.

A massive deficiency at the heart of the scheme's technical design survived into live operation, resulting in serious harm for over 3 years. A tentative interpretation, based on the narrative and the evidence supporting it, is that one of the largest government agencies in a developed economy, with long and deep experience in the application of IT to social welfare administration, was so beguiled by the promise of transformative digitalisation that it abandoned its responsibilities, and reverted to mindless, technologically-determined design, causing massive dislocation and harm to the most disadvantaged members of society. Actions and inactions of senior executives caused a long series of process safeguards to fail. The case study is a moving picture from real-life that represents a refutation of the comfortable assumptions that standards, 'good practice', legal compliance and training ensure the avoidance of such IS failures and resultant harm to parties affected by systems. Alternative interpretations are of course possible. For example, Whiteford (2021) concludes that "[Robodebt] differs from other examples of policy failures in that it was intentional, and not the result of mistakes in design or implementation" (p.340).

The agency prolonged the agony by refusing for 3 years to accept that the project was both disastrous in conception, design, execution and effect, and unlawful. At no stage did the decision-makers exhibit any respect for, or empathy with, the people on whom they were inflicting significant and unjustifiable confusion, effort, cost, and anxiety. The Royal Commission's summation was that "Robodebt was a crude and cruel mechanism, neither fair nor legal, and it made many people feel like criminals. In essence, people were traumatised on the off-chance they might owe money. It was a costly failure of public administration, in both human and economic terms" (RCR 2023, p. xix).

Given that an Australian government agency irresponsibly (mis)conceived, implemented and persisted with a large-scale, transformative IT project, many observers have been disturbed about the absence of any direct accountability for the harm that was done. No material negative consequences were experienced by the relevant Ministers or senior executives, even after gross misbehaviour had been comprehensively documented. Details

relating to the accountability failures are available in the full Working Paper from which this article was developed. See Clarke et al. (2024).

The IT deployed in support of Robodebt was not sophisticated or new. Data matching has been in widespread use for four decades. The same applies to algorithmic inferencing, particularly as simple as that used in this project. Automated generation of letters, automated deductions from welfare payments, and automated referral of cases to outsourced debt collection services, have been simple to implement for many years. One of the lessons of this case study is that seriously inappropriate organisational behaviour continues to occur even where the technologies and business processes are relatively simple to comprehend and analyse, and decision criteria are transparent.

The scope for more frequent, even more widespread, and even more harmful misbehaviour is greatly increased where data quality is low, inferencing processes are opaque, and business processes are more intensively delegated to unsupervised artefacts. The absence of accountability greatly exacerbates the problem. Ministers and government executives, in Australia at least, are aware that regulatory failure and the protection of the guilty are entrenched. With big data, opaque AI, and increased autonomy for computing-based systems, there will be ample ways for the perpetrators of future PSIS disasters to escape retribution. Key deterrent safeguards are absent.

Where PSIS projects are permitted to be conducted in such a manner, public confidence in agencies, IT and IS is likely to be seriously harmed, and public scepticism, non-compliance and active opposition to initiatives are likely to become engrained, exacerbating the already-high frequency of large-scale IS failures.

References

The Primary Case Sources, comprising Investigation Reports and Other Relevant Official Documents, are listed in the Appendix to the article.

Abbas, R. & Michael, K. (2022). Socio-Technical Theory: A Review. In S. Papagiannidis (Ed) 'TheoryHub Book', at: https://open.ncl.ac.uk/theories/9/socio-technical-theory/

Abbas R., Michael K., Michael M.G., Perakslis C. and Pitt J. (2022). Machine Learning, Convergence Digitalization, and the Concentration of Power: Enslavement by Design Using Techno-Biological Behavior. IEEE Transactions on Technology and Society 3, 2 (June 2022) 76-88, doi: 10.1109/TTS.2022.3179756

Abbas R., Pitt J., & Michael K. (2021). Socio-technical design for public interest technology. IEEE Transactions on Technology and Society 2,2 (2021) 55-61

Abbas R., Michael K., Sargent J.P. & Scornavacca E. (2021). Anticipating Techno-Economic Fallout: Purpose-Driven Socio-Technical Innovation. IEEE Transactions on Technology and Society 2,3 (September 2021) 111-113, at https://ieeexplore.ieee.org/iel7/8566059/9500078/09500093.pdfhttps://ieeexplore.ieee.org/iel7/8566059/9500078/09500093.pdf.

Akter, S., McCarthy, G., Sajib, S., Michael, K., Dwivedi, Y.K., D'Ambra, J. & Shen, K.N. (2021). Algorithmic bias in data-driven innovation in the age of AI. International Journal of Information Management, 60, 102387.

Amato (2019). Amato v The Commonwealth of Australia (Federal Court VID611/2019), at https://www.comcourts.gov.au/file/Federal/P/VID611/2019/3859485/event/30114114/document/1513665.

Avison D.E. & Wood-Harper A.T. (1990). Multiview: An Exploration in Information Systems Development. Blackwell, 1990.

Bajkowski J. (2022). Services Australia handed $5.6m more work to robodebt collector Panthera following ACCC prosecution. The Mandarin, 3 November 2022, at https://www.themandarin.com.au/204378-services-australia-handed-5-6m-more-work-to-robodebt-collector-panthera-following-accc-prosecution/

Bajkowski J. (2023). Jane Halton links 'chilling. effect of FOI to robodebt's 'frank and fearless advice' epic fail. The Mandarin, 11 July 2023, at https://www.themandarin.com.au/224898-jane-halton-links-foi-to-robodebt-failure-of-frank-fearless-advice/

Barbaschow A. (2017). Privacy Foundation calls for human intervention in Centrelink debt collection. zdNet, 2 April 2017, at https://www.zdnet.com/article/privacy-foundation-calls-for-human-involvement-in-centrelink-automated-debt-collection-process/

Baumer E.P.S. (2015). Usees. Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems (CHI'15), April 2015.

Belot H. (2017a). Centrelink debt recovery: Government knew of potential problems with automated program. ABC News, 12 Jan 2017, at https://www.abc.net.au/news/2017-01-12/government-knew-of-potential-problems-with-centrelink-system/8177988

Belot H. (2017b). Centrelink's controversial data matching program to target pensioners and disabled, Labor calls for suspension. ABC News, 17 Jan 2017, at https://www.abc.net.au/news/2017-01-17/labor-calls-for-suspension-of-centrelink-debt-recovery-program/8187934

Belot H. & McGhee A. (2017). Centrelink debt recovery program to undergo changes following public criticism. ABC News, 16 Jan 2017, at https://www.abc.net.au/news/2017-01-16/government-to-change-centrelink-debt-recovery-program/8185366

Berleur J. & Drumm J. (Eds.) (1991). Information Technology Assessment. Proc. 4th IFIP-TC9 International Conference on Human Choice and Computers, Dublin, July 8-12, 1990, Elsevier Science Publishers (North-Holland), 1991.

Bostrom, R. P., & Heinen, J. S. (1977). MIS Problems and Failures: A Socio-Technical Perspective. Part I: The Causes. MIS Quarterly 1,3 (1977) 17–32, at https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=e092be3120ce51aaa35af673fabd07b6513e702e

Bower C.M. & Christensen C.M. (1995). Disruptive Technologies: Catching the Wave. Harvard Business Review (January-February 1995) 43-53.

Braithwaite V. (2020). Beyond the bubble that is Robodebt: How governments that lose integrity threaten democracy. Aust J Soc Issues 55,3 (September 2020) 242–259, at https://static1.squarespace.com/static/5c05f8595cfd7901fc57139d/t/5f8a808b459ade460ac

d28dc/1602912397885/Beyond+the+bubble+that+is+Robodebt+How+governments+that+lose+integrity+threaten+democracy.pdf

Brennen S. & Kreiss D. (2016). Digitalization and Digitization. International Encyclopedia of Communication Theory and Philosophy, October 2016, PrePrint at http://culturedigitally.org/2014/09/digitalization-and-digitization/

Brookes J. (2022). 197,000 notices wiped from 'shameful' robodebt scheme. Innovation Australia, 12 October 2022, at https://www.innovationaus.com/197000-notices-wiped-from-shameful-robodebt-scheme/

Bryson J.M. (2004). What to do when stakeholders matter: stakeholder identification and analysis techniques. Public Management Review 6,1 (2004) 21-53, at https://ftms.edu.my/images/Document/MOD001074%20-%20Strategic%20Management%20Analysis/WK3_SR_MOD001074_Bryson_2004.pdf

Burgess K. (2019). Robodebt Centrelink compliance program cost $600m to recoup $785m so far. The Canberra Times, October 28 2019, at https://www.canberratimes.com.au/story/6407984/four-of-five-robodebt-reviews-hit-with-a-debt-as-cost-revealed/

Carney T. (2019). Robo-debt illegality: The seven veils of failed guarantees of the rule of law?. Alternative Law Journal 44,1 (2019) 4–10, at https://journals.sagepub.com/doi/pdf/10.1177/1037969X18815913

Checkland P. (1981). Systems Thinking, Systems Practice. Wiley, 1981.

Cherns A. (1976). The principles of sociotechnical design. Human Relations 29,8 (1976) 783-792.

Cherns A. (1987). Principles of sociotechnical design revisited. Human Relations, 40,3 (1987) 153-161.

Christensen C.M., Raynor M. & McDonald R. (2015). What Is Disruptive Innovation?. Harvard Business Review (December 2015) 2-11.

Clarke R. (1987). Just Another Piece of Plastic for your Wallet: The 'Australia Card' Scheme. Computers & Society 18,1 (January 1988), Addendum in Computers & Society 18,3 (July 1988), PrePrint at http://www.rogerclarke.com/DV/OzCard.html

Clarke R. (1992a). The Resistible Rise of the National Personal Data System. Software Law Journal 5,1 (January 1992), PrePrint at http://www.rogerclarke.com/DV/SLJ.html

Clarke R. (1992b). Extra-Organisational Systems: A Challenge to the Software Engineering Paradigm. Proc. IFIP World Congress, Madrid, September 1992, PrePrint at http://www.rogerclarke.com/SOS/PaperExtraOrgSys.html

Clarke R. (1994a). The Digital Persona and its Application to Data Surveillance. The Information Society 10,2 (June 1994), PrePrint at http://www.rogerclarke.com/DV/DigPersona.html

Clarke R. (1994b). Dataveillance by Governments: The Technique of Computer Matching. Information Technology & People 7,2 (December 1994) 46-85, PrePrint at http://www.rogerclarke.com/DV/MatchIntro.html

Clarke R. (2014). Promise Unfulfilled: The Digital Persona Concept, Two Decades Later. Information Technology & People 27, 2 (Jun 2014) 182-207, PrePrint at http://www.rogerclarke.com/ID/DP12.html

Clarke R. (2015). Not Only Horses Wear Blinkers: The Missing Perspectives in IS Research. Keynote Presentation, Proc. ACIS'15, at https://arxiv.org/pdf/1611.04059

Clarke R. (2016). An Empirical Assessment of Researcher Perspectives. Proc. Bled eConf., Slovenia, June 2016, PrePrint at http://www.rogerclarke.com/SOS/BledP.html

Clarke R. & Davison R.M. (2020). Through Whose Eyes? The Critical Concept of Researcher Perspective. J. Assoc. Infor. Syst. 21, 2 (March-April 2020) 483-501, PrePrint at http://rogerclarke.com/SOS/RP.html

Clarke R., Davison R.M. & Jia W. (2020). Researcher Perspective in the IS Discipline: An Empirical Study of Articles in the Basket of 8 Journals. Information Technology & People 33, 6 (October 2020) 1515-1541, PrePrint at http://www.rogerclarke.com/SOS/RPBo8.html

Clarke R., Michael K. & Abbas R. (2024). Robodebt: An Exemplary Case Study of a Failed Transformative IT Project in the Public Sector. Working Paper, Xamax Consultancy Pty Ltd, July 2024, at http://rogerclarke.com/DV/RDCS.html

Cornish, A. (2023). Record-keeping deficiencies exposed in robodebt royal commission report. Informaa Quarterly Official Bulletin of the Records Management Association of Australia, 39,3 (2023) 8–8.

CPI (2022). Delay and Decay: Australia's Freedom of Information Crisis. Briefing Paper, The Centre for Public Integrity, August 2022, at https://publicintegrity.org.au/wp-content/uploads/2022/09/FOI-Delay-and-Decay-Final.pdf

Creswell, John W. & J. David Creswell. 'Research Design: Qualitative, Quantitative, and Mixed Methods Approaches'. Fifth edition. Los Angeles, SAGE, 2018.

Cukier K. & Mayer-Schönberger V. (2013). The Rise of Big Data. Foreign Affairs (May/June 2014) 35.

Deloitte (2023a). The use of data and automation in the Robodebt scheme: A report to the Royal Commission into the Robodebt Scheme. Royal Commission into the Robodebt Scheme, March 2023, at https://robodebt.royalcommission.gov.au/system/files/2023-03/Use-of-data-and-automation-in-the-Robodebt-Scheme.pdf

Deloitte (2023b). Robodebt Process Maps. Royal Commission into the Robodebt Scheme, March 2023, at https://robodebt.royalcommission.gov.au/publications/deloitte-robodebt-process-maps

DMP (1994). Guidelines for the Conduct of the Data-Matching Program. Delegated Legislated under the Data Matching Program (Assistance and Tax) Act 1990, October 1994, nominally enforceable, but applicable only if the matching process uses the Tax File Number (TFN), at https://www.legislation.gov.au/Details/F2009B00268

Dreborg, K. H., 1996. Essence of backcasting", *Futures* 28,9 (1996) 813-828, at https://doi.org/10.1016/S0016-3287(96)00044-4.

Emery F. (1959). Characteristics of socio-technical systems. In 'The Social Engagement of Social Science: A Tavistock Anthology Volume 2, University of Pennsylvania Press, pp.157-186).

Farrell P. (2019). Government halting key part of robodebt scheme, will freeze debts for some welfare recipients. ABC News, 19 November 2019, at https://www.abc.net.au/news/2019-11-19/robodebt-scheme-human-services-department-halts-existing-debts/11717188

Fischer-Huebner S. & Lindskog H. (2001). Teaching Privacy-Enhancing Technologies. Proceedings of the IFIP WG 11.8 2nd World Conference on Information Security Education, Perth, Australia.

Freeman R.E. & Reed D.L. (1983). Stockholders and Stakeholders: A New Perspective on Corporate Governance. California Management Review 25, 3 (1983) 88-106.

Goggin, G. & Soldatić, K. (2022). Automated decision-making, digital inclusion and intersectional disabilities. New Media & Society, vol. 24, no. 2, pp. 384–400.

GR (2017). Government Response to the Senate Committee Report', Australian Government, September 2017, at https://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Community_Affairs/SocialWelfareSystem/Additional_Documents?docType=Government%20Response

Graycar A. & Masters A. B. (2022). Bureaucratic bastardry: robodebt/debt recovery, AI and the stigmatisation of citizens by machines and systems. International Journal of Public Policy 16,5-6 (2022) 333-344.

Hammer M. (1990). Reengineering Work: Don't Automate, Obliterate. Harvard Business Review (July-August 1990) 104-112.

Hanks, P. (2021). Administrative law and welfare rights: A 40-year story from 'Green v Daniels' to 'robot debt recovery' - closing the chapter. AIAL Forum, 103 (2021) 19–31.

Henriques-Gomes L. (2020). All Centrelink debts raised using income averaging unlawful, Christian Porter concedes. The Guardian, 31 May 2020, at https://www.theguardian.com/australia-news/2020/may/31/all-centrelink-debts-raised-using-income-averaging-unlawful-christian-porter-concedes

Hevner A.R., March S.T. & Park S. (2004). Design Science in Information Systems Research. MIS Quarterly 28,1 (2004) 75-105.

Hirschheim R.A. (1985). User Experience with and Assessment of Participative Systems Design. MIS Quarterly (December 1985), at https://www.academia.edu/download/51009081/viewcontent.pdf

Hogan-Doran D. (2017). Computer says "no": automation, algorithms and artificial intelligence in Government decision-making. The Judicial Review 13 (2017) 1-39, at https://www.academia.edu/38540521/Computer_says_no_automation_algorithms_and_artificial_intelligence_in_Government_decision_making?email_work_card=view-paper

IxDF - Interaction Design Foundation. (2021, June 14). What are Complex Socio-Technical Systems?. Interaction Design Foundation - IxDF. 28 February 2024, at https://www.interaction-design.org/literature/topics/complex-socio-technical-systems

Klapdor M. (2020). Social Security and Welfare. Parliament of Australia, October 2020, at https://www.aph.gov.au/About_Parliament/Parliamentary_Departments/Parliamentary_Library/pubs/rp/BudgetReview202021/SocialSecurityWelfare#:~:text=Social%20security%20and%20welfare%20expenditure,Australian%20Government's%20total%20expenditure%20(p.

Knaus C. (2016). Centrelink officer says only a fraction of debts in welfare crackdown are genuine. The Guardian, 23 December 2016, at https://www.theguardian.com/australia-news/2016/dec/23/centrelink-officer-says-only-a-fraction-of-debts-in-welfare-crackdown-are-genuine

Knaus C. (2017). 'Reasonably clear' Alan Tudge's office broke law in Centrelink case, says Labor legal advice. The Guardian, 3 Apr 2017, at https://www.theguardian.com/australia-news/2017/apr/03/reasonably-clear-alan-tudges-office-broke-law-in-centrelink-case-says-labor-legal-advice

Knaus C. & Bassano J. (2019). How a flawed freedom-of-information regime keeps Australians in the dark. The Guardian, 2 January 2019, at https://www.theguardian.com/australia-news/2019/jan/02/how-a-flawed-freedom-of-information-regime-keeps-australians-in-the-dark

Land F. & Hirschheim R. (1983). Participative systems design: Rationale, tools and techniques. Journal of Applied Systems Analysis, 1983.

Laplume A.O., Sonpar K. & Litz R.A. (2008). Stakeholder theory: Reviewing a theory that moves us. Journal of Management 34,6 (2008) 1152-1189.

Lindebaum, D., Glaser, V., Moser, C. & Ashraf, M. (2023). When Algorithms Rule, Values Can Wither. Sloan Management Review, vol. 64, no. 2, pp. 1–5.

Liu K., Sun L. & Bennett K. (2002), 'Co-Design of Business and IT Systems. Introduction by Guest Editors, Information Systems Frontiers, 4,3 (2002) 251–256.

LSD (2017). Legal Services Directions 2017', 2 July 2018, at https://www.legislation.gov.au/Details/F2018C00409

Lunde A.S. (1980). The person-number systems of Sweden, Norway, Denmark, and Israel. US Department of Health and Human Services, Public Health Service, Office of Health Research, Statistics, and Technology, National Center for Health Statistics, Vol. 80, No. 1358.

Lycett M. (2014), Datafication: Making Sense of (Big) Data in a Complex World, European Journal of Information Systems, 22, 4 (December 2014) 381-386, at http://v-scheiner.brunel.ac.uk/bitstream/2438/8110/2/Fulltext.pdf

Lyytinen K. & Rose G.M. (2003), 'The Disruptive Nature of Information Technology Innovations: The Case of Internet Computing in Systems Development Organizations', MIS Quarterly, 27, 4 (December 2003), 557-595.

Macleod, L. (2017). Lessons learnt about digital transformation and public administration: Centrelink's online compliance intervention. AIAL Forum, no. 89, pp. 59–68.

Mann, M. (2020). Technological Politics of Automated Welfare Surveillance: Social (and Data) Justice through Critical Qualitative Inquiry. Global Perspectives (Oakland, Calif.), vol. 1, no. 1.

Marjanovic, O., Cecez-Kecmanovic, D., & Vidgen, R. (2022). Theorising algorithmic justice. European Journal of Information Systems, 31(3), 269-287.

Sarah Martin. (2016). Welfare debt squad hunts for $4bn. The Australian, 5 December 2016, at http://www.theaustralian.com.au/national-affairs/welfare-debt-squad-hunts-for-4bn-in-overpayments/news-story/e19c5b0d4a39aa07364a41269fdc11c9

Mead, G. & Neves, B. (2023). Contested delegation: Understanding critical public responses to algorithmic decision-making in the UK and Australia. The Sociological Review (Keele), vol. 71, no. 3, pp. 601–623.

Medhora S. (2019). Over 2000 people died after receiving Centrelink robo-debt notice, figures reveal. ABC TripleJ, 18 Feb 2019, at https://www.abc.net.au/triplej/programs/hack/2030-people-have-died-after-receiving-centrelink-robodebt-notice/10821272

Michael, K. (2003). The technological trajectory of the automatic identification industry: the application of the systems of innovation (SI) framework for the characterization and prediction of the auto-ID industry. PhD thesis, School of Information Technology and Computer Science, University of Wollongong, 2003, at http://ro.uow.edu/theses/309. See in particular 'Section 4.3 The Evolution of the Citizen ID Number'.

Michael K. & Michael M.G. (2006). Historical lessons on ID technology and the consequences of an unchecked trajectory. Prometheus 24,4 (2006) 365-377.

Miller, K. (2017). Connecting the dots: a case study of the Robodebt communities. AIAL Forum, no. 89, pp. 50–58.

Mitchell R.K., Agle B.R. & Wood D.J. (1997). Toward a Theory of Stakeholder Identification and Salience: Defining the Principle of Who and What Really Counts. Academy of Management Review 22,4 (1997) 853-886.

MRR (2015). Welfare Integrity, Fairness and Sustainability for all Australians. Minister for Social Security, Scott Morrison, Budget Media Release, 12 May 2015, at https://formerministers.dss.gov.au/15850/welfare-integrity-fairness-and-sustainability-for-all-australians/

Mumford E. (2000). A socio-technical approach to systems design. Requirements Engineering 5,2 (2000) 125-133.

Mumford E. (2006). The story of socio-technical design: reflections on its successes, failures and potential. Information Systems Journal 16 (2006) 317–342, at https://executiveinsight.typepad.com/files/the-story-of-socio-technical-design.pdf

Naylor, S. (2023). Robodebt, Kafka and institutional absurdism in Australia. Alternative Law Journal, vol. 48, no. 4, pp. 299–302.

Newell S. & Marabelli M. (2015). Strategic Opportunities (and Challenges) of Algorithmic Decision-Making: A Call for Action on the Long-Term Societal Effects of 'Datification'. The Journal of Strategic Information Systems 24, 1 (2015) 3-14, at http://marcomarabelli.com/Newell-Marabelli-JSIS-2015.pdf

Ng, Y-F. & Gray, S. (2022). Disadvantage and the automated decision. Adelaide Law Review, vol. 43, no. 2, pp. 641–677.

Nikidehaghani, M., Andrew, J. & Cortese, C. (2023). Algorithmic accountability: robodebt and the making of welfare cheats. Accounting, Auditing & Accountability Journal, vol. 36, no. 2, pp. 677–711.

Noone, M.A. (2020). Innovation and Disruption: Exploring the Potential of Clinical Legal Education. International Journal of Clinical Legal Education, vol. 27, no. 3, pp. 5–32.

Norman, D. (2013), *The Design of Everyday Things: Revised and Expanded Edition Paperback*, Basic Books, New York.

OAIC (2014) 'Guidelines on data matching in Australian Government administration' Office of the Australian Information Commissioner, rev. 18 June 2014, at https://www.oaic.gov.au/privacy/guidance-and-advice/guidelines-on-data-matching-in-australian-government-administration

Omb (2017). Centrelink's automated debt raising and recovery system: A Report about the Department of Human Services. Online Compliance Intervention System for Debt Raising and Recovery. Australian Ombudsman, April 2017, at https://www.ombudsman.gov.au/__data/assets/pdf_file/0022/43528/Report-Centrelinks-automated-debt-raising-and-recovery-system-April-2017.pdf

Park, S. & Humphry, J. 2019. Exclusion by design: intersections of social, digital and data exclusion. Information, Communication & Society, vol. 22, no. 7, pp. 934–953.

Parnell S. (2024). Tax Office rejects one in four calls to fudge waiting time figures. The Sydney Morning Herald, 25 March 2024, at https://www.smh.com.au/national/tax-office-rejects-one-in-four-calls-to-fudge-waiting-time-stats-20240325-p5fez8.html

Piller G., Schubert P., Koch M. & Moeslein K. (2004). From Mass Customization to Collaborative Customer CoDesign. Proc. ECIS 2004, 118.

Podger A. (2023). Report to the Royal Commission into the Robodebt Scheme. Royal Commission into the Robodebt Scheme, February 2023, at https://robodebt.royalcommission.gov.au/system/files/2023-02/andrew-podger-report-to-robodebt-royal-commission.pdf

Ponterotto, J.G. (2006). Brief Note on the Origins, Evolution, and Meaning of the Qualitative Research Concept "Thick Description", *The Qualitative Report*, vol. 11, no. 3, September 2006 538-549, http://www.nova.edu/ssss/QR/QR11-3/ponterotto.pdf

Pry (2021) Prygodicz v Commonwealth of Australia (No 2) [2021] FCA 634 (11 June 2021) - the eventual judgment, at http://www.austlii.edu.au/cgibin/viewdoc/au/cases/cth/FCA/2021/634.html?context=1;query=Prygodicz;mask_path

Ray, A., Adams, B. & Thampapillai, D. (2022). Access to algorithms post-Robodebt: Do freedom of information laws extend to automated systems?. Alternative Law Journal, vol. 47, no. 1, pp. 10–15.

RCR (2023). Report of the Royal Commission into the Robodebt Scheme', 7 July 2023, at https://robodebt.royalcommission.gov.au/publications/report Simister, N. (2017) "Case studies and stories of change", *Intrac for Civil Society*, https://www.intrac.org/resources/case-studies-stories-change/

Redden J. (2018). The Harm That Data Do. Scientific American, 1 November 2018, https://www.scientificamerican.com/article/the-harm-that-data-do/

Rinta-Kahila T., Someh I., Gillespie N., Indulska M. & Gregor S. (2022). Algorithmic decision-making and system destructiveness: A case of automatic debt recovery. European Journal of Information Systems 31,3 (2022) 313-338, at https://www.tandfonline.com/doi/pdf/10.1080/0960085X.2021.1960905?needAccess=true

Robert (2019). Media Releases – 2019. Minister responsible for Services Australia, at https://web.archive.org/web/20200319204601/https://minister.servicesaustralia.gov.au/media-releases

RRC (2022a). Transcript of Proceedings for Monday, 5 December 2022. Royal Commission into the Robodebt Scheme, December 2022, at https://robodebt.royalcommission.gov.au/system/files/2022-12/transcript-hearing-day-13-5-december-2022.pdf

RRC (2022b). Transcript of Proceedings for Monday, 6 December 2022. Royal Commission into the Robodebt Scheme, December 2022, at https://robodebt.royalcommission.gov.au/system/files/2022-12/transcript-6-december.pdf

RRC (2022c). Transcript of Proceedings for Monday, 7 December 2022. Royal Commission into the Robodebt Scheme, December 2022, at https://robodebt.royalcommission.gov.au/system/files/2022-12/transcript-hearing-day-16-8-december-2022.pdf

RRC (2023a). Transcript of Proceedings for Monday, 20 February 2023. Royal Commission into the Robodebt Scheme, February 2023, at https://robodebt.royalcommission.gov.au/system/files/2023-02/transcript-hearing-day-32-20-february-2023.pdf

RRC (2023b). Transcript of Proceedings for Monday, 2 March 2023. Royal Commission into the Robodebt Scheme, March 2023, at https://robodebt.royalcommission.gov.au/system/files/2023-03/transcript-hearing-day-40-2-march.pdf

SA (2022). A guide to Australian Government payments. Services Australia, at https://www.servicesaustralia.gov.au/sites/default/files/co029-2207.pdf

SCA (2017). Design, scope, cost-benefit analysis, contracts awarded and implementation associated with the Better Management of the Social Welfare System initiative. The Senate Community Affairs References Committee, Australian Parliament House, June

2017, at https://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Community_Affairs/SocialWelfareSystem/Report

SCA (2022). Accountability and justice: Why we need a Royal Commission into Robodebt. Senate Community Affairs References Committee, May 2022, at https://parlinfo.aph.gov.au/parlInfo/download/committees/reportsen/024846/toc_pdf/AccountabilityandjusticeWhyweneedaRoyalCommissionintoRobodebt.pdf;fileType=application%2Fpdf

Trist E.L. (1981). The evolution of socio-technical systems. Ontario Quality of Working Life Centre, Vol. 2, 1981.

TT (2016). Guilty until proven innocent ... Centrelink gone rogue .... Tasmanian Times, 5 December 2016, at https://tasmaniantimes.com/2016/12/guilty-until-proven-innocent-centrelink-gone-rogue/

Twomey, A. (2023). The Coronation, the Commonwealth and government integrity. Round Table (London), vol. 112, no. 4, pp. 367–375.

Venkatraman N. (1994). IT-Enabled Business Transformation: From Automation to Business Scope Redefinition', Sloan Management Review 35,2, (Winter 1994), 73-87.

Von Bertalanffy L. (1950). The theory of open systems in physics and biology', Science, 111, 2872 (1950) 23-29.

Wahlstrom K. & Quirchmayr G. (2008). A Privacy-Enhancing Architecture for Databases. Journal of Research and Practice in Information Technology 40, 3 (August 2008) 151-162, at http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.454.3815&rep=rep1&type=pdf

Walsham G. (1995). Interpretive Case Studies in IS Research: Nature and Method. European Journal of Information Systems 4, 2 (May 1995) 74-81.

Whelan, A (2020). 'Ask for More Time': Big Data Chronopolitics in the Australian Welfare Bureaucracy. Critical sociology, vol. 46, no. 6, pp. 867–880.

White, S. (2021). Authorisation and accountability of automated government decisions under Australian Administrative Law. AIAL Forum, no. 102, pp. 84–96.

Whiteford P. (2021). Debt by design: The anatomy of a social policy fiasco – Or was it something worse? Aust. J of Public Admin 80,2 (June 2021) 340-360, at https://onlinelibrary.wiley.com/doi/epdf/10.1111/1467-8500.12479

Whiteford P. (2022). For the poorest 20% of Australian households, social security payments provide more than 70% of their income. John Menadue's Public Policy Journal, 20 May 2022, at https://johnmenadue.com/social-security/

Wong K. (2022). Robodebt scheme told to 'cease and desist. AAP, 4 November 2022, at https://www.aap.com.au/news/debt-collectors-to-front-royal-commission/

Wright, A. & Ng, Y-F. (2022). Services Australia's Single Touch Payroll Program: The enduring legacy of Robodebt, or a fundamentally different system?. Public Law Review (North Ryde, N.S.W.), vol. 33, no. 2, pp. 127–142.

Yin R.K. (2017). Case Study Research and Applications: Design and Methods. 6th edition, Sage, 2017.

Zwass V. (2010). Co-creation: Toward a taxonomy and an integrated research perspective. International Journal of Electronic Commerce 15,1 (2010) 11-48.

Appendix A: Case Resources

This Appendix provides access to the sources discovered in the course of the case study research reported in this article. To preserve their context, they are listed in chronological order.

A1 The Investigation Reports, in chronological order

Omb (2017) 'Centrelink's automated debt raising and recovery system: A Report about the Department of Human Services' Online Compliance Intervention System for Debt Raising and Recovery' Australian Ombudsman, April 2017, at https://www.ombudsman.gov.au/__data/assets/pdf_file/0022/43528/Report-Centrelinks-automated-debt-raising-and-recovery-system-April-2017.pdf

SCA (2017) 'Design, scope, cost-benefit analysis, contracts awarded and implementation associated with the Better Management of the Social Welfare System initiative' The Senate Community Affairs References Committee, Australian Parliament House, June 2017, at https://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Community_Affairs/SocialWelfareSystem/Report

Submissions, at
https://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Community_Affairs/SocialWelfareSystem/Submissions
Transcripts of Public Hearings,
https://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Community_Affairs/SocialWelfareSystem/Public_Hearings
Additional Documents, at
https://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Community_Affairs/SocialWelfareSystem/Additional_Documents

GR (2017) 'Government Response to the Senate Committee Report', Australian Government, September 2017, at
https://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Community_Affairs/SocialWelfareSystem/Additional_Documents?docType=Government%20Response

Pry (2021) Prygodicz v Commonwealth of Australia (No 2) [2021] FCA 634 (11 June 2021) - the eventual judgment, at
http://www.austlii.edu.au/cgibin/viewdoc/au/cases/cth/FCA/2021/634.html?context=1;query=Prygodicz;mask_path

SCA (2022) 'Accountability and justice: Why we need a Royal Commission into Robodebt' Senate Community Affairs References Committee, May 2022, at
https://parlinfo.aph.gov.au/parlInfo/download/committees/reportsen/024846/toc_pdf/AccountabilityandjusticeWhyweneedaRoyalCommissionintoRobodebt.pdf;fileType=application%2Fpdf

RRC (2022a) 'Transcript of Proceedings for Monday, 5 December 2022' Royal Commission into the Robodebt Scheme, December 2022, at

https://robodebt.royalcommission.gov.au/system/files/2022-12/transcript-hearing-day-13-5-december-2022.pdf

RRC (2022b) 'Transcript of Proceedings for Monday, 6 December 2022' Royal Commission into the Robodebt Scheme, December 2022, at https://robodebt.royalcommission.gov.au/system/files/2022-12/transcript-6-december.pdf

RRC (2022c) 'Transcript of Proceedings for Monday, 7 December 2022' Royal Commission into the Robodebt Scheme, December 2022, at https://robodebt.royalcommission.gov.au/system/files/2022-12/transcript-hearing-day-16-8-december-2022.pdf

RRC (2023a) 'Transcript of Proceedings for Monday, 20 February 2023' Royal Commission into the Robodebt Scheme, February 2023, at https://robodebt.royalcommission.gov.au/system/files/2023-02/transcript-hearing-day-32-20-february-2023.pdf

RRC (2023b) 'Transcript of Proceedings for Monday, 2 March 2023' Royal Commission into the Robodebt Scheme, March 2023, at https://robodebt.royalcommission.gov.au/system/files/2023-03/transcript-hearing-day-40-2-march.pdf

RCR (2023) 'Report of the Royal Commission into the Robodebt Scheme', 7 July 2023, at https://robodebt.royalcommission.gov.au/publications/report

A2 Other Relevant Official Documents, in chronological order

DMA (1990) Data-Matching Program (Assistance and Tax) Act 1990, at http://classic.austlii.edu.au/au/legis/cth/consol_act/dpata1990349/index.html

DMP (1994) 'Guidelines for the Conduct of the Data-Matching Program' Delegated Legislated under the Data Matching Program (Assistance and Tax) Act 1990, October 1994, nominally enforceable, but applicable only if the matching process uses the Tax File Number (TFN), at https://www.legislation.gov.au/Details/F2009B00268

OAIC (2014) 'Guidelines on Data Matching in Australian Government Administration' Privacy Commissioner, June 2014, unenforceable, https://www.oaic.gov.au/privacy/privacy-guidance-for-organisations-and-government-agencies/government-agencies/guidelines-on-data-matching-in-australian-government-administration

Centrelink (2016) 'Data Matching Protocol', undated, but apparently of mid-2016, suppressed by Centrelink for a year, and only disclosed incidentally by another agency as an attachment to a letter of 16 May 2017 by the Privacy Commissioner responding to a Senator's questions, at http://www.aph.gov.au/DocumentStore.ashx?id=4f473c96-f345-4314-ad5d-a2c2eecfba47

OAIC (2017) Statements by the Privacy Commissioner, January-March 2017, at https://www.oaic.gov.au/media-and-speeches/statements/centrelink-debt-recovery-system [broken link on 6 Sep 2022]

DHS (2017) 'If you owe us money, you'll need to pay us back' Department of Human Services, 2016-17, https://www.servicesaustralia.gov.au/owing-money-for-centrelink-debt [but in many versions, without revision-markings]

Amato (2019) Amato v The Commonwealth of Australia (Federal Court VID611/2019), at https://www.comcourts.gov.au/file/Federal/P/VID611/2019/3859485/event/30114114/document/1513665

Prygodicz v Commonwealth of Australia [2020] FCA 1454 (17 September 2020) http://www.austlii.edu.au/cgi-bin/viewdoc/au/cases/cth/FCA/2020/1454.html?context=1;query=Prygodicz;mask_path

Commonwealth of Australia v Prygodicz [2020] FCA 1516 (14 October 2020) http://www.austlii.edu.au/cgi-bin/viewdoc/au/cases/cth/FCA/2020/1516.html?context=1;query=Prygodicz;mask_path

Robert (2019) 'Media Releases – 2019' Minister responsible for Services Australia, at https://web.archive.org/web/20200319204601/https://minister.servicesaustralia.gov.au/media-releases

SA (2021) 'Individuals' Services Australia, 24 June 2021, at https://www.servicesaustralia.gov.au/individuals/centrelink

Prygodicz v Commonwealth of Australia (No 3) [2022] FCA 826 (23 March 2022), at http://www.austlii.edu.au/cgi-bin/viewdoc/au/cases/cth/FCA/2022/826.html?context=1;query=Prygodicz;mask_path

Royal Commission into the Robodebt Scheme:

- Letters Patent, 18 August 2022, at https://robodebt.royalcommission.gov.au/about/terms-reference
- 'Document library', at https://robodebt.royalcommission.gov.au/document-library

SA (2022) 'A guide to Australian Government payments' Services Australia, at https://www.servicesaustralia.gov.au/sites/default/files/co029-2207.pdf

Musolino A. (2023) 'Exhibit 3-4208 - AMU.9999.0001.0003_R - 20221031 NTG-0012 - Response (Annette Musolino)(46258465.1)' Royal Commission into Robodebt, 30 January 2023, at https://robodebt.royalcommission.gov.au/system/files/exhibit/Exhibit%203-4208%20-%20AMU.9999.0001.0003_R%20-%2020221031%20NTG-0012%20-%20Response%20%28Annette%20Musolino%29%2846258465.1%29.pdf

Podger A. (2023) 'Report to the Royal Commission into the Robodebt Scheme' Royal Commission into the Robodebt Scheme, February 2023, at https://robodebt.royalcommission.gov.au/system/files/2023-02/andrew-podger-report-to-robodebt-royal-commission.pdf

Deloitte (2023a) 'The use of data and automation in the Robodebt scheme: A report to the Royal Commission into the Robodebt Scheme' Royal Commission into the Robodebt Scheme, March 2023, at https://robodebt.royalcommission.gov.au/system/files/2023-03/Use-of-data-and-automation-in-the-Robodebt-Scheme.pdf

Deloitte (2023b) 'Robodebt Process Maps' Royal Commission into the Robodebt Scheme, March 2023, at https://robodebt.royalcommission.gov.au/publications/deloitte-robodebt-process-maps

Acknowledgements

The authors greatly appreciated the comments of the reviewers, and the support of the Section Editor, Craig McDonald, and Editor, Karlheinz Kautz, which enabled us to materially improve the article's argument and presentation.

Copyright

doi: https://doi.org/10.3127/ajis.v28.4681