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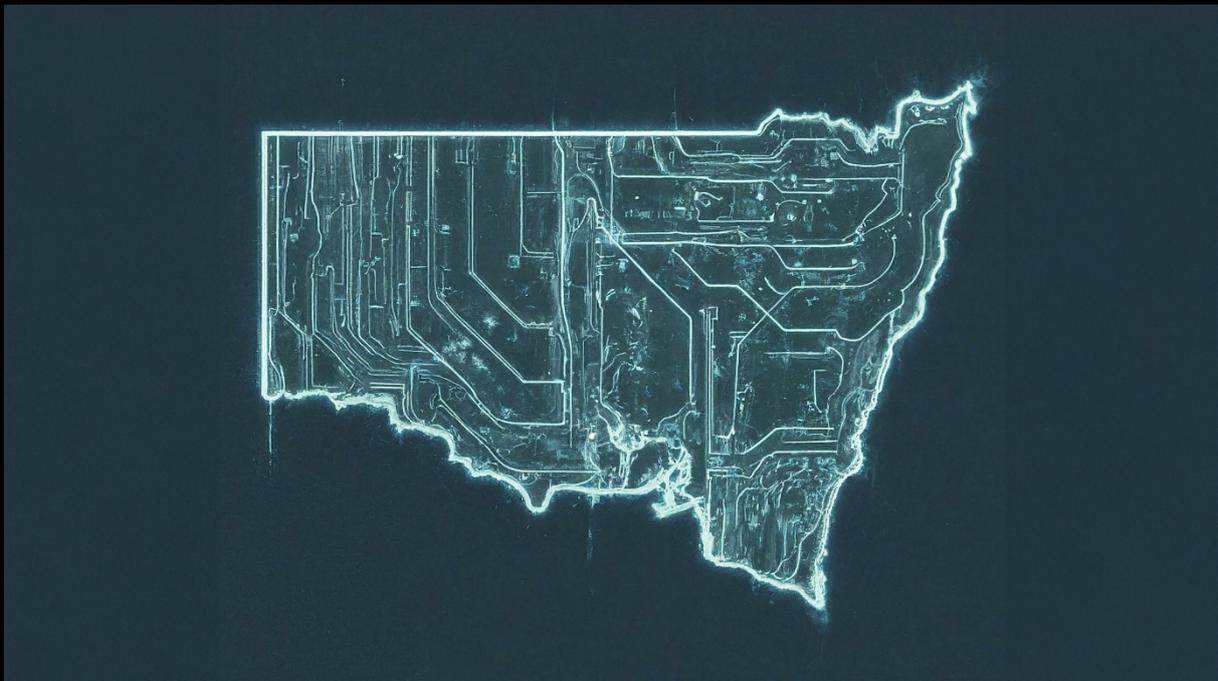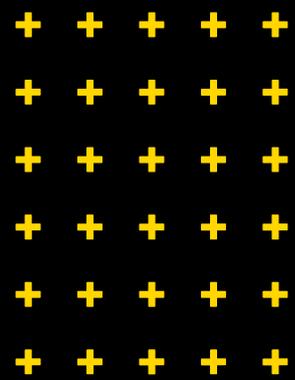
Mapping and Analysis of the use of ADM systems by state and local governments

Research Report

March 2024

Acknowledgement of Country

In the spirit of reconciliation, we acknowledge the Traditional Custodians of country throughout Australia and their connections to land, sea and community. We pay our respect to their elders past and present and extend that respect to all Aboriginal and Torres Strait Islander peoples today.

ABOUT THIS RESEARCH REPORT

We are experiencing significant technological shifts in how government decision-making is done. These shifts are in part about the adoption of artificial intelligence (AI), but also the expanding use of automated decision-making (ADM) systems in government services and functions, as more data becomes available, along with more ways to update, process, and use that data. These developments have significant implications for NSW state and local governments' relationships with the people of NSW.

The 2021 NSW Ombudsman report, *The new machinery of government: using machine technology in administrative decision-making* ('*New Machinery Report*') analysed the use of ADM systems (in that report, 'machine technology') in government. The report explored how administrative law applies to decision-making using automated technology. It also sought to provide guidance regarding good administrative practice when deploying these technologies. The *New Machinery Report* highlighted the importance of governments being transparent about, and accountable for, their use of ADM systems.

The NSW public has limited visibility over when and how ADM systems are being used to support or replace the work of NSW public servants in making decisions that affect the public in NSW. Neither state government departments and agencies, nor local councils, currently have any specific obligation to report their use of ADM systems.

The limited visibility of ADM systems used by the NSW state government and local governments:

- hinders the public's understanding, and their ability to hold governments accountable for use of ADM systems
- is a barrier to oversight by independent integrity agencies like the NSW Ombudsman's Office, and
- limits knowledge-sharing and capacity-building across government, which could hinder the development of best practice, and discourage beneficial uses of new technologies.

To address this knowledge gap, the NSW Ombudsman initiated this mapping and analysis of ADM use across government in NSW, both state government departments and agencies, and local councils. While the NSW Ombudsman's Office funded and supported this research, all responsibility for the data and analysis lies with ADM+S team. Views expressed in this Executive Report, and the Research Report are those of the researchers and do not necessarily represent the views of the NSW Ombudsman.

We found that **NSW government use of ADM is widespread, and increasing**, both at the state government level, and across local councils. This includes the use (and proposed use) of AI across a wide range of contexts, including across every NSW state government portfolio. We found ADM systems involved in across government services, from low to high

stakes contexts. We also found that a mapping of this kind is challenging for a whole range of reasons, and so we also provide insights, learned through the process of conducting this mapping, about how to identify, and record ADM system use in government, which we believe will be useful both for researchers, and for governments seeking to be transparent and accountable for their use of technology.

The research we present here is a **mapping**, **not a counting** of ADM systems across government in NSW. Defining ADM systems is not straightforward, and it is not always clear where an ADM system starts and ends. The research reported here is the result of a university project, funded by the NSW Ombudsman's Office and conducted by researchers affiliated with the ARC Centre of Excellence on Automated Decision-Making and Society (ADM+S). All responsibility for the research, data, and analysis presented in this Report lies with the authors.

HOW DID WE UNDERTAKE A MAPPING OF GOVERNMENT ADM SYSTEM USE ACROSS NSW?

The NSW state government is large, comprising 11 government departments, and more than 300 state agencies, offices and entities. Local government is also significant, comprising 128 local councils. Automated decision-making is a widespread phenomenon and a rapidly shifting target: this research was conducted over the course of 2023, a year when generative AI drew broad public – and public sector – attention to AI's potential.

To map ADM system use across NSW state and local governments, we developed a mixed research design, combining three methods:

1. **Direct surveys to government officials** asking all departments, agencies and local governments to report, categorise and briefly describe their ADM systems. Where government officials responded, the information we have on these systems is direct, likely accurate, and interesting.
2. **A systematised review of a subset of public information published by each department, agency, and local council** (official websites and annual reports, supplemented with procurement data), conducted via initial keyword search followed by human review, to learn how state government departments and agencies, and local councils are currently reporting and describing their adoption and development of ADM systems to the public.
3. **A small set of case studies,** based on interviews with public servants supplemented with documentary analysis, exploring the process and context of ADM systems.

By combining different methods, we aimed to address the challenges involved in seeking to map and understand a widespread, complex phenomenon. Each method offers us a different perspective for understanding how ADM systems are being used across government in NSW.

The body of this Report sets out our findings, with only high-level descriptions of the methods, for essential context. We explain

each methodology in detail in a Methodology and Data Annexure. Research instruments are also provided in an Appendix at the end of this Report.

A NOTE ABOUT DATA

Our Surveys had an end date of October 2023. In this Report, and the accompanying Executive Report, we present and analyse data about ADM systems reported up to that date. The analysis does not include ADM systems reported by NSW government departments and agencies to the NSW Ombudsman's Office as part of that Office's follow up process. In other words, the data presented here has already been added to, and this analysis is a **starting point**. We hope that publication of this Report prompts further awareness.

READING THIS REPORT

Our separate **Executive Report** explains the project, outlines key insights and records observations from the university research team, and considerations for public servants and policymakers. This **Research Report** provides more detail, in particular for public servants, and other researchers wishing to understand both the research and its methodology, and our findings in depth.

Section 1 of this Report sets out the scope of the project, explaining the project aims, the scope of ADM systems included in the research, and the structure of state and local government in NSW.

Sections 2 and 3 set out two different high-level **mappings** of ADM systems across NSW state and local governments:

- **Section 2** reports the result of a survey (**Survey 1**) sent to all NSW government departments and most NSW government agencies, and all 128 NSW local government councils (see the Methodology and Data Annexure for a full list). This asked recipients to identify ADM systems in use in their organisations, including systems currently or recently used, and systems planned in the next three years.
- **Section 3** reports a different mapping based on the **review of publicly available materials**. This shows us how NSW state and local governments are describing their use of ADM systems, including AI, to the NSW public. It provides additional analysis of a longitudinal nature, and helps fill in some gaps in the survey data. It suggests that NSW government departments, agencies and councils are talking about automation a great deal, although not in depth and not in a systematic way.

Sections 4 and 5 seek to **analyse** whether ADM systems as developed and deployed across NSW meet the requirements of good administrative practice in the design, development, deployment, monitoring and de-commissioning of ADM systems, as set out in the *New Machinery Report*:

- **Section 4** reports analysis of a second survey (**Survey 2**) sent to government-identified contacts in relation to a subset

of systems identified in Survey 1. Survey 2 covered stages of the system, including its inception, design, verification, deployment and use, governance, review and legal settings, technical design and procurement, and input data. Section 4 also develops themes which emerged from the free text descriptions provided by respondents to Survey 1.

- **Section 5** reports a small set of case studies based on interviews with public servants covering four discrete ADM systems, the use of computer vision in local councils, and NSW Health's own efforts to map ADM system use. These case studies provide an even deeper dive into a small set of systems and developments in ADM use in NSW.

Section 6 concludes, setting out core findings and considerations for future policy.

As well as a picture of ADM use across NSW, this combination of methods taught us something else: that seeking to map the use of ADM systems across different levels of government is challenging for everyone involved. Each of our methods has generated different data, and a different picture of ADM use; each method highlights gaps in the others. This reflects, in part, the evolving nature of ADM system use, and the many forms it can take.

The work commenced here contributes immediately to transparency over ADM systems in governments in NSW, and a broader public dialogue over how they should be designed, developed and deployed, monitored and de-commissioned. We hope that it will also enhance the ongoing policy discussion regarding how transparency in relation to ADM and AI can be maintained and enhanced going forward.

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01. THE SCOPE OF THE RESEARCH

Mapping the use of automated decision-making (ADM) systems across governments in NSW is a complex undertaking. There is no single, accepted definition of ADM, just as there is fuzziness around the concept of AI, which is a set of technologies that may be used in ADM. In addition, the NSW government is large, and complex.

This section outlines sets out the **aims, and scope** of the research presented in this Report. The methodologies we have used are summarised at a high level in each section, and in detail in the Methodology and Data Annexure.

1.1. PROJECT AIMS

This project was initiated by the NSW Ombudsman's Office. It had two core objectives:

1. **A mapping of ADM system use:** to identify, catalogue and analyse the current and planned uses in governments in NSW of ADM systems in decision-making affecting people in NSW,[1] including their functions, and types, as well as whether their use is in the recent past, current or planned (within the next three years).

2. **An analysis** of the use of ADM systems according to the key risks and issues relating to administrative law and good administrative conduct as highlighted in the *New Machinery Report*. This includes how the ADM system was designed, monitored, whether it is transparent to people affected, and what assurances there are that the ADM tool is operating, and will continue to operate, lawfully and in accordance with principles of good administrative practice.

1.2. WHAT IS AN ADM SYSTEM? (IT IS NOT ONLY AI)

To meet the project aims, we needed first to define what is meant by ADM systems.

A first critical point is that this project was concerned with the use of **ADM systems,** not only with the use of **AI** by NSW government departments, agencies, and local councils.

AI is a much-debated term, but importantly for present purposes, it refers to a (set of) technologies that generate predictive outputs based on parameters or objectives defined (usually) by a human but without

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[1] The project was not concerned with Commonwealth government decision-making affecting people in NSW.

explicit programming.[2] AI has rightly drawn attention for a range of risks: concerns about bias, fairness, and about decisions based on probabilities rather than actualities.[3]

But automation by government that does not involve more advanced technologies, such as machine learning or prediction, still impacts the relationship between a government and the people it governs:

- ADM increases speed, standardisation and consistency of decision-making: which can be positive (if accurate, and if consistency is wholly beneficial) or problematic (errors can be quickly multiplied).
- ADM reduces administrative discretion and in turn supports the increased codification of policy in law.[4] In doing so, it can contribute to de-skilling of government official's jobs, thereby further reducing discretion and judgement in practice and an increased reliance on and a default to ADM.[5]
- ADM has been accompanied by growing complexity in policy, law and service delivery arrangements,[6] which in turn can increase the opacity of the decision-making process[7] and increase the risk of errors being introduced and not detected.
- ADM has given rise to 'digital by default', and self-service engagement with government, whereby the public engage directly with government online, including entering data to apply for services and reporting, as well as automated advice through chatbots and the like.

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[2] See the definition in ISO/IEC 22989:2022, which was the basis for the definition offered in the recent Commonwealth Government Discussion Paper on *Safe and Responsible AI,* which defined AI as 'an engineered system that generates predictive outputs such as content, forecasts, recommendations or decisions for a given set of human-defined objectives or parameters without explicit programming', noting further that 'AI systems are designed to operate with varying levels of automation'.

[3] Paul Henman, 'E-government, targeting and data profiling: Policy and ethical issues of differential treatment' (2005) 2(1) *Journal of E-government* 79-98; Frederik Borgesius, 'Singling out people without knowing their names– Behavioural targeting, pseudonymous data, and the new Data Protection Regulation' (2016) 32(2) *Computer Law & Security Review* 256–271.

[4] Peter A. Busch and Helle Z. Henriksen 'Digital discretion: A systematic literature review of ICT and street-level discretion' (2018) 23(1) *Information Polity* 3–28; Stavros Zouridis, Marlies Van Eck and Mark Bovens, 'Automated discretion' In Tony Evans and Peter Hupe (eds) *Discretion and the quest for controlled freedom* (Palgrave, 2020), 313-329.

[5] Barbara Garson, *The electronic sweatshop* (Penguin books, 1989); Elizabeth E. Joh, 'The consequences of automating and deskilling the police' (2019) 67 *UCLA L. Rev. Discourse* 133; Phillip Gillingham, 'Electronic information systems and human service organizations: The unanticipated consequences of organizational change' (2015) 39(2) *Human Service Organizations: Management, Leadership & Governance* 89-100.

[6] Paul Henman, *Governing electronically: E-government and the reconfiguration of public administration, policy and power* (Springer, 2010) Ch 11.

[7] Frank Pasquale, *The black box society: The secret algorithms that control money and information* (Harvard University Press, 2015).

Australia has already been made aware of the risks of the use of ADM by government, seen in examples which are broader than the use of what would usually be defined as AI. The most high-profile case involving automation of government functions in Australia is the Online Compliance Intervention system used by the Commonwealth Government, colloquially known as 'Robodebt'. Robodebt has been the subject of a Royal Commission, which reported to the Governor General on 7 July 2023, highlighting significant problems with the way automation was adopted. The Royal Commission made a number of recommendations relating to future government use of ADM, highlighting needs including: a clear path for review; information on the use and process of the ADM in plain language and publicly available; and the availability of business rules and algorithms, to enable independent expert scrutiny. It recommended that the Commonwealth consider legislative reform to establish a consistent framework and the establishment of a body to monitor and audit ADM in government services.[8] As the literature notes, ADM remains pervasive and problematic in social security administration in Australia and internationally.[9]

The NSW government's use of ADM tools, and inflexible structured decision-making tools (such as risk assessment approaches) that can prefigure full automation has also been the subject of criticism. In an Annexure to the 2021 *New Machinery Report*, the NSW Ombudsman reported on Revenue NSW's Garnishee Order (GO) System.[10] The Report identified how the adoption of ADM in the issuance of garnishee orders[11] for the recovery of debts owing to the government led to a significant increase in orders, resulting in notable hardship, especially for low-income and welfare recipients.[12] The NSW Ombudsman reported legal advice of Senior Counsel that between early 2016 and March 2019, the operation of the GO system was 'unlawful because no authorised person engaged in a mental process of reasoning' necessary to issue a garnishee order.[13] Doubt remained as to whether amended GO system processes – which introduced a human-in-the-loop – are sufficient to constitute a lawful garnishee order.

In another example, the NSW Police Force Suspect Target Management Plan (STMP) – an intelligence-led policy and strategy aiming to proactively reduce harm by repeat offenders – has been subject to

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[8] *Royal Commission into the Robodebt Scheme* (Final Report, July 2023) Recommendations 17.1–2.

[9] Terry Carney, 'Automation and Conditionality: Towards 'virtual' social security? (2024) 31(1) *Journal of Social Security Law* 32–48 (in press); M. Bouwmeester, 'System Failure in the Digital Welfare State: Exploring parliamentary and judicial control in the Dutch childcare benefits scandal' (2023) 44 *Recht der Werkelijkheid* (*Journal of Empirical Research on Law in Action*) 13–37.

[10] NSW Ombudsman, *The new machinery of government: using machine technology in administrative decision-making, (Annexure A) – Revenue NSW case study* (November 2021) ('*New Machinery Revenue NSW case study*').

[11] A garnishee order is an order for the recovery of a debt directly from a person's bank account. A garnishee order can mean there are insufficient funds in the bank account for everyday expenses, and cause a person to default on scheduled payments out of the account, such as for rent or utilities.

[12] The number of garnishee orders issued by Revenue NSW increased from 6,905 in the 2010–11 financial year to more than 1.6 million in 2018–9. Ibid, 1–3.

[13] Ibid 3.

significant and sustained criticism for enabling intrusive and discriminatory policing. A key component of the STMP is a standardised actuarial risk assessment tool used to evaluate an individual's overall risk. This risk assessment is used by police to make decisions about whether a person is subject to the STMP as well as the kinds of policing strategies they may be targeted with. Recent iterations have seen this process shifted to a police intelligence system called Chimera, which automatically generates a shortlist of people to be targets of the STMP. In both instances, concerns have been raised about the potential for the selection process to exhibit bias, which may disproportionately impact young people and facilitate discriminatory policing practices.[14] Notably, the over-representation of young Aboriginal and Torres Strait Islander People on the STMP has been a consistent point of criticism. The continuing concerns about the STMP has led the NSW Police Force to discontinue its use in relation to young people in 2023, although it may still be used in relation to adults.

Lastly, a NSW government-commissioned, independent review in 2019 into Aboriginal out-of-home care in NSW has highlighted issues with structured decision-making approaches in child protection.[15] The report identified considerable deficiencies in the way that safety and risk assessment (SARA) tools were used in the decision-making pathway around whether a child is taken into care. For example, the report discussed how SARA tools that are completed by inexperienced, biased or non-compliant caseworkers may perpetuate cognitive biases against Aboriginal children and families. Despite NSW guidance noting the importance of Aboriginal consultation during uses of structured decision-making, the report found that there was little consultation around the use of SARA tools with respect to Aboriginal children who enter care. The report concluded that the Secretary could not be said to have properly investigated and formed the opinion on reasonable grounds regarding Aboriginal children in need of care and protection[16] until these issues were addressed.[17] A government response to this report is available online.[18]

None of these examples involved the use of advanced AI techniques. They reinforce the importance of extending this research to the use of ADM systems in government.

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[14] Law Enforcement Conduct Commission, *An Investigation into the use of the NSW Police Force Suspect Targeting Management Plan on Children and Young People* (Final Report, October 2023) Ch 3; Vicki Sentas and Camilla Pandolfni, *Policing Young People in NSW A study of the Suspect Targeting Management Plan* (Youth Justice Coalition, 2017).

[15] Megan Davies, *Final Report of the Family is Culture: Independent Review into Aboriginal and Torres Strait Islander Children and Young People in Out-of-Home Care in New South Wales* (Report, 2019).

[16] As prescribed by *Children's and Young Persons (Care and Protection) Act* (NSW) s 34.

[17] Davies (n 15) p 219–20.

[18] Office of the Children's Guardian (NSW), *Response to the Family is Culture independent review into Aboriginal out-of-home care in NSW* (July 2020).

1.3. WHAT ADM SYSTEMS HAVE WE SOUGHT TO MAP?

This project has sought to map fully and partially automated ADM systems, used by government, in administrative decision-making that affects people. This is a broad scope, and each of these terms – automated, decisions, and systems – is contestable and therefore warrants some further explanation. A more detailed explanation of how we defined ADM and how we communicated that definition in the course of the research is set out in the Data and Methodology Annexure to this Report. In summary however, how we have defined the scope of each of these terms, for the purposes of this project, is set out in Table 1 below. We discuss reasons for this scope below the table.

Table 1: What is an ADM system?

ADM system: a fully or partially automated technical system, used by a NSW government organisation (state government department or agency, or local council), in administrative decision-making, and that affects people.	
Fully or partially automated	An ADM system may be **fully or partially automated**. It may: • make a final decision • make a recommendation to a decision-maker • guide a human decision-maker through a decision-making process • provide decision support, e.g., commentary at relevant points in the decision-making process • provide preliminary assessments, and/or • automate aspects of the fact-finding process and influence an interim decision or the final decision. An automated system may or may not involve the use of AI.
Decisions that affect the people of NSW	This research focuses on the use of ADM in decisions that **affect the people of NSW**. It does not consider purely internal government activities or business processes, nor, for example, systems managing transport or goods logistics or for assessing or understanding natural resources or natural phenomena (e.g., meteorological systems). Clinical decision-making in the Health portfolio is also excluded due to its distinct nature. The project was not confined to decisions that would be reviewable under administrative law. Consistent with our inclusion of partial automation, we were interested in ADM that contributed to decisions, not just systems that make final decisions.
Systems	'Systems' can be defined at different levels. A large database that powers multiple automated decision-making functions could be seen as one large system, or multiple smaller subsystems. For this research, a bottom-up approach was adopted: that is, we recorded ADM systems as they were defined by public servants themselves, within the context of their own organisational and administrative systems.

Used by a NSW state government department or agency, or local council	ADM systems of interest are (i) systems currently in use, being piloted, discontinued within the last three years or planned within the next three years (ii) by a NSW state government department or agency, or NSW local council.

Automated

As set out above, our research considered partial, as well as full automation. Decisions are *automated* where technology is used that 'either assists or replaces the judgment of human decision-makers'.[19] This concept of automation set out in Table 1 above draws on the Commonwealth Ombudsman's *Better Practice Guide*.[20]

Whether a government process is fully automated, or an automated system contributes data, or shapes the decision-making process, it can have implications for people affected by those decisions. A decision support system can close off options for a decision-maker or individual; analysis or prediction can shape the way a decision-maker understands a case before them. For example, the Dutch SyRi fraud detection system calculated risk scores for different welfare recipients, leading to further investigation and legal decision-making. It was found that the system was in breach of the EU's Human Rights Act because its calculations was biased, giving higher risk scores to migrant families.[21] This example illustrates that automated calculations or data analytics poses legal, policy and ethical concerns even when not directly providing input into an administrative decision.

Our project has therefore sought to include ADM systems across this spectrum: wherever the ADM system is replacing or assisting the human decision-maker. We did however exclude the simplest forms of automation from our survey instrument.[22]

(Administrative) Decision-making

In defining the scope of our project, we also took a broad view of what constitutes a 'decision', extending beyond the limited set of government decisions which give rise to rights under administrative law, to decisions that affect the people of NSW. This reflects the broader remit of the NSW Ombudsman under s 26 of the *Ombudsman Act* 1974 (NSW) to consider, not just administrative *decisions,* but administrative *conduct* that, while not necessarily illegal, is nevertheless unreasonable, unjust, oppressive or improperly

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[19] This definition comes from the Government of Canada, *Directive on Automated Decision Making* (April 2023).

[20] Commonwealth Ombudsman, *Automated Decision-Making Better Practice Guide* (July 2023).

[21] Van Bekkum, M., and Borgesius, F. Z., 'Digital welfare fraud detection and the Dutch SyRI judgment' (2021) 23(4) *European Journal of Social Security* 323–340.

[22] For more detail, see the Methodology and Data Annexure. The survey instrument and participant information sheet which sought to explain which systems were in scope are included in the Appendix.

discriminatory.[23] We do not confine our understanding of 'decisions' to acts which involve a human decision-maker engaging in a 'mental process'.[24]

Decision-making is a process, often involving multiple choices or acts that precede any final decision. It is not only systems that make or substantially influence a final administrative decision that can have a significant impact on people. A chatbot or guided webform on a government website could misinform or misdirect a member of the public and lead to them missing out on entitlements in ways that significantly impair their lives, health, or opportunities. An automated triage system could determine which issues or inquiries government officials should prioritise for investigation or attention.

That said, the NSW Ombudsman is most concerned with government decisions and conduct that affects members of the NSW public, by way of a broad understanding of the exercise of public power. We did not seek to collect data on the automation of internal business or organisational processes or activities.[25]

System

'System' can also have a range of meanings and operate at a number of levels. A database used for multiple automated activities (such as issuing a range of licences, or licence renewals, and tracking demerits against those licences) could be considered a single 'system', or a series of ADM systems, on the basis that there are multiple different *decisions* being made, with potentially different degrees of impact on people. As Table 1 notes, we relied on government officials' own identification of 'systems', on the basis that local, 'bottom-up' understandings are most useful for an overall mapping which seeks to provide transparency over use of ADM systems to the public.

This approach has downsides. Organisations making more extensive use of ADM systems may have described systems at a higher level, to keep the work of filling out the survey manageable. We were asked to clarify what we meant by 'system', and we observed that local governments and small state government agencies often reported ADM systems that were small in scope or size, whereas large agencies with high levels of automation (such as the Transport portfolio) reported ADM systems at higher-level systems, with multiple automated functions. A good example is our case study of LifeLink and the Online Birth Registration systems. These systems make possible, among other functions, customer-driven online registration of births. At different points the views within the NSW Registry of Births Deaths and Marriages (BDM) diverged: for some LifeLink was the reportable ADM system, whereas for others, focusing on the function (the registration), the Online Birth Registration system (OBR) was the ADM

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[23] NSW Ombudsman, *The new machinery of government: using machine technology in administrative decision-making* (November 2021) ('*New Machinery Report*') 9.

[24] Cf *Pintarich v Deputy Commissioner of Taxation* [2018] FCAFC 79.

[25] On the other hand, we did collect information regarding internal systems in our review of publicly available material, in part due to challenges in differentiating systems. See further Section 3 and the Methodology and Data Annexure.

system. Depending on the approach, this could be reported as one system, or multiple systems to match the number of functions it could perform (e.g., registration of births, marriages, deaths, etc.), increasing as these functions are progressively added. This is one reason why the data in this Report must be read as a **mapping,** not a **counting** of ADM systems in NSW state and local governments.

1.4. STATE AND LOCAL GOVERNMENTS IN NSW

This project has sought to examine use of ADM systems at the state and local government levels across NSW. It may be helpful to explain how these are organised, especially for readers outside of NSW. We are talking about a large sector. According to the NSW Public Sector Commission, in 2022 over 400,000 people worked in the NSW public sector, or 10.1% of all people employed in NSW.[26]

State government departments and agencies

The NSW state government is complex. At the time we sent out Survey 1 in early 2023, it was made up of 11 departments (core state government entities responsible for policy development and service delivery),[27] and over 300 separate agencies (specialist government organisations established under law with specific limited responsibility). Departments and agencies at that time were also grouped more broadly into clusters, working in related areas and each with a responsible Minister**.**

One matter of terminology must be noted. In April 2023, during the course of this research and after surveys had been distributed, the NSW government replaced the terminology of *clusters* with *portfolios* and made some other minor institutional changes. Other institutional changes have occurred over the course of the project. In this Report, we use the current terminology, i.e. portfolios. Our data, and the analyses we have produced however reflect the institutional allocations in place as of February 2023.[28]

The portfolios differ in their range and type of responsibilities, their size and the numbers of agencies. At the time of Survey 1, for example, the Health portfolio included multiple Local Health Districts and networks, Medical Councils, the Ambulance Service and other agencies. The Treasury portfolio on the other hand included only 5 agencies. Some departments and agencies are directly responsible for service delivery to the people of NSW – e.g. the Education department; others (such as Treasury, or Premier and

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[26] Public Service Commission, *Workforce Profile Report 2022, Executive Summary* (December 2022). Note that this research does not cover the whole public sector: only state government departments and agencies, and local councils. It does not, for example, extend to ADM use in public schools or public hospitals.

[27] Effective 1 January 2024, Department of Planning and Environment has been split to form two departments, bringing the current number to 12.

[28] That is, where we report ADM systems by portfolio, the systems will be those reported by the agencies and departments allocated to that portfolio (then cluster) as of February 2023. We have also used the current names of portfolios for better comprehensibility: thus we refer to the Communities and Justice portfolio, although in February 2023 it was referred to as the Stronger Communities cluster.

Cabinet) perform oversight, coordination, and policy roles. Again, this reaffirms that our project is a **mapping**, not a count.

Table 16 in the Appendix[29] sets out the institutional arrangements and groupings as of February 2023.

Local government

The other level of government covered by this research is local government**.** There are 128 local councils in NSW, classified into rural (16), large rural (42), regional town/city (36), metropolitan fringe (9) and metropolitan councils (25). Table 18 in the Appendix provides a list.[30] NSW local councils are independent, locally-elected statutory bodies. They have a range of responsibilities, including maintenance of local roads, parks, libraries, and other public/community services and infrastructure; waste management (garbage collection), and some development and planning functions. They engage in some enforcement activities, for example with respect to street parking.

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[29] See Appendix, below at 140.

[30] We have chosen in reporting survey results not to identify individual councils, as it is possible to conduct meaningful analysis at a group level, owing to the fact that we have multiple organisations performing similar tasks and with similar jurisdiction. Where our analysis is based on publicly available material published by local councils, those councils are named.

02. MAPPING ADM SYSTEMS REPORTED BY NSW STATE AND LOCAL GOVERNMENTS

In this section we report our analysis of the ADM systems that have been reported to us by NSW government departments and agencies, and local governments across NSW. We sent out a short survey that asked state government departments and agencies, and local councils to identify, categorise and briefly describe each ADM system in use, used recently or planned for use within the next three years. The material below distinguishes between ADM systems used by state government departments and agencies, and local governments. We draw this distinction because the spheres of operation are very different as between state and local government.

In summary: while not all NSW departments and agencies provided responses to our survey, those who did reported 136 ADM systems, a third of which are planned, in development or being piloted. These systems perform a wide range of government functions, using a range of technologies, from simple decision-tree systems to natural language processing (NLP) and generative AI. Of 35 local councils which responded, 14 reported 77 ADM systems performing a range of purposes, with 23 of the reported systems planned, in development or being piloted.

These reports, sourced directly from governments across NSW, confirm that ADM systems are **widespread, varied**, and **actively expanding** across NSW state government departments and agencies and local governments.

2.1. ADM SYSTEMS REPORTED BY NSW STATE GOVERNMENT DEPARTMENTS AND AGENCIES

At the state government level, we sent surveys to a total of 206 NSW government organisations, made up of 11 departments and 195 agencies.[31] Separate responses from each department and agency were sought because these organisational entities typically have their own responsibilities and functions and operate independently. They are diverse in their size and resourcing, which has implications for both their need for ADM systems, and resourcing to deploy them.

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[31] A full list used in this project is included in Table 16 in the Appendix below.

Responses were received from over a third of those organisations (Table 2). Departments had a higher response rate.[32] There are a range of reasons why departments and agencies may not have provided responses to the voluntary survey within the survey period: surveys may not have reached the right people, and the data collection occurred at a busy time, with a state election, a subsequent change of government, some restructuring, the state government budget. Further discussion of our methods is provided in the Methodology and Data Annexure below. We note that further information may have been provided after our survey period directly to the NSW Ombudsman's Office as part of that Office's follow-up process. Information provided directly to the NSW Ombudsman's Office is not part of our analysis below.

Use of ADM systems by NSW state government portfolio

Table 2 shows the survey responses received, and ADM systems reported, by NSW government portfolio.

Table 2: Survey responses and reported use of ADM systems by state government portfolio

Portfolio*	Organisation type	Organisations reporting zero ADMs (n)	ADMs Reported (n)
Communities & Justice	Department (1)	0	10
	Agencies/Entities (35)	10	19
Customer Service	Department (1)	–[33]	-
	Agencies/Entities (22)	5	13
Education	Department (1)	0	9
	Agencies/Entities (5)	-	-
Enterprise, Investment & Trade	Department (1)	0	4
	Agencies/Entities (16)	6	7

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[32] The response rate is broadly consistent with typical response rates to online surveys: Meng-Jia Wu, Kelly Zhao and Francisca Fils-Aime 'Response rates of online surveys in published research: A meta-analysis' (2022) 7 *Computers in Human Behavior Reports* 100206.

[33] No consolidated department response was provided by the Department of Customer Service, however, units within that department returned responses that are included in the 'agencies and entities' count.

Health	Department (1)	1	0
	Agencies/Entities (47)	1	9
Independent Integrity Agencies	Agencies/Entities (6)	0	6
Planning & Environment	Department (1)	-	-
	Agencies/Entities (32)	1	5
Premier & Cabinet	Department (1)^	0	3
	Agencies/Entities (6)	2	1
Regional NSW	Department (2)	0	1
	Agencies/Entities (11)	2	11
Transport	Department (1)	0	11
	Agencies/Entities (10)	0	24
Treasury	Department (1)	0	1
	Agencies/Entities (5)	1	1
TOTALS	Departments (11)	1	39
	Agencies (195)	30	97
	Total (206)	31	136

Portfolio relationship with agencies/entities and numbers based on organisational structure of NSW government as at early February 2023, Table 16 in the Appendix sets out the list used in this project to allocate entities to portfolios.

^Restructure means some functions/responsibilities from this department have been spread across 2 departments.

Table 2 highlights that the Transport portfolio and the Communities and Justice portfolio reported higher levels of automation compared to other portfolios, as did the Department of Education. The high automation of transport arguably reflects the highly technical role in managing transport movements, licensing and infrastructure. The Communities and Justice portfolio provides a wide range of services to diverse population groups, which may necessitate diverse automation practices. We consider below the distribution of uses of ADM systems among these portfolios.

ADM

+S

Figure 1 shows the proportions of organisations reporting ADM systems. Of the 77 state government organisations that responded of the total of 206 surveyed, 31 said that they had no ADM systems, while 46 said that they were using ADM systems or were planning to use them in the next three years. A total of 136 systems were reported to us.

Analysing the patterns of the ADM systems reported provides some indication of the distribution of ADM systems across NSW state government organisations, though given the diversity between portfolios and their activities, care must be exercised when extrapolating patterns to the full range of ADM systems across the NSW state government. We undertook a separate analysis of material published on government websites and other official sources, which provides insights into ADM systems use in organisations that did not respond to the survey (see Section 3 below).

Does your agency currently use, or plan to use in the next 3 years, any ADM systems that may fall within the scope of the mapping project?

31, 40%

46, 60%

■ YES ADM   ■ NO ADM
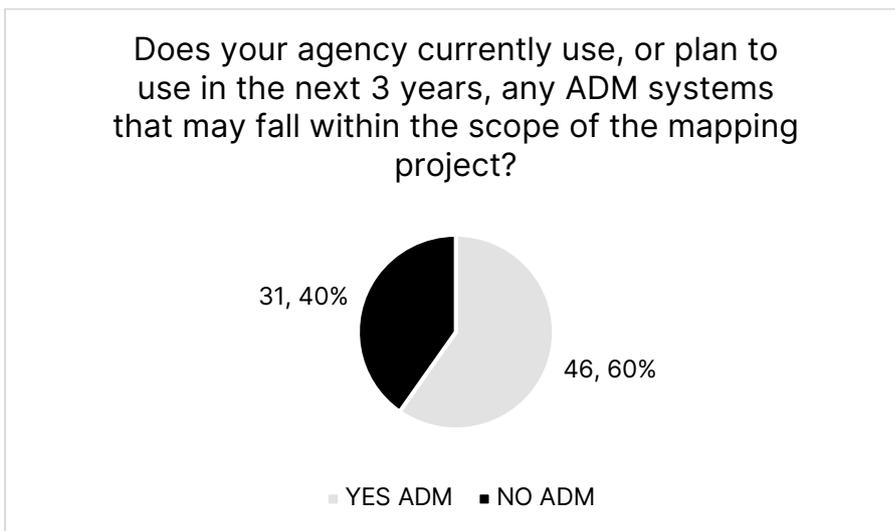
Figure 1: Proportion of NSW state departments and agencies reporting ADMs in use or planned

Status of ADM systems in NSW state government departments and agencies

As Figure 2 shows, most of the 136 ADM systems reported are currently in use (89, 65%), with 6 being piloted, 14 in development, 25 planned for use in the next 3 years and 1 discontinued in the last three years.[34] Only one ADM system was reported as being discontinued in the last three years. Looking closely at the survey data, there were cases where a system was reported as both in use, and in development: in such cases the status was taken as 'being in use'.

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[34] One agency reported having an ADM system, but did not indicate its use status.

What is the ADM system's current status?

Status	Value
In use	89
Being piloted	6
In development	14
Planning in next 3 years	25
Discontinued within last 3 years	1
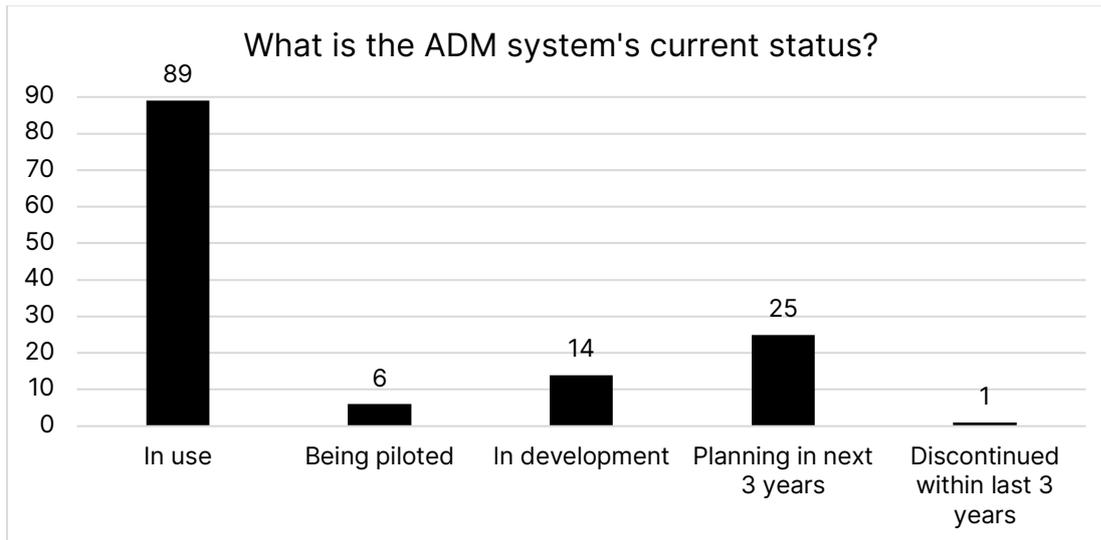
Figure 2: Status of ADM systems in NSW departments and agencies

Organisational purposes of ADM systems in NSW state government departments and agencies

Figure 3 sets out the organisational purposes to which ADM systems are being put. The survey allowed for multiple responses, recognising that one ADM system may serve more than one organisational purpose. The purposes as explicitly described in the survey were as follows:[35]

- **Enforcement**: including identifying infringers and sending notices; licence or permit termination; preliminary assessment of possible infringements; application and collection of fines
- **Compliance**: including systems that enable compliance (e.g. systems for applying for/renewing licences and permissions; systems that enable regulated actors to submit information)
- **Adjudication and justice**: tasks that support formal or informal agency adjudication or rights or entitlements
- **Public service delivery and user interaction**: direct provision of services to the public (e.g. delivery of education services to students); chatbots and other automated systems for engagement with, or service delivery to, the public
- **Resource allocation and planning**: using data-driven insights to make operational and resource allocation decisions (e.g. identifying communities to prioritise for street maintenance, policing or public health interventions)
- **Policy design**: monitoring or analysing effectiveness of government actions or policies; profiling or cohort analysis for policy purposes

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[35] The derivation of this list is further explained in the Methodology and Data Annexure below, Section 8.5.

- **Public service operations**:[36] e.g. procurement; monitoring service delivery and performance; internal fraud detection, and

- **Other:** with respondents invited to 'please describe'.

The survey data suggests that **compliance** is the most common use of ADM systems in NSW state organisations. Of those listing an organisational purpose for their reported ADMs, over a third (34%) of ADMs listed compliance (33, or 24% of all reported ADM systems).[37] This was closely followed by resource allocation and planning (27 ADM systems, 28%), and public service delivery and user interaction (23, 24%). Both enforcement and public service operations were listed as organisational objectives for 21 ADM systems (16% of all ADMs reported, 22% of ADMs with reported organisational purposes). Interestingly, few organisations reported using ADM systems for adjudication and justice, suggesting that perhaps there is still a strong sense that human decision-making should be used in that area.
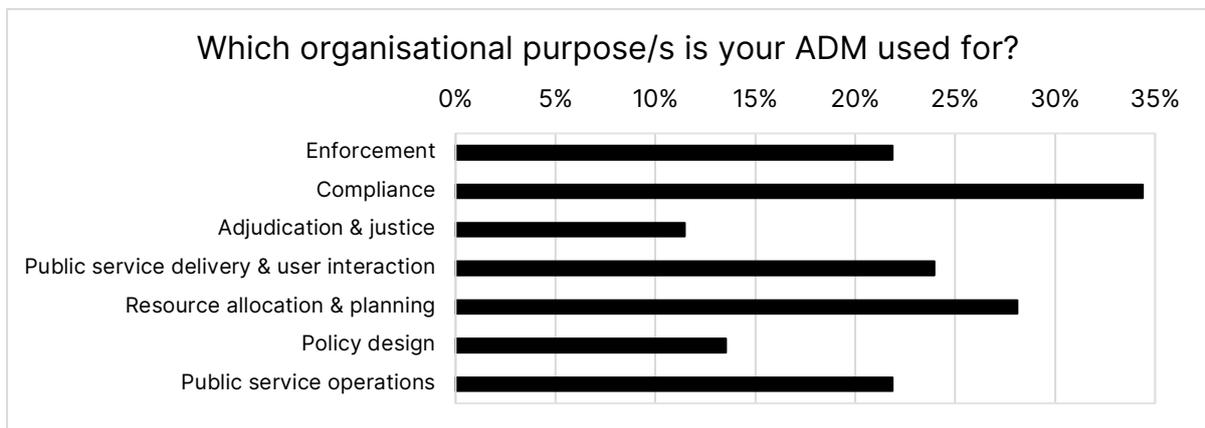
Figure 3: Organisational purpose of ADM systems in NSW departments and agencies

NSW state government departments and agencies also classified 25 purposes into 'other', with their descriptions including: data management (data transfer); incident management, registration and trading of certificates; audit management; analysis of stakeholder inputs to assist decision-making; 'insight gathering' (e.g. generating insights to support schools); eligibility assessments and others. While some of

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[36] Recall that only ADM systems with (direct) implications for people in NSW were within scope, thus only certain types of ADM systems used public service operations would likely to be reported. The same applies in relation to systems for resource allocation and planning.

[37] An organisational purpose for 40 (29%) of the 136 ADM systems was not reported. Survey responses which did not identify an organisational purpose were much more likely on reported future ADMs (47% not classified), than for those not those currently in use (19% not classified). No responses may have been a result of the respondent not knowing the answer, choosing not to respond or challenges in filling in the survey (in particular, the use of the 'carousel' feature to present options within Qualtrics).

these arguably fall within our categories, in most cases those categories were also nominated: respondents appeared to use the additional 'other' purpose to provide more nuanced information.

We would expect the organisational purpose of ADM systems to vary by portfolio, reflecting the different policy scope, goals and approaches of organisations within those portfolios to their interactions with members of the public. For example, the Customer Service portfolio is oriented towards the delivery of services direct to the public, while the Communities and Justice portfolio has more enforcement responsibilities, as well as direct responsibility for managing specific groups in society (such as prison populations).

Figure 4 visualises the different patterns in the organisational use of ADM systems by portfolio.[38] It shows that 60% of reported ADM systems within the Planning and Environment portfolio (noting that this did not include a department response) are used for resource allocation and planning, and none for enforcement, adjudication and justice, or public service delivery. This suggests that the portfolio (at least those parts of it which responded) is not particularly customer facing in its use of ADM systems.

The Health portfolio also reported a significant proportion of ADM systems for resource allocation (50%, noting that clinical systems were excluded from our study). ADM systems for adjudication and justice were evident in the Customer Service portfolio. Meanwhile in the Regional NSW and Enterprise, Industry and Tourism portfolios, ADM systems for compliance were common.

It may seem incongruous that the Communities and Justice portfolio did not report ADM systems for adjudication and justice – defined as 'tasks that support formal or informal agency adjudication or rights or entitlements'. Given 21 ADM systems in this portfolio had organisational purposes classified, this is a robust pattern suggesting that ADM systems are prioritised for use for other organisational purposes. Indeed, the portfolio reports a wide range of organisational uses.

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[38] To ensure a meaningful analysis, Figure 4 includes data only for portfolios where the organisational purposes for five or more ADM systems were reported. For example, as the Treasury portfolio only reported one ADM system, it would not be meaningful to make a conclusion about the pattern of the organisational use of ADM systems in that portfolio.

Cluster	Enforcement	Compliance	Adjudication	Public service	Resource	Policy	Operations	Other
Regional NSW	50%	100%	0%	17%	50%	17%	0%	33%
Enterprise, I&T	50%	83%	17%	33%	50%	67%	0%	17%
Health	13%	25%	13%	25%	50%	0%	25%	38%
Education	0%	0%	0%	30%	10%	30%	10%	80%
Communities	14%	24%	10%	29%	24%	14%	14%	24%
Transport	31%	38%	8%	12%	15%	0%	42%	12%
Customer Service	17%	33%	33%	50%	33%	17%	33%	17%
Planning & Environment	0%	20%	0%	0%	60%	20%	0%	40%

Figure 4: Proportion of ADM systems reported by organisational purposes and by NSW state government portfolio

Figure 5 shows how organisational purposes are distributed by the status of the ADM systems, comparing ADM systems currently in use with those being developed, piloted and planned. The pattern suggests a shift in the organisational purposes being pursued with the aid of digital technologies: compliance and enforcement is receiving less future attention, with a shift towards resource allocation and planning, public service delivery and user interaction. The role of chatbots and wider generative AI is evident in this shift, as more detailed data will demonstrate.
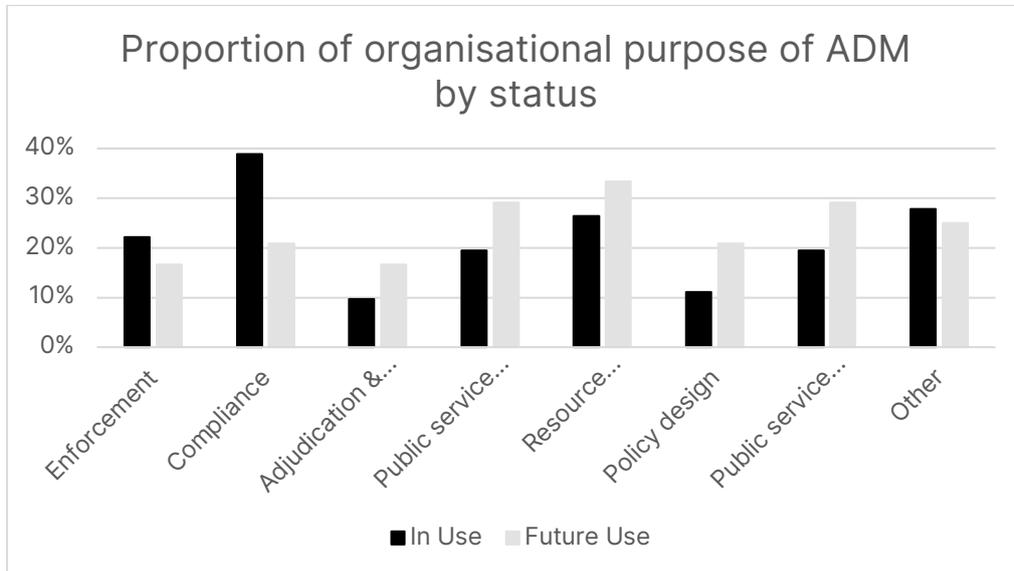
Figure 5: Proportion of organisational purpose of NSW department and agency ADM systems by status

Technology types of ADM systems in NSW state government departments and agencies

Survey 1 also sought to discern the types of technologies being adopted in ADM systems. There are a wide range of ways in which ADM systems can be built. We asked respondents to indicate which technologies from the following list were utilised in each ADM system reported:[39]

- Fully automated, rule-based system
- Structured decision-making tool
- Risk assessment/ predictor/ profiling/ classifier tool
- Automated data gathering system or sensor
- Natural language processing (including chatbots and large language models such as ChatGPT)
- Visual, audio or biometric processing
- Geo-location tool
- Modelling/ simulation systems (e.g. digital twins)
- Recommender systems (e.g. for individualising content for a user)
- Optimisation tools
- Anomaly detection, and
- Other/ Unsure (survey respondents were invited to describe other technologies).

As is evident in Figure 6, the most common ADM technology, consisting of 45 systems (about a third of all systems reported) is a structured decision-making tool. This highlights that ADM systems are more often used to *support* human decision makers, rather than *replace* them, which would be fully automated rules-based systems (24). Importantly, this means that public servants still retain much authority and responsibility for government decision-making in NSW, although as we discuss further in Section 4, and as pointed out in the *New Machinery Report,* there are important questions about *how* people interact with automated systems. Geo-location tools are also widely used (24); geo-location is now common on smart phone apps, but also to provide spatial insights from data. Risk assessment, predictors and profiling systems are also significant element of ADMs used by state government departments and agency (18). Tools not widely used include recommender systems (5), modelling/simulation (6), visual, audio and biometric processing (6) and anomaly detection (7). A different picture emerges when compared with publicly available data.

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[39] The derivation of this list is further explained in the Methodology and Data Annexure below, Section 8.5. Of all reported ADM systems 99 (73%) had their technologies classified.

What kind of technology is utilised in your ADM?
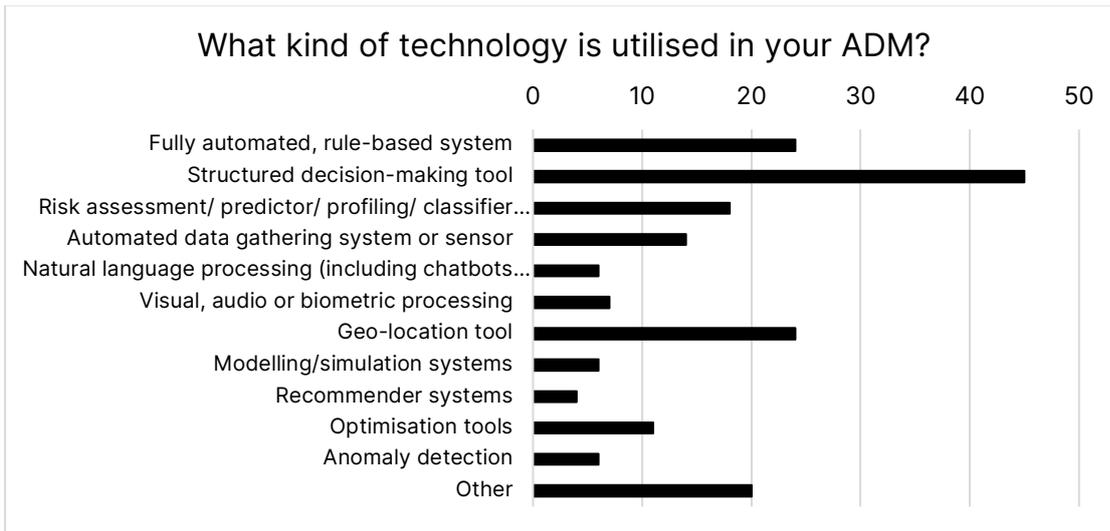
Figure 6: Technology types of ADM systems in NSW departments and agencies[40]

Figure 7 breaks down the types of tools used in ADM systems between portfolios. It is noteworthy that fully automated rules-based systems make up a greater proportion of ADM systems in Regional NSW (55%) and Health (50%) than other portfolios. The Planning and Environment portfolio show greater interest in NLP (40%). Perhaps unsurprisingly geo-location tools have greater use in the Planning and Environment (40%) and Transport portfolios (38%) than elsewhere. The common usage of structured decision-making is most heavily evident in the Customer Service portfolio (67%) and Communities and Justice portfolio (55%), suggesting that these are the locations using a lot more automation to support human decision-making, rather than deploying full automation.

Cluster	Fully automated, rule-based system	Structured decision-making tool	Risk assessment / predictor/ profiling/ classifier tool	Automated data gathering system or sensor	Natural language processing	Visual, audio or biometric processing	Geo-location tool	Modelling/ simulation systems	Recommender systems	Optimisation tools	Anomaly detection	Other
Regional NSW	55%	27%	18%	9%	0%	0%	18%	0%	0%	0%	18%	27%
Health	50%	38%	13%	13%	13%	0%	13%	13%	13%	25%	13%	13%
Education	0%	30%	20%	0%	10%	0%	10%	0%	0%	20%	0%	60%
Communities	18%	55%	23%	5%	9%	5%	18%	14%	5%	9%	5%	9%
Transport	19%	42%	12%	19%	0%	12%	38%	8%	4%	12%	4%	15%
Customer Service	33%	67%	17%	17%	0%	17%	17%	0%	0%	17%	0%	33%
Planning & Environm	0%	40%	20%	20%	40%	20%	40%	0%	20%	0%	20%	0%
Total	22%	43%	18%	14%	8%	6%	24%	6%	5%	10%	7%	20%

Figure 7: Proportion of ADM technologies used in NSW State-organisations, by portfolio[41]

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[40] Technologies mentioned in the 'other' category included fuzzy logic data matching, spatial data capture, and process automation. While several of the other uses reported might be have been recoded under the survey's given categories, it was decided to leave the responses unaltered.

[41] To ensure a meaningful analysis, Figure 7 includes data only for portfolios where the technologies used for five or more ADM systems have been reported. For example, as the Treasury portfolio only reported one ADM system, it would not be meaningful to make a conclusion about the pattern of technological use of ADM systems in that portfolio.

To get a sense of whether certain types of ADM tools are being increasingly deployed, Figure 8 presents the ADM tools by the use/development status of the ADM system, comparing in current use with those being developed, piloted or planned. While structured decision-making tools, risk assessment and geo-location tools continue to be priorities into the future, there does appear to be a growing emphasis on NLP (e.g. chatbot), automated data gathering, recommender, and optimisation tools into the future. No doubt this reflects the rapid, recent emergence of generative AI tools, such as ChatGPT. There does also seem to be a reduced emphasis on fully-automated systems, perhaps reflecting a response to the Robodebt Royal Commission and known public governance challenges associated with full automation.
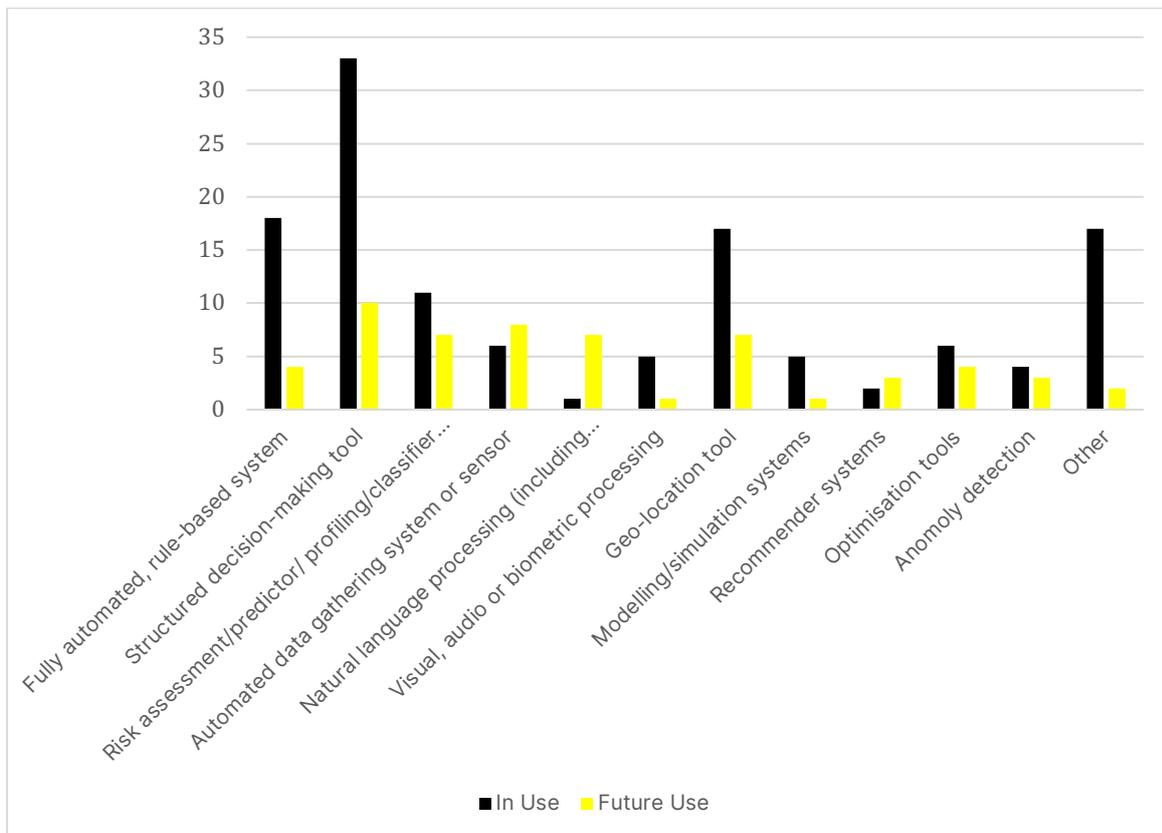
Figure 8: Technology used in NSW state ADM systems, current vs future use status

2.2. ADM SYSTEMS REPORTED BY NSW LOCAL COUNCILS

We also sought to survey all 128 NSW local councils, which have been classified by the Office of Local Government into rural (16), large rural (42), regional town/city (36), metropolitan fringe (9) and

metropolitan (25).[42] Overall, we had a response rate of 27%, which was lower than for NSW state government organisations. Response rates were lowest among rural councils. In addition to the responses from 35 councils, we also received verbal or email notification from several councils that they declined to participate.

Although there is great diversity among councils, their scope of policy and service delivery responsibilities are relatively similar. Therefore, we considered that findings from NSW councils about ADM system use could be generalisable to some degree; that the findings from the responding councils might be broadly reflective of similar patterns and practices from those that have not responded.

At the same time, interviews conducted for our case studies suggest that we cannot assume too much similarity. Some interviewees noted that, while councils do imitate each other and share learnings, some councils act as early adopters in deploying technology innovations. It is possible that we have more responses from such councils. We explore this question below through our review of publicly available material, discussed in Section 3.

Use of ADM systems by NSW local councils

Of the 35 councils responding, a minority (14, 40%) reported having ADM systems and/or planning them (Figure 9), with a total of 77 ADM systems being reported among 14 councils.
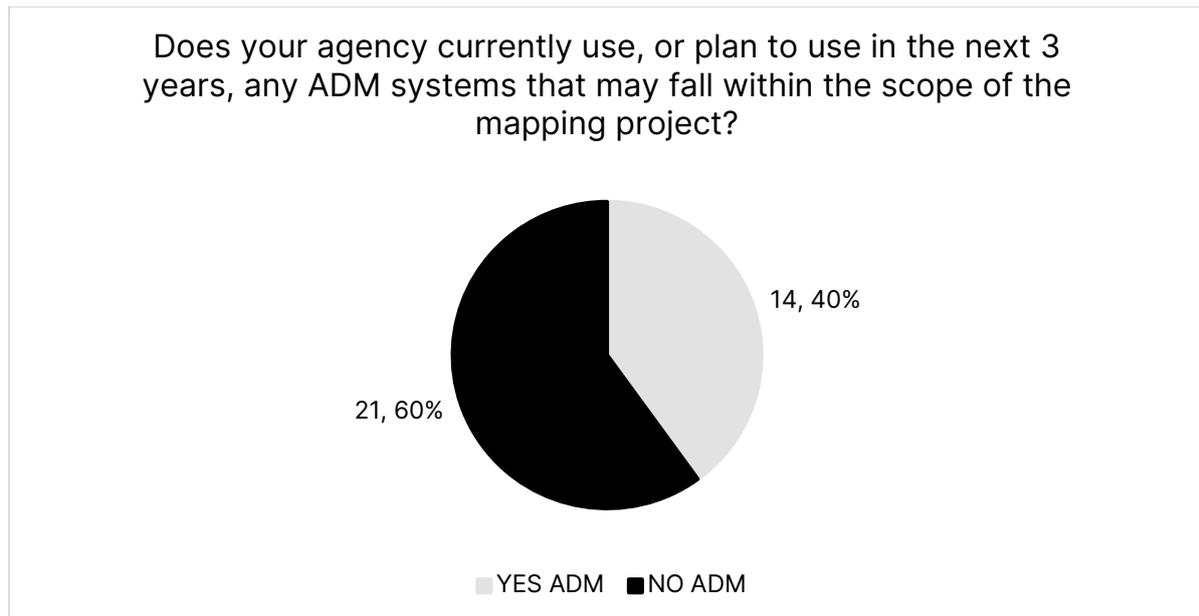
Figure 9: Proportion of NSW local councils reporting ADMs in use or planned

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[42] See Table 18 in the Appendix for a list of local government agencies by classification.

Table 3 demonstrates a clear case of greater numbers of ADM systems as the councils become closer to major cities. No rural council reported any ADM systems, and only one of 10 large rural councils reported using them. In contrast, 5 of the 6 metropolitan councils reported using an ADM system, with an average of 9.2 ADM systems in each of those 5 councils.

Table 3: Survey responses and reported use of ADM systems by local council category

Type of council (n)	Councils responded (n, %)	Councils reporting zero ADMs (n)	ADMs reported (n)
Rural (16)	3 (19%)	3	0
Large Rural (42)	10 (24%)	9	0[43]
Regional Town/City (36)	13 (36%)	7	19[44]
Metropolitan Fringe (9)	3 (33%)	1	12
Metropolitan (25)	6 (24%)	1	46
TOTAL (128)	**35 (27%)**	**21**	**77**

Status of ADM systems in NSW local councils

Figure 10 shows that of the 77 ADM systems reported by councils, most (53) are in use, with 5 being piloted, 5 being developed and 13 planned in the next three years, a similar pattern to NSW state government departments and agencies.[45] Based on the survey responses, there appears to be significant ADM system use and development, but little or no action in the rural councils, typically noted to cover large geographical areas, having lower revenue and low population density. There is no evidence that the metropolitan councils are more active in working to build ADM systems than regional towns/cities (Table 4).

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[43] One council reported having ADM, but did not list any names.

[44] One council reported having ADM, but did not list any names.

[45] One council reported an ADM, but did not provide its development status.

What is ADM system's current status?
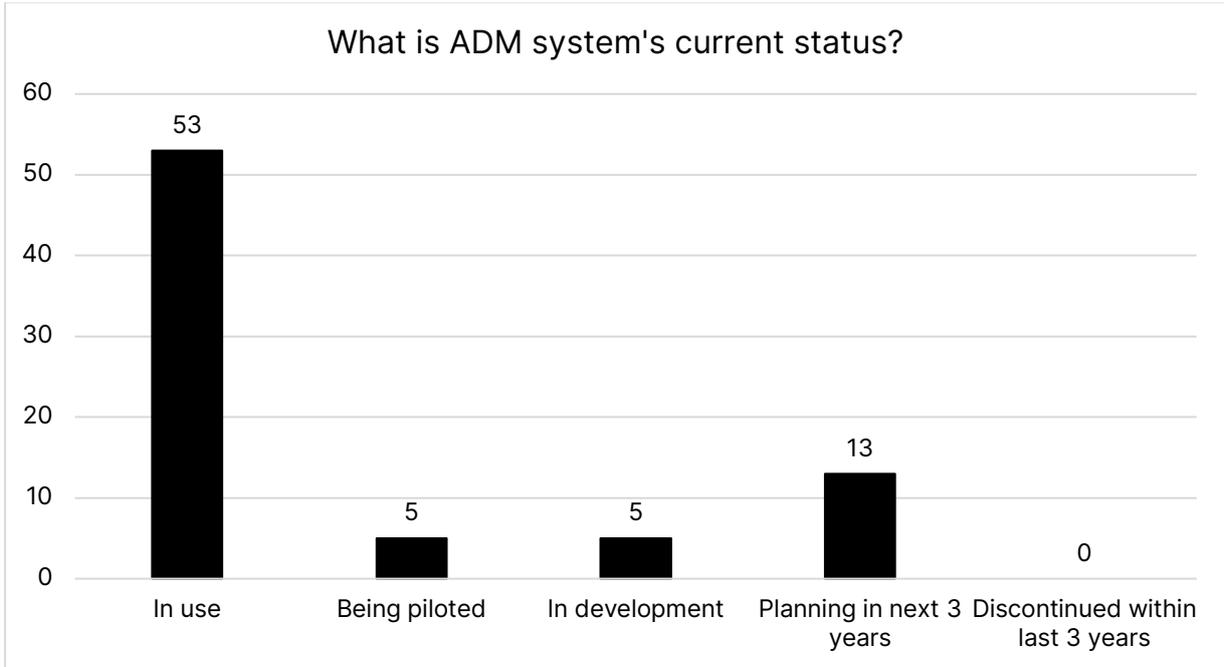
Figure 10: Status of ADM systems in NSW local councils

Table 4: Status of ADM systems by local council category

	In use	Piloted	In Development	Planned	Total
Rural	0	0	0	0	0
Large Rural	0	0	0	0	0
Regional Town/City	12	3	1	3	19
Metropolitan Fringe	6	0	0	6	12
Metropolitan	35	2	4	4	45
TOTAL	53	5	5	13	76

Organisational purposes of ADM systems in local councils

The local councils that report using ADM systems primarily classified their systems as being used for public service delivery and user interaction (35), as well as resource allocation and planning (22) (Figure 11). This is a different profile of uses from state government departments and agencies. While both jurisdictional levels give high priority to resource allocation and planning, the state-level organisations also

have strong enforcement and compliance objectives for their ADM systems, which are less prevalent in local government use of ADM systems. An exception to this trend is the use and planned use of computer vision analysis systems for parking enforcement, considered in a case study below, see Section 5.6.

This different profile of organisational uses for ADM systems between jurisdictional levels of government arguably reflects the different patterns in roles and responsibilities that councils have to state level organisations, with the local councils' strong role in localised community service delivery with resourcing to plan those services. Councils' important regulatory responsibilities in planning and the environment do not appear to be reflected in their use of ADM systems. Other uses for ADM systems reported by councils are: 0perational efficiency; community safety; commercial rent and commercial property enhancements; condition assessment, repairs and maintenance; and public safety.
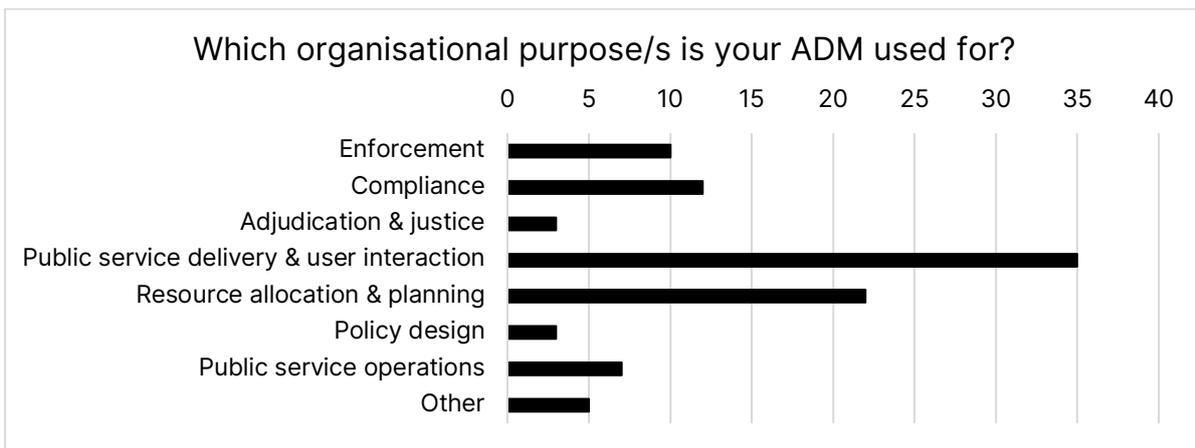
Figure 11: NSW councils: ADM organisational purposes

Given that councils often have similar roles and responsibilities, we did not expect to see different organisational use patterns for different types of councils. Figure 12 however does suggest some differences. For example, councils on the metropolitan fringe are more invested in ADM systems for operations and less likely to invest in ADM systems for public services, than the other large councils, but it is hard to make any meaningful interpretation of these differences.
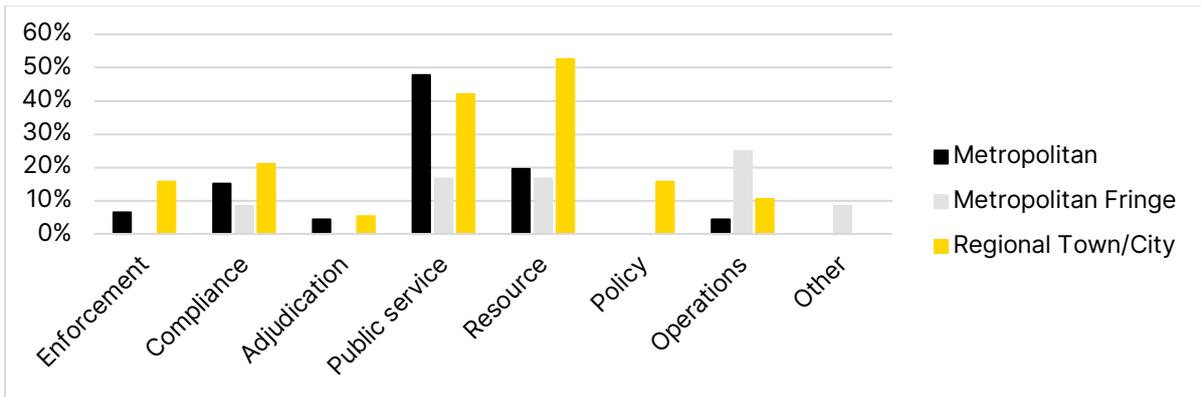
Figure 12: Organisational uses of ADM systems, by council category

Technology types of ADM systems in NSW local councils

The technological makeup of ADM systems used by NSW local councils shows a different profile than those used at NSW state government departments and agencies (Figure 13). Most commonly used were (1) fully automated, rule-based systems (second most common among state ADM systems); followed by (2) structured decision-making tools (first among state ADM systems); then (3) automated data gathering systems or sensors (fifth among state ADM systems). Perhaps surprisingly, geo-location systems are much less reported by councils.
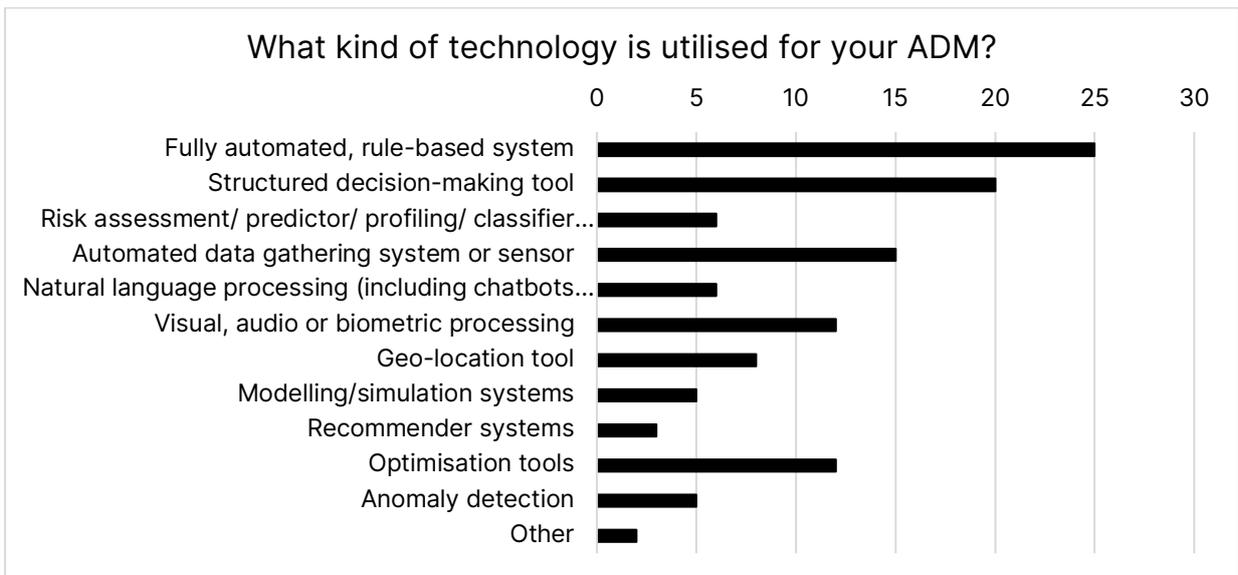
Figure 13: Technology types of ADM systems in NSW local councils

As Figure 14 shows, different types of council did seem to vary in terms of the types of ADM systems they reported using. Notably, automated data collection and sensors are dominant in regional towns/cities, but

were not reported by the metropolitan fringe councils. By contrast, the metropolitan fringe councils show a greater propensity for chatbots and NLP, but did not report using structured decision-making tools.

Caution is required in interpreting these patterns however. While the specifics of different types of councils may be important, so too might patterns in local Chief Information Officer (CIO) or IT leadership, and sharing of innovations among councils. Indeed, a background conversation with an IT leader in one small state level agency spoke of how they had introduced automated triage systems in a former state agency they worked in, then proceeded to develop and deploy them in their new agency.
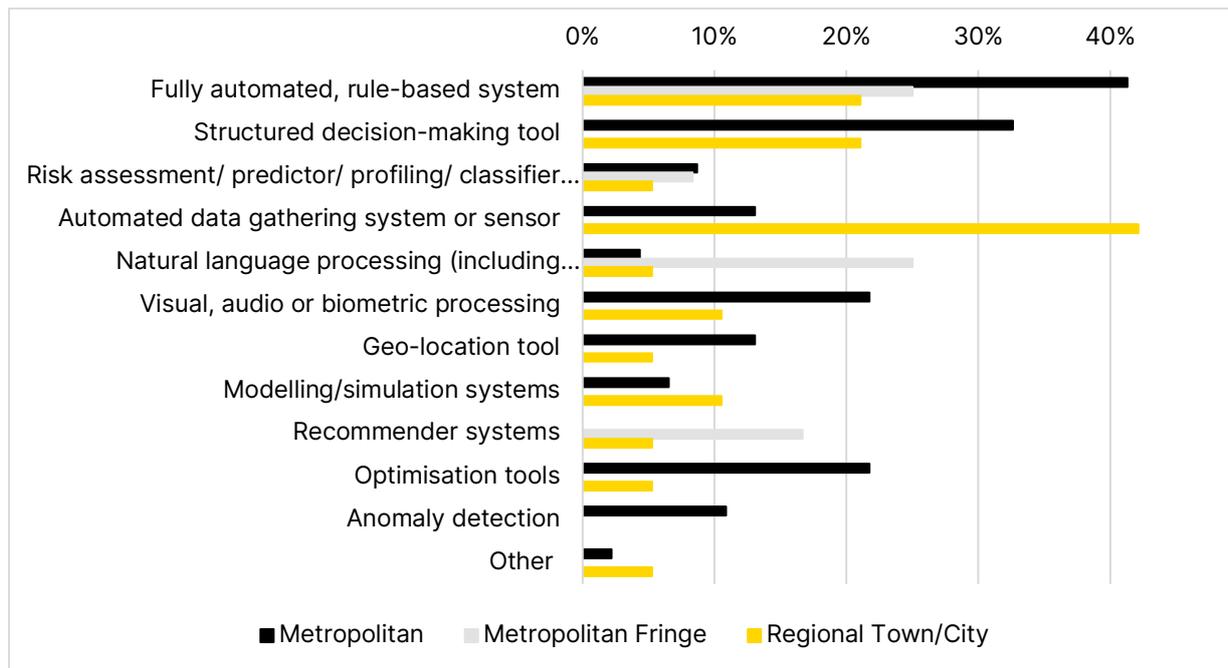
Figure 14: Technology types of ADM systems by local council category

2.3. BEYOND THE NUMBERS: WHAT KINDS OF ADM SYSTEMS DID THE SURVEY FIND?

Types of ADM systems

Survey 1 asked organisations to describe their ADM systems in their own words. NSW government organisations reported a strikingly wide variety of ADM systems: some citizen-facing, while others were internally-facing but with impacts on members of the NSW public. The Executive Report accompanying this Research Report sets out illustrative examples which show the wide range of ADM systems being used across the government in NSW.

Multiple agencies reported the automation of **customer self-service.** Examples include:

- a council's automated system for venue booking
- automated licence applications and renewals and other automated reporting to government agencies.

Licence or other registration *renewals* would seem to be a clear case for automation, likely to increase convenience in a relatively low risk setting where (human) approval has occurred in the past. Nevertheless, it is important to recognise that these decisions can have an impact on people's legal rights or similarly significant interests. The refusal or non-renewal of a taxi licence, for example, could affect an individual's livelihood or business.

Another recurring theme among the systems reported in Survey 1 is the use of automated sensing and analysis. In this we include **image recognition**: recognition of objects, letters/numbers (such as number plates), or unidentified persons in still or video images (for example, for the purpose of counting users of a location or service). In particular we observed that multiple local councils reported using, or trialling, automated image collection and analysis: these uses are discussed below in case study 5.

Another notable set of systems reported in Survey 1 is **chatbots**. Agencies are using, or trialling, chatbots for internal use – for example, in the Public Service Commission to provide aggregated workforce data in response to natural language queries. Others are externally facing, aimed at customer interactions. What we do not know necessarily from Survey 1 are the details of the technology underlying these chatbots. We note, however, that customer-facing chatbots, especially when deployed in relation to vulnerable populations, have given rise to controversy in the past, and need to be carefully developed and monitored.[46]

NSW state government departments and agencies, and local councils are also not immune, it seems, to the attraction of using other recent innovations in NLP made possible by **generative AI** large language models, such as ChatGPT and Bing Copilot. Although mostly in the planning or pilot/trial phase, we do see in the results of Survey 1 some interesting plans being developed for this emerging technology, with some already in use. Examples are given in our accompanying Executive Report. Some survey responses noted that third party suppliers were building capacities such language-based generative AI into their offerings, and that use of such third-party capacities would be considered. An example of this is the Independent

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[46] At federal government level the National Disability Insurance Agency (NDIA) abandoned development of its proposed client engagement chatbot 'Nadia' for National Disability Insurance Scheme (NDIS) participant interaction, because the inevitable individual error rate as it continued to refine itself by learning from actual client interactions carried too great a risk of unacceptable harms to vulnerable people with disabilities: Justin Henry*, NDIS' great bot hope Nadia takes more time off for stress leave* (Web Article, 2018). See also Chloe Xiang, *'He Would Still Be Here': Man Dies by Suicide After Talking with AI Chatbot, Widow Say*s (Web Article, March 2023) and Amanda Hoover, *An Eating Disorder Chatbot Is Suspended for Giving Harmful Advice* (Web Article, June 2023). In February 2024, a Canadian tribunal found Air Canada liable for misleading conduct after its chatbot misinformed a customer regarding its bereavement discount policy: *Moffatt v Air Canada* [2024] BCCRT 149.

Commission Against Corruption (ICAC), which noted that their electronic evidence software provider was using NLP for data analysis and pattern discovery. Generative AI poses challenges for government use, particularly as outputs are based on predictive 'best guesses' rather than factual and rules-based outputs. This can result in non-factual material being generated (sometimes called 'hallucinations'). Such systems can also have in-built biases that get reproduced.[47]

Pattern recognition is another area where automation can offer gains compared to human performance. In the public context, this is especially relevant for **risk assessments**. At this stage, only a handful of systems currently in use were reported in Survey 1 to be deployed for risk prediction or assessment, mainly in the food security context. However, some state government agencies reported planning for or considering tools with more potentially significant consequences. The use of prediction in government decision-making is the subject of significant controversy and ongoing scholarly analysis.[48]

Origin of systems: Commercial, off the shelf systems

While governments may develop their own databases, software and ADM systems, it was evident in reading the system names and descriptions of ADM systems reported in Survey 1, that off-the-shelf, commercially provided systems are common. Both global and Australian software companies were reported, in some cases repeatedly, as being used by NSW government organisations. These examples not only illustrate that government organisations rely on strong relationships with the private sector, but also that those technologies come from corporations around the globe.[49]

At present, the *NSW Artificial Intelligence Assurance Framework* ('*NSW AI Assurance Framework*') does not apply to the use of off-the-shelf software.[50] Care would need to be taken with such software to ensure that it can be sufficiently customised so that its use matches the authorised exercise of government power: that the round peg of authorised government decision-making is not being forced into the square hole of generic, commercial systems. Our Case Study 4 – Water Market System below illustrates the need to consider the level of control of the system and its development, in that case involving the shift from an external contracting relationship to internal management of the system.

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[47] See, for example, Genevieve Bell et al., *Rapid Response Information Report: Generative AI - language models (LLMs) and multimodal foundation models (MFMs)* (Australian Council of Learned Academies, March 2023) and Fiona Fui-Hoon Nah et al., 'Generative AI and ChatGPT: Applications, challenges, and AI-human collaboration' (2023) 25(3) *Journal of Information Technology Case and Application Research* 277–304.

[48] Monika Zalnieriute, Lyria Bennett Moses and George Williams, 'The Rule of Law and Automation of Government Decision-Making' (2019) 82(3) *Modern Law Review* 425–455.

[49] This echoes a finding from a past ADM+S project: Lyndal Sleep, Brooke Ann Coco and Paul Henman 'Mapping ADMs in Australian Social Services' (2022) *ARC Centre of Excellence for Automated Decision-Making and Society*.

[50] NSW Government, *NSW Artificial Intelligence Assurance Framework* (2022).

03. A DIFFERENT MAPPING: ADM SYSTEMS DESCRIBED BY NSW STATE AND LOCAL GOVERNMENTS IN PUBLICLY AVAILABLE MATERIAL

In seeking to map use of ADM across NSW state government departments and agencies, and local councils, our primary method was to ask government organisations directly with a survey. Our view was that data collected through surveys was more likely to be current, accurate, and comparable, especially as the project was undertaken with support from within the NSW state government.

To complement the survey data, we also conducted a review focused on what government departments, agencies and local councils themselves have published about their use of ADM systems. This was intended to provide a wider context for the survey results, and how governments communicate their vision and plans for, and current use of, ADM systems.

To identify what NSW state departments and agencies and local councils have publicly communicated about their use of ADM systems, we carried out a systematised, keyword-based search of publicly available materials, over the websites of every department, agency and local council within the project scope.[51] We supplemented the resulting data with information derived from a specific, limited set of databases (in particular, procurement data). Such methods have been used by researchers as a method for mapping ADM or AI use in the public sector.[52] While we originally conceived of this review as supplementing the survey data, as the project progressed we realised that we were capturing different – and interesting – information. Importantly, this data is historical (as it includes public statements made over many years) as well as recent (and thus relatively current), allowing for some longitudinal analysis.

In this section, therefore, we present a different lens on the use of ADM systems across the NSW state government and local councils. We emphasise that the data in this section is **not comparable** to the data from Survey 1 reported in the previous chapter. It does not capture the same things; rather, it presents a different picture focused on how NSW government departments and agencies, and local councils publicly share and describe their own automation initiatives.

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[51] The relevant organisations are listed in Table 16 (state government) and Table 18 (local councils), in the Appendix.

[52] David Freeman Engstrom et al., 'Government by Algorithm: Artificial Intelligence in Federal Administrative Agencies' (2020) *NYU School of Law, Public Law Research Paper* No. 20-54.

The data presented in this chapter is not, except in the most limited sense, any kind of check of the accuracy of the survey responses we received. We set out reasons in more detail below (Section 3.3), but briefly, this section reports on descriptions from websites and reports: many relevant, but some potentially speculative and others outdated. Public documents include systems that are outside the project scope and indeed might not even be ADM systems as characterised in this Report. Some could describe projects proposed but not pursued; other systems described may have been discontinued. All these factors cannot be captured in the data collection, cleaning or analysis.

3.1. HOW THE REVIEW OF PUBLICLY AVAILABLE MATERIAL WAS CONDUCTED (IN BRIEF)

A further description of our methodology is provided in the Section 8 Methodology and Data Annexure. In summary, between May and July 2023, members of the research team searched state government department, agency and local council websites and formal procurement records[53] for **key terms,** set out in Table 5.[54]

Table 5: Key terms for review of publicly available material

computerisation	automate	AI (whole word)
artificial intelligence	automated decision	ADM
algorithm*[55]	machine learning	natural language processing
NLP	computer analysis	predictive analysis
online compliance	image recognition	decision support
robotic process automation		

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[53] The list of relevant, official government websites was provided by the Department of Costumer Services and the Office of Local Government. Some webpages visited are no longer available. For a more detailed description of the sources, see Section 8 Methodology and Data Annexure.

[54] During testing these terms generated results that appear to refer to concrete ADM systems in place or under development, providing rich (albeit selective) information, with a moderate degree of reliability. Some minor adjustments, which should not affect the integrity of the results, had to be made depending on source, for example, the online interface of TenderNSW does not allow for reliable truncations, so the searches of the terms 'AI' and 'ADM' generated as hits for any word containing 'ai' or 'adm', such as 'administrative'. However, we noted that NSW government departments and agencies had a tendency not to use the terminology of ADMs or even automation, preferring to refer to systems as 'digital', or 'customer service', and refer to functions ('online registration') rather than automation". If none of the listed terms are use the potential system will not be captured.

[55] Called a wildcard, the * in a search term represents any one or more characters; it instructs the search tool to include other words with the same root.

Each identified instance of a search term (i.e., '**hit**') identified via these searches was individually assessed by a human reviewer, who read the surrounding text, and manually entered the data into a database. Hits describing similar systems with similar functions or names within the same agency were grouped together to mirror the system-driven approach of our survey methodology: we call these grouped examples '**possible instances**' of ADM system use. The researcher also recorded their assessment of the degree of possible *relevance* of each instance: i.e., the likelihood that it represented a possible use of an ADM system.[56]

The outcome of these searches is a dataset that attempts to document all possible instances of ADM system use in NSW government departments, agencies and local councils, as recorded on official websites, annual reports and procurement databases, restricted by consistent terms and filters.[57] As a note on terminology, in this Report we refer to the original source material as 'publicly available material', and the dataset used for analysis as the 'publicly available data'. In total, the initial review produced 977 possible instances of use of ADM systems for further investigation.[58]

3.2. DISTRIBUTIONS OF POSSIBLE ADM INSTANCES DISTINGUISHED BY LEVEL OF RELEVANCE

Not all possible instances found in our review are equally relevant to this project. Individual researchers therefore noted the potential **relevance** for each of the 977 possible instances. Possible instances were classified as set out in Table 6 below.

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[56] We adopted methods for double-checking consistency across different researchers, spot testing, and follow-up checking for all state government level data, as described in the Methodology and Data Annexure.

[57] The dataset also records 'absences' – i.e. sources where there were no 'hits'. We have not analysed that data in this Research Report.

[58] Changes to websites affect the reliability and reproducibility of this analysis. Ongoing website consolidation by the NSW government means some of the data included in the dataset is no longer accessible. This also limits the possibility of any longitudinal analysis 'by system'. For example, there are cases where an agency describes a system as being piloted in annual reports over a number of years, and then the same system does not show up as a 'hit' in subsequent years. It is impossible to assess if this is (a) a limitation of the methodology; (b) that the pilot was discontinued; or (c) that the agency has decided it is no longer sufficiently important to report. Systematic reporting of ADM system use, as discussed in the conclusions to this Report and our Executive Report, would enable further analysis.

Table 6: Levels of relevance of possible instances in publicly available data

Rating	Meaning	Example
Nil Relevance	We are confident the possible instance does not indicate the existence of an ADM system used by the NSW state government department or agency or local council, affecting the people of NSW; even if one of the search terms is identified, and there is enough data to make a judgment call	The NSW Flood Data Access Program was reported as centralising critical flood data captured by NSW government agencies and stakeholders to facilitate 'decision support for improved capability in floodplain risk management, community safety, emergency management and strategic land use planning'. However only data collection, not automation is described
Low Relevance	The possible instance does not appear to refer to an ADM system as characterised for our study (e.g., an automated system that is not linked to making any decision)	Within the State Emergency Service, the 'Electronic Document and Records Management System', is described as a 'software to automate the management of digital records' based on workflows. Even if one can imagine some degree of potential decision-making, we consider it is not likely to be involved in decision-making within scope
High Relevance	The possible instance is either: 1. a system with a moderate likelihood of involving some automated decision-making (e.g., a system that records a lot of data, creating some ADM potential, but the actual ADM is unclear or low-level, such as control of payment in a parking lot, or management of book lending in a public library), or 2. a system which seems to be in use or planned, and involves ADM of some significance.	As an example of (1), the Domestic Violence and Triage Risk Assessment Scale (DV-TRAS), from Corrective Services NSW - An automated risk assessment tool was internally developed in 2021–2022 to rapidly estimate custody-based DV offenders' likelihood of DV recidivism using official administrative data. It cannot be assessed, based on the publicly available material, if the tool was ever used in real conditions. As an example of (2), an Automated Valuation Model was noted in the 2020–2021 report of the Office of the Valuer General as planned for testing in December 2021, based on big data and AI and capable of rating and taxing valuation of land.

Table 7 below summarises the data, disaggregated by relevance at the state and local levels. Of the 977 possible instances identified in the initial review, 530 instances (54%) were regarded as 'high' relevance: 380 possible instances in state government departments and agencies (62% of all possible instances at that level of government), and 150 possible instances in local councils (42% of possible instances). Note that in some cases, a high number of overall results from the search of the terms within a website does not correspond to a high number of 'high relevance' for possible uses of ADM systems. For example, where the review identified a high number of possible instances in the Communities and Justice portfolio, approximately half were considered high relevance; by contrast, 72% of the 84 possible instances relating to the Planning and Environment portfolio were labelled high relevance.

Table 7: Distribution of publicly reported instances by government entity and relevance

	Assessed relevance	Total	Nil	Low	High	High - % of total
Agency portfolio/category	Planning & Environment	117	23	10	84	(72%)
	Communities & Justice	115	35	20	60	(52%)
	Health	104	29	6	69	(66%)
	Transport	62	11	15	36	(58%)
	Customer Service	58	13	11	34	(59%)
	Regional NSW	51	9	4	38	(75%)
	Enterprise, Investment & Trade	46	6	13	27	(59%)
	Premier & Cabinet	28	11	2	15	(53%)
	Education	25	6	10	9	(36%)
	Treasury	11	3	0	8	(73%)
	Total	617	146	91	380	(62%)
Local councils	Total	354	59	145	150	(42%)

While the data from this method is not commensurate to that in Survey 1, it is useful to compare the relative levels of detected automation in different portfolios. The three portfolios reporting the highest levels of automation in Survey 1 were Transport, Communities and Justice, and Regional NSW. In contrast, only Communities and Justice is found in the top three portfolios in terms of the number of possible instances of ADM systems identified through our review of publicly available materials.

The distribution is quite dissimilar in the **procurement data**. As Table 8 below shows, 45% of cases identified through this data were considered to have nil relevance, and just under one third classified as high relevance. Instances in the Transport portfolio represent 40% of those with potentially high relevance and refer mainly to trials of automation of vehicles (buses) or signals (trains). Among those of nil

relevance, the majority fell within the Health portfolio, referring mainly to automated clinical systems used for medical diagnosis, which were outside of the scope of this mapping study.

Table 8: Possible instances identified in the procurement database

Potential relevance	N (% of total)	Most represented portfolio (possible instances)
High	10 (32%)	Transport (4)
Low	7 (23%)	Transport (2), Health (2)
Nil	14 (45%)	Health (9, mainly HealthShare NSW)
Total	31 (100%)	

3.3. WHY ARE THE SURVEY RESULTS SO DIFFERENT FROM THE REVIEW OF PUBLICLY AVAILABLE DATA RESULTS?

There is a clear gap between the number of possible instances of ADM system use with high relevance identified through our review of publicly available material, and the total number of systems identified in Survey 1. On further examination, only between 12% and 18% of the systems reported in Survey 1 could be matched to possible instances of ADM systems identified in the publicly available data. There is some uncertainty in this number because it is not always clear whether something is a 'match'. For example, systems described as performing similar functions, within the same agency, but with different names could be considered a match, but not with absolute confidence.

If the reasons for the overall difference in numbers were simply that the survey did not pick up all ADM systems in use,[59] we would have expected our Survey 1 systems to be a subset of those in the publicly available data: that is, we would expect to see the ADM systems from Survey 1, plus more. The fact that we *didn't* observe more matches suggests that other factors are at play.[60] Further, not only were there ADM systems found in the public data but not reported in Survey 1, we found many ADM systems

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[59] We reiterate that participation in the survey a voluntary, with a response rate of 37% among state level departments and agencies, and 27% response among councils.

[60] Further steps we took to examine the disparity are described in the Section 8.5 Survey 1 Methodology.

reported in Survey 1 that were not picked up in our systematised review of public material, across *all* portfolios.

Some of the most remarkable examples of this dynamic were found within the Education portfolio: only one of the nine systems identified in Survey 1 clearly corresponded to a system identified as high relevance in the publicly available data. Another one reported in Survey 1 for contract/grant management for early childhood grants was classified as low potential relevance in the review. A system in use reported in Survey 1 with predictive capabilities for future student attendance, could be linked to a potential system identified in the review, which related to absence reporting and automated translation for parents' notifications of those absences, but had a different name and no predictive function. Finally, one potential system considered of nil relevance in the review, as it was listed as a mere idea for the future in a report from 2020, was reported to be 'in development' in the survey in 2023, emphasising the difference in timing of the data collected in Survey 1, at a point in time, compared to the review of documents which reviewed information published over a period of time.

We suggest the following as possible additional explanations for the disparity:

- descriptions of automation online may not correlate with systems at all: they could be speculative commentary, or references to ADM not linked to any particular implementation. If captured initially, some of these hits should have been filtered out as being of 'nil' relevance
- the dataset is the result of keyword searches. Information about an ADM system on a government website that does not use those keywords will not have been captured (i.e. false negatives)
- the search captured systems outside the scope of our survey and project: clinical systems; HR systems; old systems; discontinued systems; systems that were proposed, planned or piloted, but which were never pursued (i.e. false positives)
- an online search will only capture ADM systems reported publicly. Automation has been occurring for decades, and agencies might not consider it meaningful to publicly mention those forms of automation considered mundane and straightforward
- our search will not have captured ADM uses not considered ready to publicise, or considered sensitive and consciously kept from the public eye. It could only capture those ADM uses that governments have chosen to make public, as they have chosen to describe them, and
- a single system reported in Survey 1 could consolidate multiple 'instances' from the publicly available data. This is likely to be the case in government organisations further along the 'automation journey', such as Transport for NSW. While we sought to group 'hits' into 'instances', some doubling up may remain in the data.

Despite all these explanations for the difference, we cannot exclude the possibility that the disparity between our survey results and the review of publicly available material indicates ADM systems that we may have missed in Survey 1. For example, the dataset includes 7 possible high relevance instances of ADM in Corrective Services NSW and 26 high relevance instances in different emergency-related services

within the Communities and Justice portfolio. Even though the descriptions in the respective websites suggest these instances are within the scope of the project, none of these possible systems appear to match any systems reported in Survey 1.

A more concrete example can be extracted from procurement data. The dataset includes official records of an invitation to tender from the Stronger Communities cluster (now Communities and Justice portfolio) in 2017 for a Mobile Automatic Number Plate Recognition (MANPR) system. This is a technology that uses optical character recognition on images to read vehicle registration plates, including 'to check if a vehicle is registered or licensed'.[61] This possible ADM system was marked as of 'high' relevance in the review of public documents, but was not reported in Survey 1. It could be a case of underreporting, but it could also be a tender that was never completed, a system that was never deployed, or an ADM system within scope that could have been discontinued more than three years ago and hence out of scope. Finally, if the system does exist, there could also be a misalignment in the understanding between the surveyed entities and the researchers of what types of systems were within scope.

These examples show that the datasets are not comparable. We therefore opted to analyse this publicly available data primarily as a self-standing dataset and only compare these higher-level observations with the observations extracted from our surveys. We turn now to this analysis.

3.4. WHAT CAN WE LEARN FROM THE PUBLICLY AVAILABLE DATA ABOUT ADM SYSTEMS IN STATE GOVERNMENT DEPARTMENTS AND AGENCIES?

We turn first to ADM use at the state government level. As noted above, the total count and distribution of possible instances of NSW government department and agency use of ADM systems per portfolio described in publicly available material differs significantly from the data we received in Survey 1. Further analysis of publicly available data enriches this bigger picture of automation in NSW government in two ways: the evolution of the deployment of automated systems across time; and how the purposes of automation are publicly described.

Automation across time

While it is self-evident that automation is increasing over time, it is unclear whether the rate of adoption is accelerating or not.

Survey 2 (See Section 4) collected information about 20 ADM systems of particular interest in use or in pilot phase at the state level, including the date of deployment of those systems (Figure 15). While the

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[61] NSW Government, eTendering, *Provision of Mobile Automatic Number Plate Recognition (MANPR) and In-Car Video (ICV) – 001528* (Webpage, 27 November 2017).

data demonstrates a clear acceleration in new ADM system adoption in the last five years and a slight concentration of early deployment around 2010–2013, given the small numbers involved it would be unreliable to assume this is reflective of NSW government ADM system adoption more broadly.

Count of first deployment of system
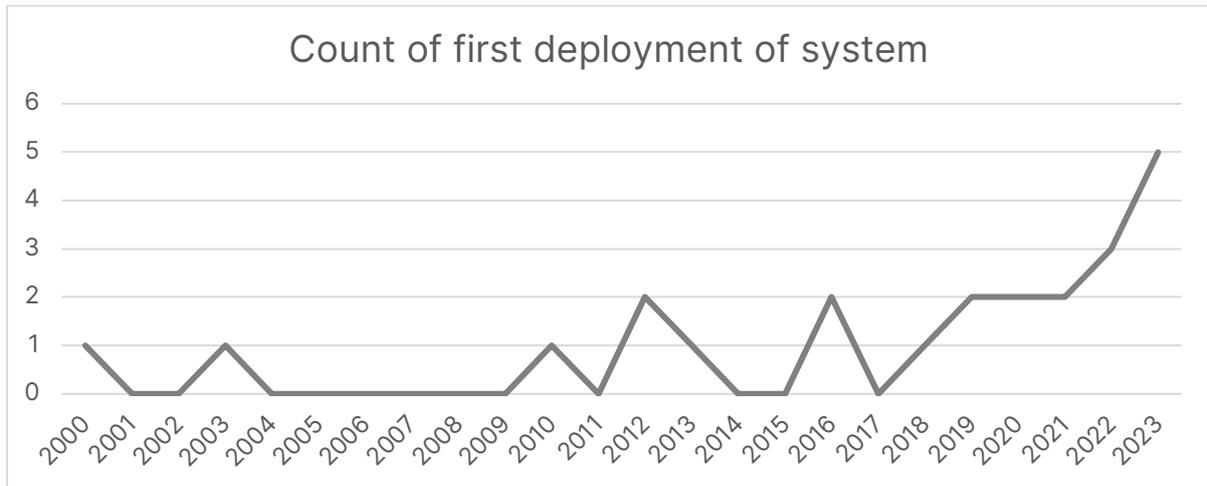
Figure 15: ADM system year of deployment as reported in Survey 2

The larger number of possible instances of ADM systems identified through the analysis of public documents provides greater robustness in understanding adoption patterns over time, even if it was not possible to allocate a year for 50 instances of potential ADM systems based on the information gathered from publicly available materials. Figure 16 demonstrates a relatively clear pattern around the dates of deployment, which is consistent with the general trends derived from Survey 2, with two added observations. First, the initial peak of deployment noted in Survey 2 is only noticeable around 2010 and does only marginally expand into 2012–2013. Second, the pattern of acceleration seems to stop in the last year. However, these low 2023 figures could be explained by the timing of when the public information was collected (May–July 2023).

State ADM Systems per portfolio and year

Legend:
- Planning & Environment
- Health
- Communities & Justice
- Customer Service
- Transport
- Regional NSW
- Enterprise, Investment & Trade
- Premier & Cabinet
- Treasury
- Education
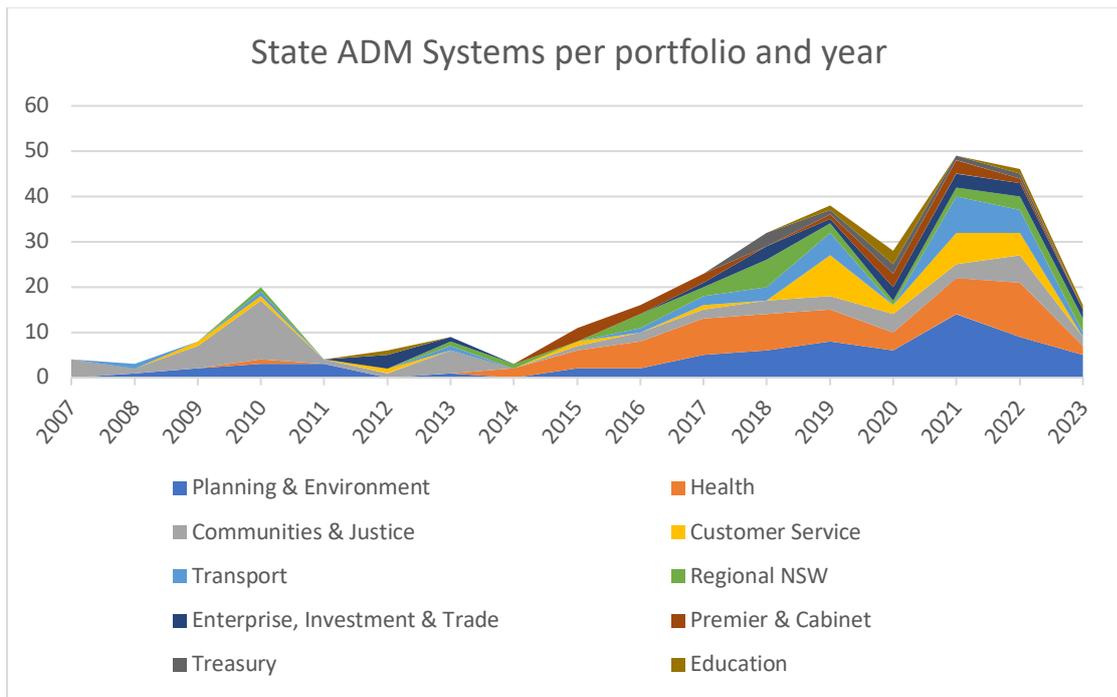
Figure 16: State government possible ADM system year of deployment as observed in publicly available material

We can disaggregate these dates of deployment further, depending on the source of the data. Given the diversity of the publicly available materials, a more rigorous analysis can be obtained from grouping data sources in a more consistent manner. Figure 17 includes all data obtained from materials which are not regular annual (or compulsory) reports.[62] According to this subset (media releases, announcements, instructions for use of online tools, references in one-off reports, etc.), the initial push for automation around 2009–2010 reflected both in the survey and publicly available data is mainly a result of automation within the Communities and Justice portfolio. The subsequent period, when the recorded instances of possible ADM systems noted in publicly available documents is reduced (2011–2014), is evenly distributed by a few portfolios with one or two instances. This is then followed over the last six to seven years by an accelerated trend of public reports of automation from 2016–2017. This recent increase is more evenly distributed among several portfolios, but with more frequent references to possible ADM systems in the Customer Services, Health, and Planning and Environment portfolios. One interpretation of this picture is that these portfolios are more inclined in recent times to discuss automation efforts publicly, i.e. to provide transparency.

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[62] Note that Figure 16, Figure 17 and Figure 18 are truncated from 2007, as data before that date was only marginally relevant. Figure 18 is truncated to eliminate the 2022–2023 reports, which were not fully available at the time of collecting the data.

ADM System per portfolio per calendar year
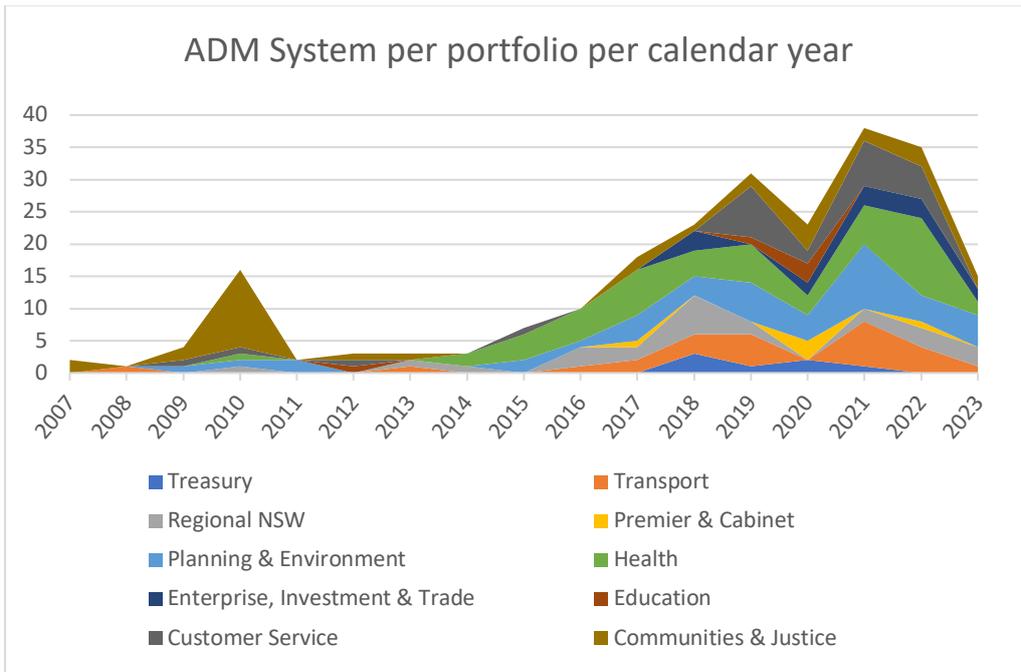
Figure 17: Possible ADM systems by portfolio by calendar year deployed based on publicly available data

Looking only at automated systems identified in annual reports provides a slightly different portrait, which benefits from higher levels of internal consistency (Figure 18).[63] It is interesting to see how automation is portrayed based on the compulsory reporting (Figure 18, even if reporting ADM systems is not an established part of their scope) in contrast to how things look based on other more diverse sources (Figure 17). We observe that analysis of this subset of data shows again an expansion of the first automation peak noted in Survey 2 into 2012–2013, which did not appear when analysing calendar-year based data. This seems to support the idea of an initial push for automation between 2010 and 2012–2013.

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[63] The other main source besides the annual reports are compliance reports under the *Government Information (Public Access) Act 2009* (NSW) ('GIPA Act'), the GIPA Act compliance reports, also issued by financial year.

ADM System per portfolio per financial year
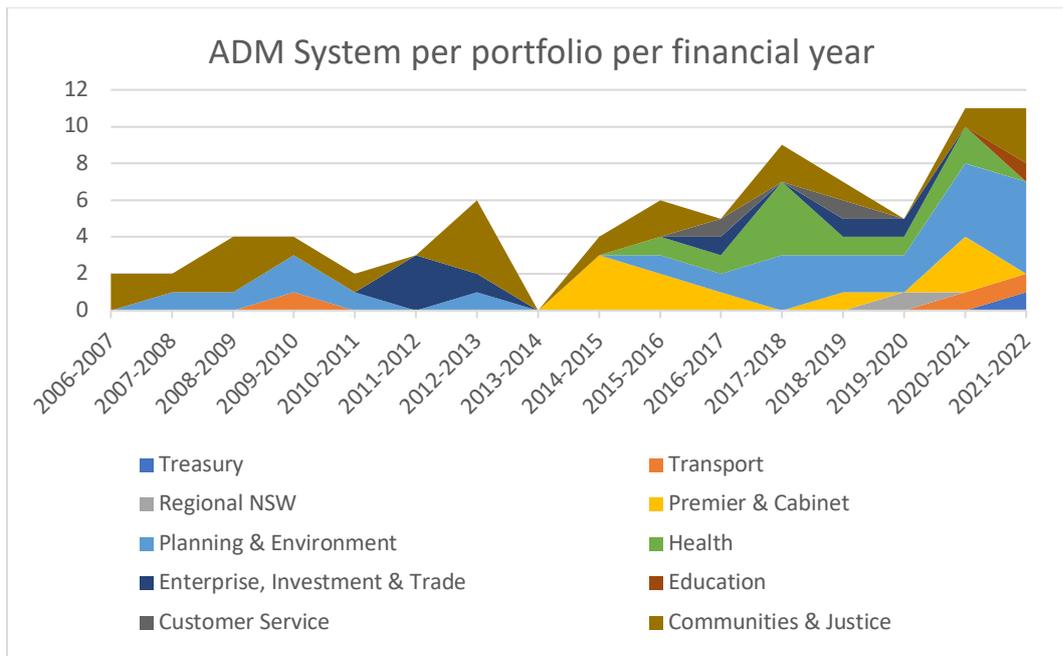
Figure 18: Possible ADM systems by portfolio by financial year deployed based on publicly available data

In addition, analysing annual reports as shown in Figure 18 shows the Communities and Justice and the Planning and Environment portfolios to be more active. This again is consistent with Survey 2 data. These two portfolios regularly include descriptions of systems potentially performing ADM-related tasks in their annual reports. By contrast, other portfolios that seem to be active in the deployment of ADM systems in recent years based on all scanned public sources (Figure 17) – such as Customer Services, Health, and Transport – do not seem to refer to ADM systems as frequently in their annual reports.

Looking at the annual reports of different departments and agencies within the one portfolio provides further insight into where automation is occurring. For example, the initial automation peak noted in Communities and Justice was driven by possible instances of ADM systems reported by the NSW Police Force. Twelve possible ADM systems are noted in its annual reports between 2006–2007 and 2012–2013; and 2 more in its 2015–2016 report. Interestingly, the search of publicly available material identified very few references to possible ADM systems in subsequent years.

The purposes of automation by state government departments and agencies

The dataset generated by the review of publicly available material also offers an opportunity to look into the public-facing purposes of automation, by considering how they are described by the state government departments and agencies to the general public. It was more challenging to assign purposes based on the publicly available material. Members of the research team assigned categories based on the descriptions of possible instances from websites and other public documents. Some of these descriptions are clearer than others. We modified the categories to make an analysis meaningful. We did not assign

more than one purpose, instead choosing the best categorisation available – unless multiple purposes were clearly described.

Figure 19 provides an overall impression of the distribution of purposes. At first glance, there seems to be a significant disparity between this picture and the data reported from Survey 1. In our view, however, the results of analysing the two datasets are moderately compatible.

ADM by Purpose (State)
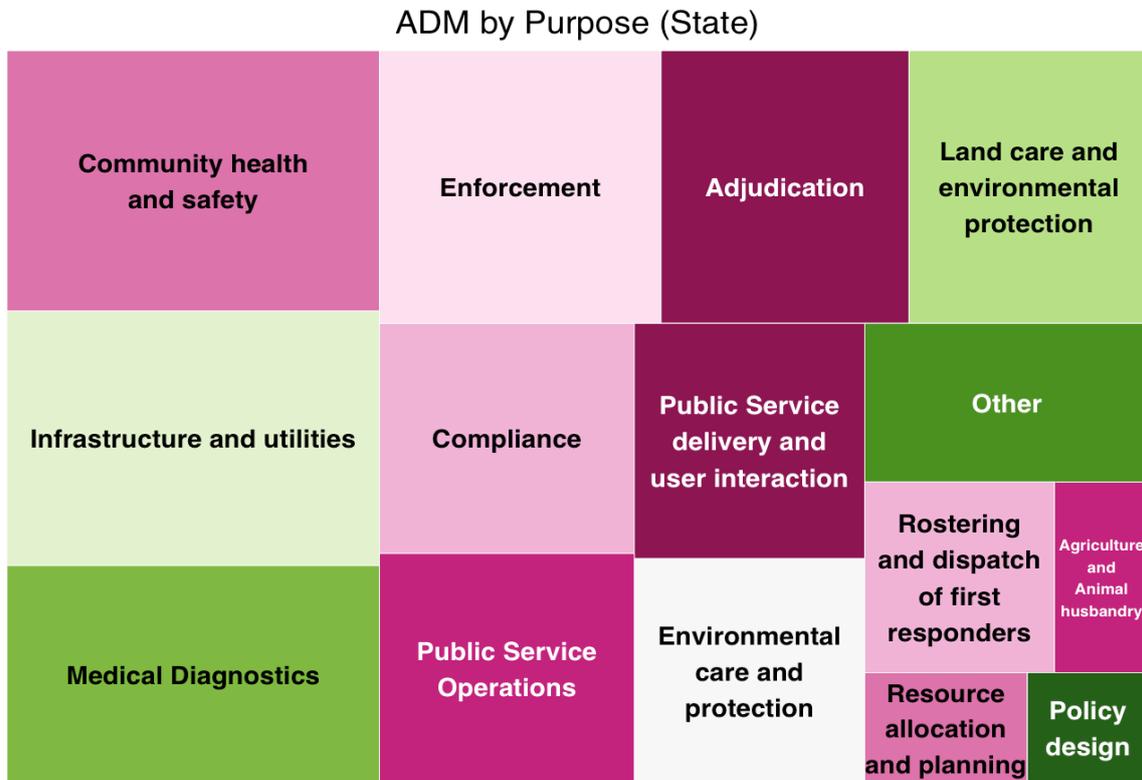
Figure 19: Purposes allocated to possible instances to ADM systems at state level based on publicly available data

In Survey 1, the dominant purposes of ADM systems reported by state government departments and agencies were compliance (34%), resource allocation and planning (28%), public service delivery and user interaction (24%), enforcement (22%) and public service operations (22%); followed by policy design and adjudication (between 11 and 14%).[64] Taking this different approach, the purposes identified in the publicly available data are more closely related to three groups of purposes that were not listed in the survey. Together these three represent close to half of the overall count of identified purposes:

1. Community health and safety and medical diagnostics;
2. Infrastructure and utilities; and

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[64] See above at 23 (Organisational purposes of ADM systems in NSW state government departments and agencies).

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3. Environmental care and protection or land care and environmental protection.

We therefore conducted a statistical analysis of the correlation between the portfolios and the purposes. As expected, mentions of automation for purposes related to community health and safety and diagnostics were more prominent in the Health portfolio; environmental protection and land care in the Planning and Environment portfolio. When we looked further into those subgroups, we observed that many of these potential systems could have been considered 'out of scope' by public servants filling out Survey 1, based on the instructions given. However, we included them in the publicly available dataset because their descriptions made us think that they had some relevance for decision-making purposes. Equally, in infrastructure and utilities, it is possible that many of the potential systems included here might have been considered out of scope by survey respondents and hence not reported by them.

If we set to one side these three groups, the publicly available data highlight the dominant categories for using automation as publicly described are (in order): enforcement; adjudication; compliance; public service operations; and public service delivery and user interaction. The main difference between the two data sources then is 'adjudication', with the lowest count in the survey, but the second highest in the publicly available data (again, after discounting the three groups noted above). Most instances were identified in three portfolios: Customer Services (10), Communities and Justice (9) and Planning and Environment (6).

It is possible that the interpretation of 'adjudication' applied by the research team to the publicly available materials was different from respondents filling in the survey. ADM system use cases that we considered to be adjudication (such as decision-making that involved an element of judgment about the circumstances or condition of the people or entities involved), could have been considered by public servants as involving the allocation of resources, enforcement or compliance. For example, in the publicly available dataset we recorded a system operated by Corrective Services for classifying inmates as 'adjudication', but it was categorised as 'enforcement' in Survey 1.[65]

This illustrates a need for better clarity regarding the categories of purposes, and the risks involved in relying too much on the reported results of mapping exercises like this one. For example, there is much discussion today of basing regulation of AI according to a characterisation of the risk of a given AI system. Based on our experience in conducting the present mapping, and the comparison of results from our surveys compared to researcher-led categorisation, we think it would be a mistake to assume that any system categorised by a public servant (or indeed any survey recipient) as related to 'enforcement' carries some pre-established level of risk. A top-down assignment of a risk level may be based on an

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[65] Note also that Survey 1 enabled respondents to select more than one purpose, and respondents often did, whereas this was not typically done in classifying the findings from the publicly available material.

understanding of what enforcement means which may not be shared 'bottom up' by public servants responsible for managing such systems.

3.5. WHAT CAN WE LEARN FROM THE PUBLICLY AVAILABLE DATA ABOUT ADM SYSTEMS IN LOCAL COUNCILS?

In relation to local councils the data collected from publicly available material is less rich. We were able to identify a series of possible uses of ADM systems, but the scant detail in the public documents about the technologies being used make any high-level analysis unreliable.

There are, however, two areas where we had enough data to provide some observations. The most promising application of the dataset was to supplement the analysis of ADM use when the data collected from the surveys cannot be considered representative. The analysis below on geographical distribution illustrates this point with local councils. A second analysis explores the purpose that local councils link to their public-facing reporting of automation.

Geographical distribution of automation at the local council level

Survey 1 was administered to all 128 NSW local councils, receiving responses from 35 (27%) councils. As councils have a similar scope of policy and service delivery responsibilities, these replies are regarded as relatively generalisable in the ways in which ADM systems are being used and the types of technologies being used. In other words, it is reasonable to expect that the findings derived from the responding councils are broadly reflective of those that have not responded. However, when we generalise in this way, we risk losing some nuance. The review of publicly available material can supplement this information by providing greater insights into the distribution of possible instances of ADM system use among local councils.

Figure 20 maps the geographical location of councils for which possible instances of ADM system use were identified in the publicly available data. Based on the survey, we noted that rural (16) and large rural (42) councils were not typically using ADM systems, whereas metropolitan and large regional councils typically were. We based that conclusion on the fact that 11 of the 12 rural and large rural councils reported that they had no ADM systems in use, piloted or planned. Figure 20 shows that the publicly available data supports this high-level observation, however there are instances of possible intense local council use of ADM systems in non-metropolitan areas.
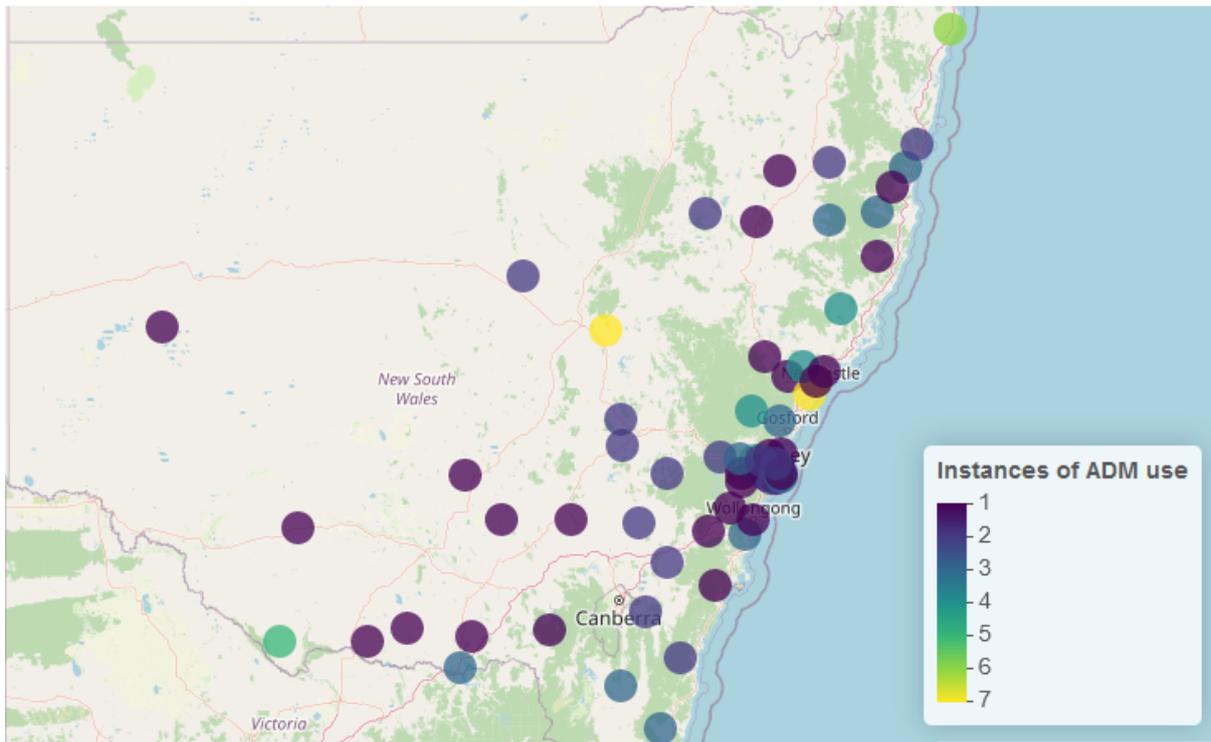
Figure 20: Local councils with possible instances of ADM systems identified in publicly available material (high relevance)

At first sight the map shows a concentration of automation activity around Sydney and other metropolitan areas, even if the count of individual instances per council is not very high (in purple in the map). Focusing instead on the councils with the highest counts of possible instances of high relevance, the picture becomes a bit more complex, as these councils are diverse in terms of population.

- Dubbo Regional, Lake Macquarie and Ballina Shire (all classified as Regional Town/City councils) are medium-sized councils governing populations over 40,000. This suggests the need for a certain scale to make automation worthwhile. Such scale is more often – but not exclusively – associated with metropolitan councils.
- Murray River Council (a large rural local council), with a relatively small population of around 12,000 people, can also be identified in the publicly available data as having high levels of automation, suggests that population size is not the only determinate of automation.

This observation nonetheless supports some of the findings noted in our case study of computer vision in local councils (see Section 5.6) that some councils are more technology-inclined and more willing to test the use of automation in service delivery. Our conclusion from the data is that, in general, automation is needs-driven. For example, councils with larger populations benefit more from automating customer service-related tasks. However, during interviews local council employees noted that automation is also

shaped by the existing skills among staff and the leadership.[66] For example, Lake Macquarie City Council was acknowledged to be one of those councils more likely to adopt technological solutions. This is reflected in the dataset, which identifies 7 possible instances of use of ADM systems.

We note also that councils where leadership and staff are more inclined to use technology are also more likely to *promote* their technology-driven initiatives in public documents. This could explain the presence of Murray River among those councils with a higher level of publicly reported use of ADM systems.

The purposes of automation in local government

It is also useful to consider the **purposes** of automation in local government. We described the challenges of categorising the public data by purpose in Section 3.4 above.[67] It was even more challenging to assign purposes to the publicly available material on local council purposes: we found the descriptions less clear, and more varied at the local council level, which is to be expected given the lower levels of resources we would expect to be available at that level of government.

We found that automation as described in the publicly available material seems to concentrate around the needs of local councils in the domains of infrastructure and utilities, and public service operations. In contrast to Survey 1 findings,[68] public service delivery was not identified as a dominant purpose and resource allocation was marginal. Figure 21 provides a quick insight into the distribution observed.

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[66] 20 years of research into local government adoption of e-government has repeatedly found that financial resourcing (per capita), technological leadership, and larger populations are associated with higher levels of e-government. See for example, Jennifer M. Connolly, Leticia Bode, and Ben Epstein 'Explaining the varying levels of adoption of e-government services in American municipal government' (2018) 50(3) *State and Local Government Review* 150-164. Aroon Manoharan A study of the determinants of county e-government in the United States (2012) 43(2) *The American Review of Public Administration* 159-178.

[67] See above at 44.

[68] Survey 1 results for local councils highlighted the highest priorities as public service delivery and user interaction (35) and resource allocation and planning (22).

ADM by Purpose (Local)
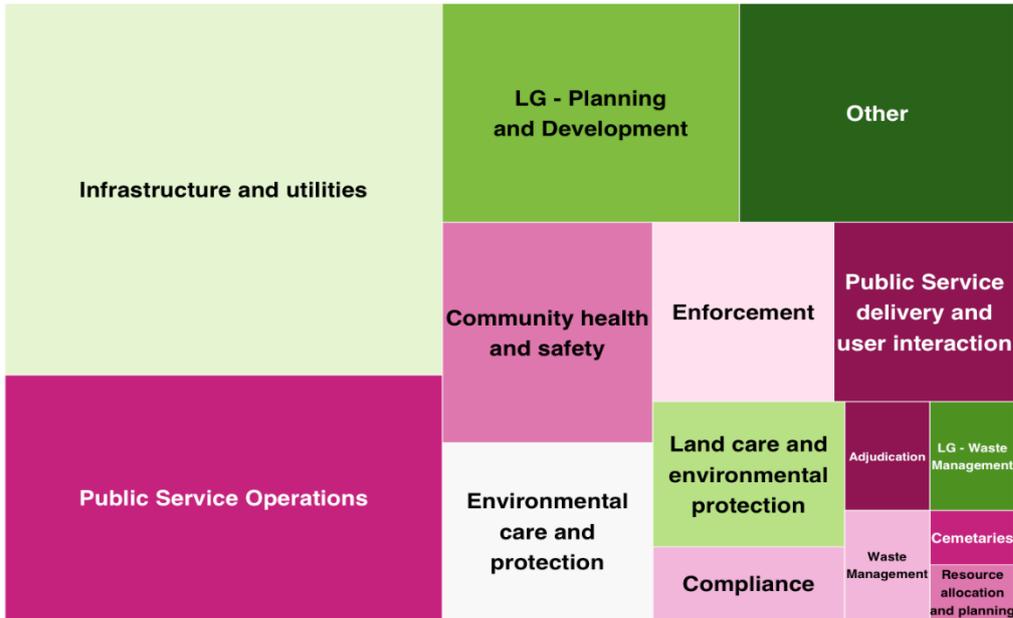
Figure 21: Purposes allocated to possible instances to ADM systems at local government level based on publicly available material.

It is noteworthy that some of the publicly reported systems could be linked to enforcement and/or compliance, in a similar ratio to that observed in the survey data. It is therefore reasonable to assume that councils are interested in using automation for these purposes, and that some are willing, consistent with good practice, to make that use visible to interested stakeholders and citizens.

04. ANALYSING HOW ADM SYSTEMS ARE USED AND GOVERNED ACROSS STATE AND LOCAL GOVERNMENTS IN NSW

Mapping the use of ADM systems by NSW state and local governments, as we have done in Sections 02 and 03, helpfully sheds light on the extent of the phenomenon and some trends and clustering of uses at a broad level. But to understand *how* such systems are used; and what challenges may arise in ensuring that ADM systems are designed, developed, deployed and monitored in a way consistent with the requirements of good public administration and administrative law, we need to dig deeper into the **practices** around ADM systems (how they are designed, developed and deployed) and **governance arrangements** (how they are authorised; who is responsible; how they are monitored; how they are made visible to various stakeholders).

In the *New Machinery Report*,[69] the NSW Ombudsman outlined four basic requirements for assessing whether the use of machine technologies by public sector organisations supports good and lawful administrative decision-making:

- **proper authorisation**, including consideration of whether the ADM instrument has a proper legal foundation and whether the decision is within the scope of the law
- **appropriate procedures**, including whether the ADM instrument complies with the requirements of procedural fairness and other applicable laws and principles, such as privacy and anti-discrimination law
- **appropriate assessment**, including whether decisions produced by the ADM instrument gives proper effect to the statutory power ('it answers the right question') and is based on a proper analysis of relevant material, and
- **adequate documentation**, i.e., the maintenance of appropriate records of administrative decisions and records about the ADM instrument itself.

These criteria are a simplification of a more complex set of administrative law doctrines. They provide a useful and accessible starting point for assessing whether ADM systems pose issues in relation to basic administrative law norms.

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[69] *New Machinery Report* (n 23).

4.1. HOW WE WENT ABOUT EXAMINING THESE CRITERIA

In order to examine practices and governance arrangements for ADM systems across state and local governments in NSW, we undertook a second survey (Survey 2). We contacted government officials named as knowing more about particular ADM systems in Survey 1, and asked more detailed questions relating to good public administration. This included the organisational context; governance, review and legal settings; procurement and operation; technical aspects of the ADM system; input and output data and testing, auditing and accuracy.[70]

By surveying a *set* of systems in more depth, we aimed both to find out more about individual systems, but also, through a survey method, to see if we could identify any patterns. Out of a total 213 ADM systems reported, 54 were selected for Survey 2, from which we and received a total of 26 responses (48% response rate), with a greater response rate from state-level agencies (20 responses, 56% response rate) than councils (6, 33%). Sampling for Survey 2 was purposive, rather than representative. We sought to focus attention on ADM systems that could provide more insights into the various administrative law, governance and human impact elements associated with using ADM systems. We also needed to be mindful of the time and effort required to respond to a detailed survey, requiring some coordination within the organisation to answer all the questions. In particular, this meant that we could not send too many surveys to one organisation. We also excluded from Survey 2 those ADM systems that were in development or planned, owing to the detailed information required to answer the survey. The sample and final responses we have obtained cannot be considered representative, and we cannot therefore draw general conclusions about practices across NSW state government departments and agencies: ADM systems across NSW state and local governments are very diverse. Rather, the responses highlight important considerations for legal analysis with potential policy, legal or organisational implications.

We also conducted a small set of case studies, as another way of digging deeper into practices around ADM design, development and deployment (See Section 05 below).

The focus of analysis in this section is on recurring **themes** that emerge from Survey 2, particularly patterns that indicate areas of good administration and areas of concern for the proper regulation and control of automated systems by NSW state government departments and agencies, and local councils, now or into the future. The analysis in this section is based on data collected by way of Survey 2. It does not include data subsequently updated with the NSW Ombudsman's Office.

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[70] More information on the selection criteria and survey design is set out in the Methodology and Data Annex, section 8.6. The survey instrument itself and a table mapping questions to issues in administrative governance and practice are also included in the Appendix.

4.2. DRIVERS OF ADM SYSTEM ADOPTION BY NSW STATE AND LOCAL GOVERNMENTS

Before turning to the requirements of law and good administrative practice identified in the *New Machinery Report*, it is important to recognise that there are good reasons in favour of the adoption, and deployment of ADM systems in state and local governments across NSW.

Government organisations make decisions to computerise and automate their activities for a wide range of reasons. Survey 2 asked respondents to indicate, from a list of 13 possible organisational objectives for introducing the ADM system, all applicable objectives, *and* the most important objective. As can be seen from Table 9, the most widespread organisational objectives were reducing administrative error (19 of 26), general data management (17), productivity gains (15) and improving consistency of decision-making (14). Two of these focus on improving the integrity of administrative processes (in other words, effectiveness), while one is about efficiency, an oft-touted argument for automation.

Table 9: Organisational objectives for deploying the ADM system (Survey 2)

	Responses citing this objective (n)	Responses citing this objective as important (n)
Improving public access to government services	8	2
Enhancing direct customer experience/interface	11	3
Reducing administrative error	19	0
Improving consistency of decisions	14	2
Productivity gains	15	4
Cost reduction	8	0
Creating new institutional capabilities	9	1
Triaging resources, enquiries, applications etc	7	2
General data management	17	1
Augmenting human capabilities	12	1
Improving policy/service agility	9	0
Implement a new function	5	1

Fraud/unlawful conduct detection and action	4	1
Unsure	1	1
Other	1	3

Also of interest is the diversity of responses officials gave when identifying the most important objective. Productivity gains ranked highest here (4) (with 2 also citing triaging of resources, inquiries etc). But customer-oriented objectives were also commonly cited as most important: 3 cited 'enhancing direct customer experience/interface'; and 2 listed 'improving public access to government services'. Reported purposes in the 'other' category included objectives such as improving cyber security and replacing legacy systems.

4.3. PROPER AUTHORISATION

The first requirement outlined in the *New Machinery Report* is 'proper authorisation'. This requirement centres on the question of whether a decision made with the assistance of an ADM system is authorised by and within the scope of the law, and is made by an authorised person. It captures the basic administrative law requirement of lawfulness. Questions about the lawfulness of automated systems have come to the fore in the work of the Robodebt Royal Commission, which found that the scheme had been introduced in the face of advice questioning the legality of the method for calculating debts on the basis of averaged earnings instead of the legislatively prescribed fortnightly calculation—doubts later confirmed by the Federal Court.[71] Issues of legality of automated systems have also arisen in NSW. As reported in an Annexure to the 2021 *New Machinery Report*, the NSW Ombudsman received legal advice that Revenue NSW's Garnishee Order (GO) System as it had been operated from 2016–2019 was unlawful, because no authorised person engaged in a mental process of reasoning necessary to issue a garnishee order.[72]

Legal basis

Survey 2 sought to understand the type and nature of authorisations in place for automating administrative decision-making for systems where the respondent had already indicated that the ADM system was being used in administrative decision-making. The results are shown in Figure 22. Of the 14

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[71] *Royal Commission into the Robodebt Scheme* (n 8). See Terry Carney, 'The Automated Welfare State: Challenges for socio-economic rights of the marginalised' in Zofia Bednarz and Monika Zalnieriute (ed) *Money, Power and AI: From Automated Banks to Automated States* (Cambridge University Press 2023): 95–115; see also the order made by Justice Davies in *Deana Amato v The Commonwealth of Australia* (Federal Court of Australia, VID611/2019, 27 November 2019).
[72] *New Machinery Revenue NSW case study* (n 10).

responses to this question,[73] most reported authorisations by way of organisational policy and procedures (12, 86%) and legislation, regulations or other legislative authorisations (10, 71%). Ministerial involvement was reported in 2 cases, and one ADM system reported having no explicit authorisation or guidance (a council's Licence Plate Recognition system).
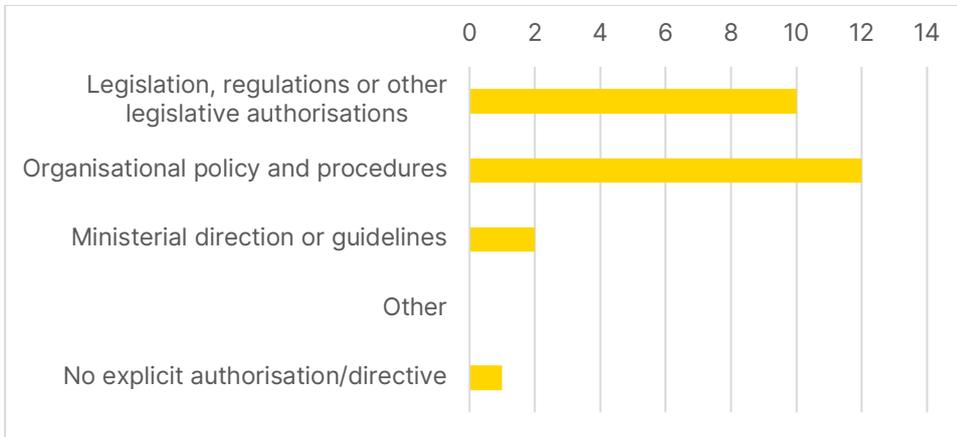
Figure 22: Source of authorisation for the ADM system (Survey 2)

Respondents were asked to briefly name authorisations, rules or guidance. Many listed specific Acts.[74] These were cited in general terms, and appear to be legislation which empowers decisions to be made rather than specific provisions that might address automation. Other reported sources of authorisation, rules and guidance reported included manuals and guidance provided by the Information Commissioner; a departmental Cyber Security and Privacy Policy Framework, state-level management and other Plans, and a Public Information Manual. One survey describing a system currently in use noted that authorisation or guidance 'remains under development'.

We have not further considered here whether the cited pieces of legislation and policy specifically authorise ADM or the particular ADM system, for a number of reasons. The responses received do not pinpoint legislative authority for the particular decision with sufficient clarity such that an analysis of the extent of discretion involved in the decision-making could be considered; and as outlined below, the

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[73] Of the 12 surveys not responding to this question, 11 were not asked this question as a previous question in the survey indicated that the ADM system was not used in administrative decision-making. We remind the reader that the scope of this research project extended beyond systems involved in making decisions that would be subject to judicial review. See the discussion in Section 1 above.

[74] These included, for example, (1) *Architects Act 2003* (NSW), *Architects Regulation 2017* (NSW), *Licensing and Registration (Uniform Procedures) Act 2002* (NSW); (2) *Greyhound Racing Act 2017* (NSW), *Greyhound Racing Regulations 2019* (NSW), *Greyhound Racing Rules, Fit and Proper Person Policy, Code of Practice and Welfare, Betting and Racing Act 2017* (NSW); (3) *Mining Act 1992* (NSW); *Petroleum (Onshore) 1991* (NSW), *Mining Regulation 2016* (NSW), *Petroleum (Onshore) Regulation 2016* (NSW).

systems reported did not involve full automation, with one exception. In any event, the question of whether a decision assisted by ADM is authorised by and within the scope of the law requires careful case-by-case consideration. Responses indicating legislative authorisation do not necessarily mean that the surveyed systems have explicit statutory basis. Importantly, too, the absence of express legislative authorisation does not necessarily render an ADM system, or decisions made with the assistance of such a system, unlawful. A decision may be lawful as long as the threshold conditions of 'a decision' are sufficiently met for the decision to qualify for judicial and administrative review.[75]

There is increasing recognition that some form of statutory basis for ADM systems is useful, both to ensure the system has a proper foundation and to increase transparency around the use of ADM in government. At the very least, it is incumbent on agencies to ensure that the adoption of ADM systems that assist with statutory functions have a proper legal basis.

The question of who decides to deploy ADM systems is also relevant to the requirement of proper authorisation. The data from Survey 2 paints a mixed picture here. Figure 23 shows that decisions to deploy ADM systems in NSW have often been taken by agency heads or by digital leaders (Chief Information Officer or heads of division). Interestingly, one council reported that 'the council as a whole' took responsibility for deciding to deploy the ADM. No state-level agency reported equivalent Ministerial or Cabinet involvement. This suggests that decisions to deploy these ADM systems were not seen as requiring political consideration. A mixed picture of who makes these decisions is perhaps not surprising given the diversity of automated systems, but the reported high levels of organisational decision-making below Secretary/Head or CEO is notable. It raises the question: to what extent is the leadership within NSW government departments and agencies aware of, or involved in, shifts to automate government functions? In the United States there are moves to require agencies to appoint a Chief AI Officer. As discussed in Section 6 of this Report, NSW government departments and agencies, at least, may wish to consider nominating a responsible individual or team in order to ensure accountable, transparent development of ADM systems.

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[75] *Pintarich* (n 24). For a full discussion see Yee-Fui Ng and Maria O'Sullivan, 'Deliberation and automation: When is a decision a "decision"?' (2019) 26(1) *Australian Journal of Administrative Law* 21–34.

Who made the formal decision to initially deploy ADM system?

Role	Value
Cabinet	0
Minister	0
Secretary/Head of agency	9
Mayor	0
Council	1
Council Chief Executive	0
Chief Information officer or similar	2
Head of division	7
Head of relevant unit	3
Other	1
Unsure	3
Not applicable	0
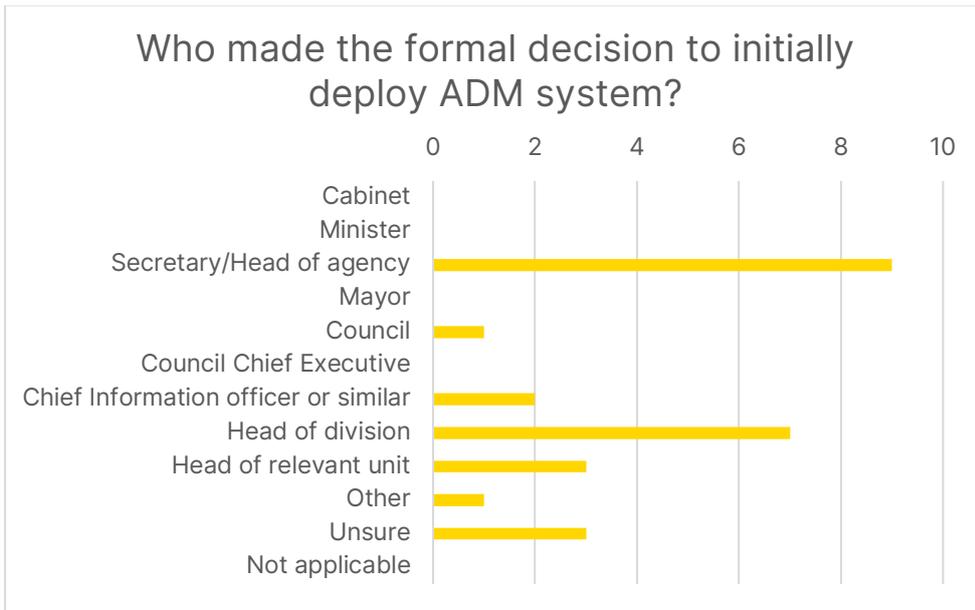
Figure 23: Who made the formal decision to initially deploy the ADM system? (Survey 2)

Are lawyers involved in system design?

One way to provide some assurance that an ADM system is consistent with the law is to ensure that lawyers are involved in the design of new automated systems. As the NSW Ombudsman explained in the *New Machinery Report*: 'when new technologies and new modes of exercising [a statutory] function are being considered, it is **essential** that the source legislation be carefully considered afresh'.[76]

Expertise	Value
Technical	18
Legal	9
Policy	15
Practitioner/end user	20
Other	5
Unsure	2
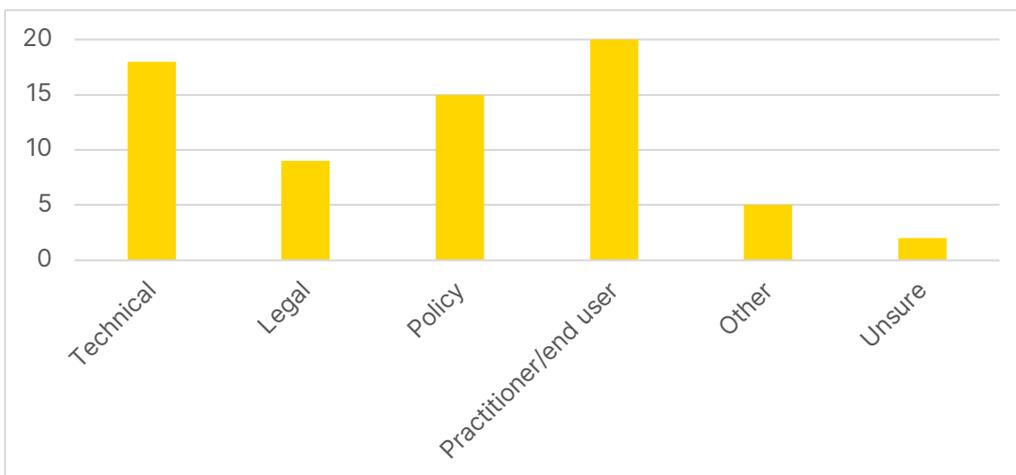
Figure 24: Expertise in the teams designing ADM systems (Survey 2)

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[76] *New Machinery Report* (n 23) 51, emphasis original.

Of the 25 ADM systems for which we have responses, most had input from technical professionals, policy professionals and practitioner/end users (Figure 24). It is perhaps surprising that more ADM systems have had practitioner/end user input than technical input.

However, just 9 out of 22 (41%) Survey 2 respondents (excluding non- and 'unsure' responses) indicated that legal experts were included in the system design team. Perhaps unsurprisingly, the proportion of design teams that included legal experts was higher for ADM systems involved in administrative decision-making, with 8 out 14 (53%) teams included lawyers (excluding 1 unsure response). A greater number of Survey 2 respondents indicated that they had sought legal advice in relation to the ADM system in the pre-deployment phase, either internally (11 respondents) or externally (2 respondents). Some agencies, such as the NSW Architects Registration Board in relation to its BOASYS platform, involved legal expertise in the design team in addition to seeking both internal and external legal advice at the pre-deployment and other stages in the life course of the system.

The results of the surveys suggest that, in general, government departments, agencies and local councils need to give **greater weight to the questions of legality** in the design and implementation phases to ensure adopted systems are properly authorised by law. They also reinforce the responses to questions regarding the testing and evaluation of ADM systems, legal and other, discussed further below.

The role ADM systems play in decision-making

Another question relevant to the 'proper authorisation' requirement is whether the decision is made by an 'authorised person'. Ordinarily, statutory functions are not granted to or delegated to an automated system; a 'legal person' should retain control of the decision-making process and any departure from that requires express statutory authorisation.[77] Similarly, where the decision involves the exercise of discretion (that is, some degree of choice or the exercise of judgment on the part of the decision-maker), the ADM system must not narrow or otherwise fetter that discretion. That said, there is a significant body of literature going back over 20 years that demonstrates that computerisation in and of itself reduces administrative discretion, even if this is unintentional.[78] Both the Royal Commission into Robodebt,[79] and the Law Enforcement Conduct Commission in its report on NSW Police use of the STMP risk assessment

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[77] But see the discussion in Ng and O'Sullivan (n 75).

[78] Mark Bovens and Stavros Zouridis 'From street-level to system-level bureaucracies: how information and communication technology is transforming administrative discretion and constitutional control' (2002) 62(2) *Public Administration Review* 174–184; Busch and Henriksen (n 4); Michael Adler and Paul Henman 'e-justice: A comparative study of computerization and procedural justice in social security' (2010) 15(2) *International Review of Law, Computers & Technology* 195–212.

[79] Royal Commission into Robodebt (n 8).

tool[80] have noted the risks of failing to act in accordance with the law (as government departments, agencies and local councils must), when ADM programs or internal policy seeking simplicity or uniformity results in illegality or failure to follow the law.

Survey 2 therefore sought to understand how ADM systems were involved in automating administrative decisions. Table 10 shows that almost half (11, 44%) of the ADM systems surveyed provided no contribution to an administrative decision. Of the 15 that contributed to an administrative decision, only 7 had a major input.

Table 10: Role of ADM systems in administrative decision-making (Survey 2)

Degree of input into administrative decision	Count
It is not used in an administrative decision-making process	11
It has minimal input	2
It is one input among many	6
It is one of the main inputs	5
It is the main input	1
In most cases it is the only material input	0
It solely makes the administrative decision	1

Figure 25 breaks down the role the ADM system was said to play in cases where it contributed to an administrative decision. Note that the numbers here will not match other analyses in this chapter: respondents could indicate more than one of the options given. Of these, almost all are reported to **provide input data and guidance to human decision makers**. This suggests that human decision-makers remain central to government (including administrative) decision-making, and that ADM systems, for now, largely support, rather than replace, human decisions. At first glance, a system that provides input data and guidance presents fewer risks in terms of these aspects of the 'proper authorisation' requirement as these systems do not appear to displace the human decision maker or constrain the exercise of discretionary power. However, the use of these systems is not without risk, including legal risk, a point that we return to below.

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[80] Law Enforcement Conduct Commission (n 14).

In relation to administrative decision-making, what role does the ADM system play?
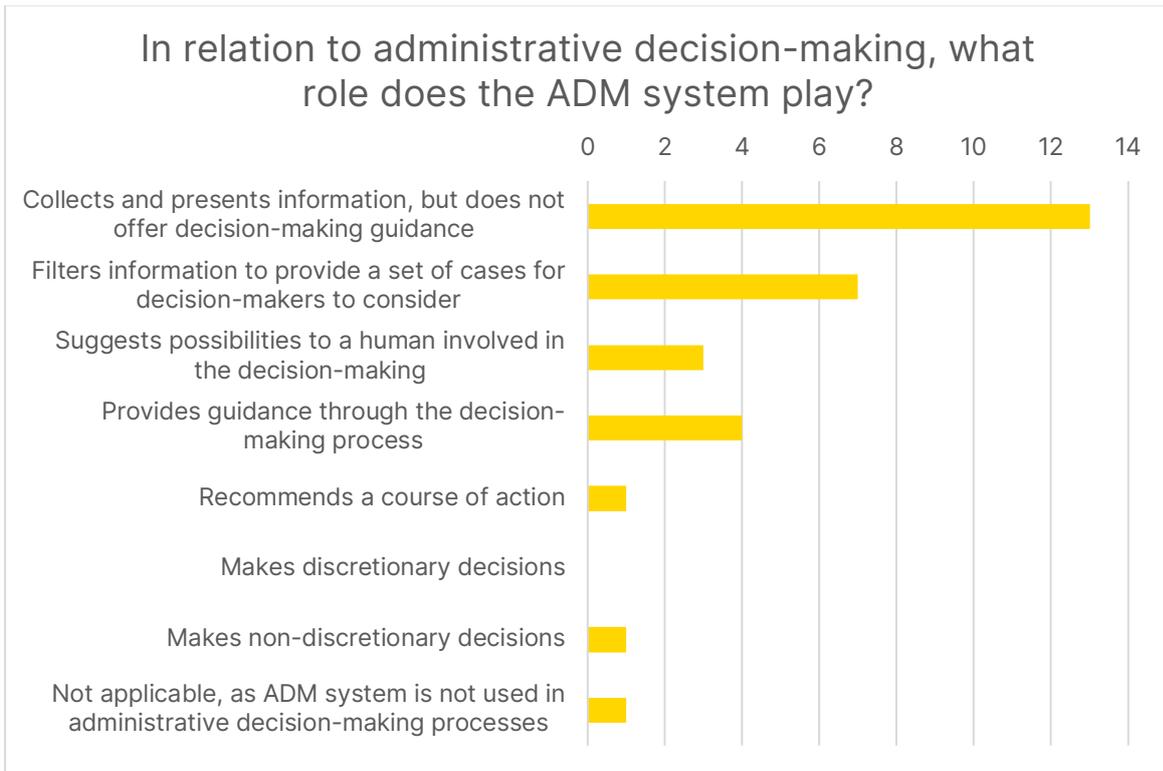
Figure 25: Role of ADM systems in administrative decisions (Survey 2)

Other surveyed systems facilitate, structure or otherwise assist the decision-making process in a more active way. For example, three ADM systems suggest possibilities to a human involved in the decision-making, whilst one – the Department of Regional NSW's ServiceNow platform (currently referred to as the 'Activity Compliance and Enforcement System' or ACES) – recommends a course of action. Specifically, the system, 'takes actions based on scoring of submitted information' in limited cases, although the tool can be overridden by administrators. These systems may pose greater risk in relation to the 'proper authorisation' criterion, although this depends on the nature of the decision, including whether it involves the exercise of discretion, among other circumstances.

Are ADM systems that contribute to human decision-making necessarily 'low risk'?

The majority of Survey 2 systems used in administrative decision-making (8 out of 14 responses) collect and present and/or filter cases, but are not otherwise used to structure or make decisions. This approach to automation in government is generally assumed to be low risk, because it does not displace the role of the human decision-maker and thus does not interfere with the exercise of discretion. It also does not interfere with existing administrative review and appeal mechanisms.

Systems of this kind are not, however, without legal risk. They can shape and structure the decision-making process in ways that can lead to improper and unlawful decisions and undesirable outcomes. While we are making no comment about the systems reported to us in Survey 2, we emphasise that it is critical that agencies do not overlook or ignore the ways that apparently 'low risk' systems can still:

- **Contribute to unlawful administrative decisions**. It is often assumed that systems which do not themselves produce decisions cannot produce unlawful decisions. But these systems can still contribute to errors and lead to unlawful decisions. For example, where a system presents inaccurate information that is then relied on by a decision-maker, the decision may be unlawful. Similarly, if a system fails to present all relevant material or displays irrelevant material, it could lead to unlawful decisions. These issues may arise due to a mistranslation of law into code (discussed in Section 4.5 below), software faults (bugs), or inaccuracies in the input data.
- **Produce biases.** ADM systems which provide inputs may be less likely to systematise biased outcomes compared to partially and fully automated predictive ADM systems, but they can still contain and produce bias. For example, data inputs may contain biases, or the process of encoding the system may reflect human biases or assumptions. Similarly, the way that the system collects, presents and collates information, including what is emphasised or hidden, may influence the decision-maker in ways that produce biased outcomes. Such biases are likely to be subtle and difficult to detect.
- **Diminish administrative accountability and transparency**. ADM systems that collect, analyse or present information for decision-makers effectively sit behind the decision-making process, which may reduce the requirement and appetite for disclosing information about the use of the system to the public. This point is taken up in greater detail below.
- **Pose privacy risks**. ADM systems that assist in decision-making about people will almost inevitably involve the collection, use and/or storage of at least some and often significant amounts of personal information. The adoption and use of ADM in government thus creates risks associated with protecting citizens' privacy and data security. The way these systems operate must be in compliance with relevant privacy law, such as the *Privacy and Personal Information Protection Act 1998* (NSW).

4.4. APPROPRIATE PROCEDURES

The second requirement for good and lawful administrative decision-making as outlined in the *New Machinery Report* is 'appropriate procedures'. This means that an administrative decision must follow a fair

process, including satisfying the requirements of procedural fairness, as well as meeting other legal and ethical obligations, such as privacy and anti-discrimination laws. The focus here is on procedural fairness.

Procedural fairness or 'natural justice' represents a collection of doctrines concerned with the process by which a decision is made rather than its substantive outcome.[81] Procedural fairness captures two main rules:

1. **The hearing rule**. This demands that affected parties are given an appropriate and genuine opportunity to be heard before a decision is made that adversely impacts their interests.[82]
2. **The bias rule**. This requires that a decision-maker is impartial and is free from real or perceived bias.

The requirements of procedural fairness apply to almost all administrative decisions that affect the rights or interests of individuals in a direct and immediate way,[83] the exception is where its requirements have been clearly excluded by statute.[84]

Procedural fairness is a flexible obligation, which adapts to the circumstances of the particular case.[85] What is required to fulfil the requirements of procedural fairness depends on the context, scope and purpose of relevant legislation and the consequences of the decision, among other factors.[86]

Due to the flexible, contextual nature of procedural fairness requirements, it is crucial that organisations assess their compliance with their obligations on a case-by-case basis. This reinforces the importance of involving legal experts in design and assessment of ADM systems, as discussed further below.

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[81] For a fuller outline of these requirements see Judith Bannister, Anna Olijnyk and Stephen McDonald, *Government accountability: Australian administrative law* (Cambridge University Press, 2023) Ch 12.

[82] *Kioa v West* (1985) 159 CLR 550.

[83] Ibid. For a discussion of the bias rule, see Matthew Groves, (2020) 44(2) 'Clarity and Complexity in the Bias Rule', *Melbourne University Law Review* 565–601.

[84] The statute must use 'plain words of necessary intendment': See *Annetts v McCann* (1990) 170 CLR 596, 598; *Offshore Processing Case* (2010) 243 CLR 319, 352.

[85] *Kioa v West* (n 82) per Mason CJ at 585.

[86] *Kioa v West* (n 82). See also Bannister, Olijnyk and McDonald (n 81).

Bias and the need to undertake a broader consideration

A key issue associated with the use of ADM and the requirements of procedural fairness is the potential for ADM systems to produce new forms of bias. This includes 'algorithmic bias', that is, biases based on social categories that are embedded into data and/or algorithms in ways that produce biased or discriminatory outcomes. Bias may also stem from coding processes and decisions that reflect the biases of designers as well as human deference to automated outputs.[87] These forms of bias can produce significant and systematic harm, examples of which are documented in the *New Machinery Report*. Concerns about bias have been raised in relation to decision-making tools in NSW, including the STMP[88] and tools used in the out-of-home care sector.[89] Legal scholars have noted that applying the law to these forms of bias is challenging.[90] We note, however, there other legal bases for subjecting such biases to review (such as an unreasonableness analysis); there are also broader ethical approaches to fairness that are relevant.

One NSW framework that addresses questions of bias is the *NSW AI Assurance Framework*.[91] To date, only 4 out of 15 systems from Survey 2 which were involved in administrative decision-making had been assessed using this framework. The small number is not surprising, given the limited time in which the Framework has been operating (i.e. since March 2022) and the limited circumstances where it is required to be applied: i.e. only where AI is used, and where the system is funded under a particular scheme or above a certain value. The ADM systems which had been assessed using the framework were FishOnline (NSW Fisheries); Natural Language Analysis of Submissions (Information and Privacy Commission); and systems within the Regional NSW portfolio. Interestingly three of these four systems report not using machine learning (which is what is often equated with AI), while survey respondent from the Information and Privacy Commissioner was 'unsure' in relation to their ADM system for Natural Language Analysis of Submissions.

One way to detect bias in the outputs of a system is to conduct testing. Survey 2 therefore asked how much testing ADM systems had undergone before, during and after deployment, identifying a series of testing, auditing and assessment activities that might be undertaken and asking if, and when they had been undertaken. The results are shown in Table 11. Responses were received for about 23 ADM systems, with one of these ADM systems yet to be deployed, meaning that it was not yet possible to test or assess it during and since roll-out.

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[87] Anna Huggins (2021) 'Addressing Disconnection: Addressing disconnection: Automated decision-making, administrative law and regulatory reform' *UNSW Law Journal* 44(3), 1048–1077.

[88] Law Enforcement Conduct Commission (n 14).

[89] Davies (n 15).

[90] Ibid. For a full discussion of the bias rule see Groves (n 83).

[91] *NSW Artificial Intelligence Assurance Framework* (n 50).

The most commonly used forms of testing/auditing/assessment of ADM systems were testing for accuracy, cyber security tests, internal legal advice about legal compliance, privacy impact assessments and risk assessments. We found little evidence of external assessment (either auditing or legal advice), meaning that testing/auditing/assessment is internally done. This suggests that NSW government organisations will need to ensure that they have the appropriate skills to properly undertake assessments of ADM systems.

Table 11: Types of testing, auditing and assessment of ADM systems (Survey 2)

	Pre-deployment	During roll-out	Since roll-out	No such testing*
Testing for accuracy	20	17	17	1
Disability accessibility	7	3	3	16
Privacy impact assessment	10	4	4	13
Risk assessment	10	6	6	12
Internal advice about legal compliance	11	7	9	10
External legal advice	2	1	2	20
Assessment against the *NSW AI Assurance Framework*	3	2	1	19
ISO technical standards	6	2	2	15
External auditing	2	2	3	18
Cyber Security compliance	12	7	12	6
Analysis of complaints and review request data	4	6	12	10

The data in Table 11 suggests that most types of testing are more often undertaken pre-deployment (i.e. during development; design; procurement) than during roll-out or during ongoing operation. This might suggest a 'set and forget' approach, which may be appropriate in some cases, but should not be the default approach. Unsurprisingly, assessing ADM systems by analysing complaints and requests for review data is more likely to occur after roll-out. Indeed, it would be hard to assess a system using such data prior to roll-out. Cybersecurity checking is another area where significant levels of testing is done

after roll-out as well as in pre-deployment. This is entirely appropriate given the rapid and continuing evolution of cybersecurity threats.

It is also useful to consider types of testing and assessments that were *not* reported as being used widely. To be sure, care should be taken in interpreting the data in the Table 11 column 'No such testing'. Respondents were asked which tests *had* been undertaken, not which testing had not, so our data reflects an absence of positive responses reporting that type of test. This could be that no such test was undertaken at any time, or that the respondent did not know the answer, or that they overlooked answering it. With this proviso in mind, the lowest levels of use were the external assessments (audit and legal advice) and the *NSW AI Assurance Framework*, that have been already discussed. The next least used assessment was testing for disability accessibility. This finding is potentially concerning given the importance of universal design and requirements under disability anti-discrimination to ensure public services are accessible.[92] This low level of testing may be because several ADM systems are internal-facing and not directly interacting with the public (see Figure 23). Nevertheless, government employees may also have disabilities, and their ability to use internal-facing systems would be enhanced if accessible design is taken into account.

Transparency

Transparency around government activities and processes is essential to ensure trust in government, government accountability and democratic society more generally.[93] Numerous policy documents, such as the Australian *AI Ethics Framework*[94] and the *NSW AI Assurance Framework*,[95] require transparency around AI systems, including, in particular, those used by government. The *Government Information (Public Access) Act 2009* (NSW) (GIPA Act), supported by recommendations provided by the NSW Information Commissioner, requires that NSW agencies provide access to government information, which may include information about the use of ADM systems.[96]

In the *New Machinery Report*, the NSW Ombudsman noted that the hearing rule typically requires an administrator to notify an individual of a possible or proposed decision or cause of action, and invite them to respond before a decision is finalised. The Report also noted that as a matter of good administrative

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[92] Shari Trewin et al., 'Considerations for AI Fairness for People with Disabilities' (2019) 5(3) *AI Matters* 40–63.

[93] See e.g., Michele Loi, *Automated Decision Making in the Public Sector: An Impact Assessment Tool for Public Authorities* (Report, Algorithm Watch, 2021); see also Lyria Bennett Moses and Louis de Koker, 'Open Secrets: Balancing Operational Secrecy and Transparency in the Collection and Use of Data by National Security and Law Enforcement Agencies' (2017) 41 *Melb. U. L. Rev.* 530–570.

[94] Department of Industry, Science and Resources, *Australia's Artificial Intelligence Ethics Framework*, (Webpage, 2019).

[95] *NSW Artificial Intelligence Assurance Framework* (n 50).

[96] See NSW IPC, *Automated decision-making, digital government and preserving information access rights* (Factsheet, August 2022).

practice, members of the public should be informed if an automated system (or machine) has proposed or been involved in proposing a decision or action. This goes to questions that in the literature on AI are often grouped under the heading of transparency, explainability and contestability: are people affected by automated systems aware of those systems, are they given reasons for decisions, and do they have an opportunity to contest automated analyses that inform decisions, or the decisions themselves?

Availability of general information about ADM systems

We asked in Survey 2 whether there is a generalised public statement that the ADM system is in use. Figure 26 sets out the responses which, on their face, suggest that information about ADM systems used by NSW agencies is not consistently available. Of the 25 ADM systems reported, almost half (11, 44%) had no generalised public statement that the ADM system was in use.
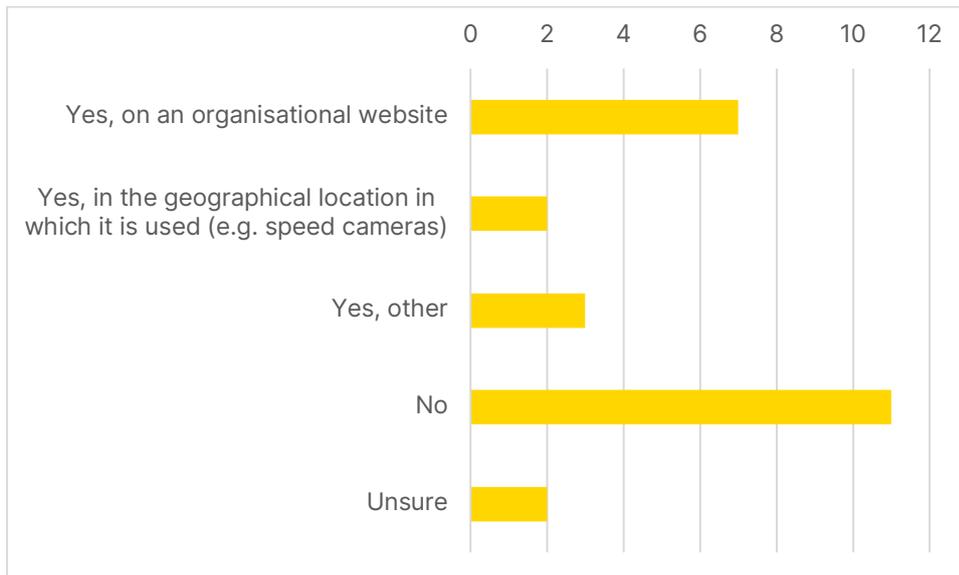

Figure 26: Is there a generalised public statement that the ADM system is in use?

Survey 2 also asked what information about the ADM system can be accessed by the public. The responses are shown in Figure 27.
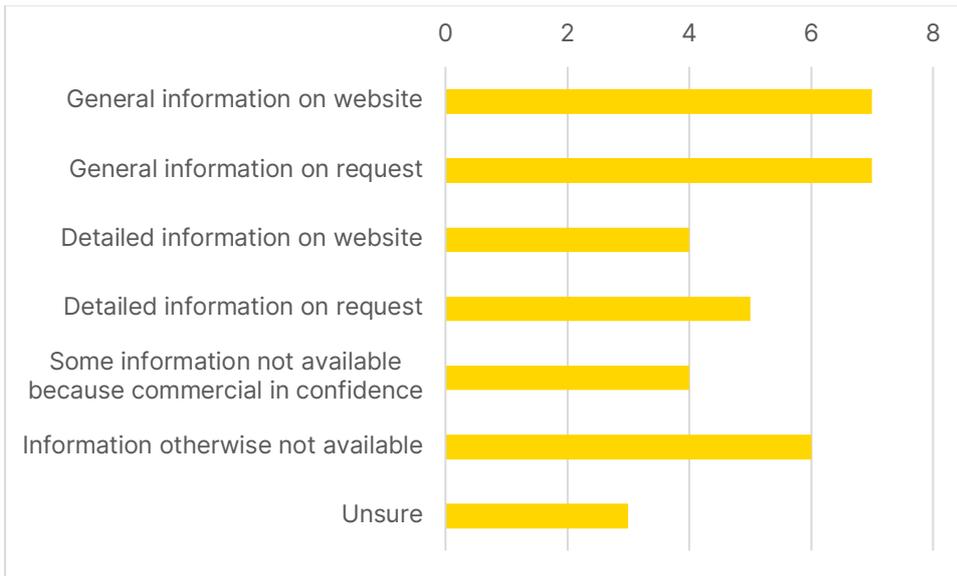
Figure 27: What information is provided about how ADM works and how it is used is publicly available?

These results are not ideal. Even with ADM systems having limited direct impact on NSW residents and/or organisations, it is reasonable to expect that at least general information about ADM systems will be made available, at the very least on request.

On the surface, these findings from Survey 2 might appear to be inconsistent with the results of our review of publicly available data, reported in the previous chapter (Section 3). That review identified high numbers of possible instances of ADM system use across NSW state government departments and agencies and local councils. There are several explanations for this apparent disparity, including that:

- a public statement that an ADM is being used (Figure 26) is distinct from the kinds of material captured in our review of publicly available material: especially so far as we captured information via annual reports and procurement data. A survey respondent who knew there was a procurement record or annual report mention of an ADM system could still maintain there is no general public statement that a system is in use.
- online reporting of automated systems captured in our review of publicly available material will include many systems that are beyond in particular those on which Survey 2 focused.
- the public servants who filled out Survey 2 may not have been aware of the publicly available material we captured.

While the results from Survey 2 regarding transparency are not encouraging, we note there can be legitimate reasons for a lack of public notice, such as where an ADM system plays only a limited role in administrative decision-making and has limited impact on stakeholders' interests. For instance, one system reported in Survey 2 was used by NSW Communities and Justice Department to assess incoming reports and highlight cases for reporting to another part of government. According to Survey 2, the

system merely provides information which may trigger further action (reporting) by the agency. Due to its limited direct impact on administrative decision-making and limited risks to stakeholders (individuals or organisations), the need for public notice is low. At the same time, the Survey 2 response indicated that detailed information about the system is available upon request, which is welcome.

For other systems, however, the absence of notification is potentially problematic because the system can impact on people's rights. An example is the Automated Youth Advisory Application Triage system used by the Office of the Advocate for Children and Young People to triage applications to the Office's Youth Advisory Council based on key demographic information. It was reported that there is no public notice about the use of the system, and general information about the system could be provided upon request only.

One concerning scenario is where system impacts on rights but where information is neither published, nor available on request. In Survey 2, for example, the Department of Regional NSW reported using an ADM system without providing public notice about its existence, nor information on request. As described to us in Survey 2, the system assisted with making and managing some applications relating to mining, including grant, renewal and transfers, and automated notification(s) when events (e.g. renewal) were due. This system was also reported as 'filtering information to provide a set of cases for decision makers to consider' (this being another option in the survey for describing the role of the ADM in administrative decision-making). We emphasise however that as described in Survey 2, ultimate decisions where the system was used were made by humans after reviewing all data related to the matter. We are also informed that the system is not included in the Department's current list of ADM systems, and therefore it may not be operating as described here, or even be active at the time of this Report.

When there is a generalised public statement about ADM system use, it is typically via the organisation's website (7 cases), while 2 cases reported notification within a specific geographic area (such is sometimes done with CCTVs and speed cameras). Only one system was reported as providing notice in decision documents (Statements of Reasons). In another the notice *was* the system (a system that notified people automatically of 'hazards near me').

Of the type of information about how the ADM system is used and how it works (general versus specific), information was more often than not general in nature, rather than detailed, with more ADM systems requiring people to request the information than having it available on the internet (see Figure 27). Notably, however, there were other systems where general information is provided on the website, *and* more detailed information is available on request. For instance, in relation to the eTrac system used to manage greyhound races (case study 3 in this Research Report), the public can access general information about it on the website, and get detailed information upon request. Detailed information about the FishOnline and Department of Primary Industry Shellfish systems is available both online and upon request.

In addition, Survey 2 indicates that there might be some barriers in ensuring access to information about ADM systems that are relevant to the public. We received 4 responses which indicated that some information about the systems is not publicly accessible due to being commercial-in-confidence. Commercial confidential information (trade secrets) has been previously identified as a barrier to government transparency, both from within the NSW Government itself[97] and in academic literature.[98] Government should undertake measures to ensure that trade secrets do not prevent adequate transparency around ADM systems used in public administration. The Robodebt Royal Commission recommendation, for example, does not limit transparency to protect commercial confidentiality.[99]

A related question is the degree of access *government* has to details of the ADM system. When external vendors are involved in (co-)delivering ADM systems, it can be challenging for government organisations themselves to understand the inner workings of the system and particularly how a decision is made. This issue was at the centre of *O'Brien v Secretary, Department Communities and Justice* [2022] NSWCATAD 100.

Of the 17 ADM systems which had external vendor involvement in their design and development, most (11, 65%) reported having access to the algorithmic design, with an additional 3 (18%) having access subject to the provider's consent (Table 12). In two cases – the Licence Plate Recognition system and the Drug Court Database – the survey response reported that the government organisation was unable to access the algorithmic design of the ADM system or information about how specific decisions are made.

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[97] See NSW IPC, *Annual Report 2020-2021*, (Annual Report, 1 October 2022) 5.

[98] See, e.g., Rita Matulionyte, 'Government Automation, Transparency and Trade Secrets', *Melbourne University Law Review* (forthcoming 2024); Sharon K Sandeen and Tanya Aplin, 'Trade Secrecy, Factual Secrecy and the Hype Surrounding AI', in Ryan Abbott (ed), *Research Handbook on Intellectual Property and Artificial Intelligence* 443-460 (Edward Elgar 2022); Ana Nordberg, "Trade secrets, big data and artificial intelligence innovation: a legal oxymoron?," in Jens Schovsbo, Timo Minssen, and Thomas Riis (eds), *The Harmonization and Protection of Trade Secrets in the EU, An Appraisal of the EU Directive* (Edward Elgar, 2020); Sonia Katyal, 'The Paradox of Source Code Secrecy', (2019) 104 *Cornell L. Rev* 1183; Rebecca Wexler, 'Life, Liberty, and Trade Secrets: Intellectual Property in the Criminal Justice System', (2018) *70 Stan. L. Rev.* 1343.

[99] *Royal Commission into the Robodebt* Scheme (n 8), Recommendation 17.1 states that 'Where automated decision-making is implemented: ... • departmental websites should contain information advising that automated decision-making is used and explaining in clear language how the process works; •business rules and algorithms should be made available, to enable independent expert scrutiny'.

Table 12: Can your organisation access the algorithmic design of the ADM system to investigate how specific decisions are made?

Can the organisation access information about the design of the ADM system?	n (%)
Yes	11 (65%)
Yes, but subject to the provider's consent	3 (18%)
No - due to contractual constraints (e.g. commercial intellectual property)	2 (12%)
No - due to algorithmic complexity	0 (0%)
No - due to lack of expertise	0 (0%)
Unsure	1 (6%)

Specific information: availability of information about particular decisions affecting individuals

When one or more ADM systems are used in administrative decision-making, it is important that individuals affected by these decisions are informed about the role of those system(s) in making a specific decision, and have the opportunity to request that a decision be reviewed. This is a requirement both under the *NSW AI Assurance Framework*[100] and many national and international policy guidelines on ethical AI.[101] While there is no common law right of individuals to receive explanations or reasons about how the decision is made, it is endorsed as good practice[102] and legislation requires that in certain circumstances a statement of reasons be prepared, such as when Commonwealth decisions are reviewed by the Administrative Appeals Tribunal or by a court under the *Administrative Decisions (Judicial Review) Act 1977* (Cth). The same duty to provide reasons for administrative decisions when requested to do so applies when people seek review by the NSW Civil and Administrative Tribunal.[103]

Survey 2 asked respondents to indicate whether individuals are notified that automated systems were involved in making the decision affecting their interests, and whether they received reasons for decisions that were made with the help from the automated system. Few agencies reported positive answers to both of these questions. For instance, the NSW Information and Privacy Commission reported using AIG Bot, a system that helps identify the presence of Agency Information Guides on other agencies' websites.

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[100] *NSW Artificial Intelligence Assurance Framework* (n 50).

[101] See, e.g., *Australia's Artificial Intelligence Ethics Framework* (n 94).

[102] See McHugh in *Re Minister for Immigration and Multicultural and Indigenous Affairs; Ex parte Palme* (2003) 216 CLR 212.

[103] *Administrative Decisions Review Act 1997 (NSW)* s 49*.*

When the system is in use, notice about its use is provided with each individual decision made; these reasons for an individual outcome are provided by a staff member in a written form. The Independent Planning Commission reported using an NLP system that helps categorise and sort high volumes of written and verbal submissions to both augment manual review and provide additional layers of analysis (e.g. exemplar submissions, geographical distribution etc.) as inputs into decision-making by humans. They indicated that an 'individual notification with a decision' is provided when a system is used, and the Commission 'always' provides reasons for the decisions made with an assistance of this system.

In the case of some systems, however, agencies neither notify individuals about the use of the system, nor provide reasons for decisions that involve the use of ADM systems. For instance, according to the survey response, no notifications or reasons are provided with relation to a Plate Recognition System (LPRX) used by one council to identify potential parking infringements based on driving past vehicles and determining overstays. Similarly, it was reported that no individual notifications are provided with relation to the Geospatial Emergency Management System used by State Emergency Services. Although we do not have more detailed information, it is possible to speculate why notification of the public is not considered important. In the former example, a timestamped photo of a vehicle's number plate might be regarded as sufficient as evidence, and consistent with long-standing practice, whether automated or not. In the latter, the automation in emergency settings does not relate to specific individual cases, and its relevance is determined by its accuracy in addressing emergency situations. It is possible that an individual subject to a government decision is more concerned with the decision, the basis for that decision and reasons provided, rather than the fact that the decision used automation.

In other cases, agencies do not inform individuals about the use of the automated system in making the decision, but provide reasons for the decision, either always or as a matter of discretion. For instance, according to a survey response, Regional NSW reported using a system where individuals are not informed when provided with decisions about use of the ADM system 'behind the scenes' (i.e., with a human decision-maker making final decisions). In that case they reported providing reasons for decisions at the discretion of the authority.

This could suggest that there is still a lack of understanding regarding whether and in which cases persons affected by the decisions should be informed about the involvement of ADM systems in the decision-making process, and what explanation of the ADM system and its role should be provided. There is no binding guidance in NSW regarding when agencies should inform individuals about the involvement of ADM system(s) in the process of making a decision, or what information about the ADM system should be provided. Similar to the discussion above, the level of information to be provided might depend on the role of the system in administrative decision-making and the possible impact on affected persons. The greater the role the ADM system plays in making a decision, the more important it is that people subject to

decisions be notified about the use of the ADM system and receive an explanation about its role.[104] For instance, our data across the project has identified a range of ADM systems that assist service interaction and self-service interaction by business and/or individual end-users. Depending upon the transaction undertaken, these can be fully or partially automated systems. Such systems may not only collect and present information, but also suggest possibilities to a human decision-maker, provide guidance through the decision-making process, and make non-discretionary decisions. When this level of automation is involved and the impact on individuals or organisations becomes relatively significant, it becomes especially important to ensure individuals affected are appropriately informed in some way (which could be through their interaction directly with the system).

4.5. APPROPRIATE ASSESSMENT

The third criterion in the *New Machinery Report* is appropriate assessment, which involves three main components in relation to a decision produced or supported by an ADM system:

1. that it gives proper effect to the law ('it answers the right question')
2. it is based on a proper analysis of relevant material, and
3. it is based on the merits and is reasonable in the circumstances.

In this discussion, we focus on the first component and specifically the risk associated with translating law into code. This issue represents a particularly fraught area of law and practice and is of general relevance to the adoption of a variety of ADM systems in government.

Introducing automation to assist with statutory functions may require the translation of statutory provisions into machine-readable code. The interpretation of legal rules is a complex and multi-faceted process, which involves consideration of multiple factors, including the provision's text, context and purpose.[105] It is a topic on which legal minds often differ. On the other hand, coding language is generally more precise and finite. Consequently, 'legal meaning may easily become oversimplified, lost or distorted in the encoding process.'[106]

The risk of mistranslation is most obviously present in relation to discretionary provisions. As such, many lawyers strongly caution against the automation of discretionary decisions; these arguably entail 'complex and subtle questions incapable of being transcribed into rigid criteria or rules and are, therefore, beyond

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[104] E.g., the European Union's GDPR requires 'meaningful information' only in case of (fully) automated decision-making: see *Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the Protection of Natural Persons with Regard to the Processing of Personal Data and on the Free Movement of Such Data, and Repealing Directive 95/46/EC* [2016] OJ L 119/1, arts 13–15.

[105] *Project Blue Sky v Australian Broadcasting Authority* (1998) 194 CLR 355, 384 [78] (McHugh, Gummow, Kirby and Hayne JJ).

[106] Huggins (n 87) 1050.

the capacity of an automated system to determine.'[107] However, these risks also apply to non-discretionary statutory functions, a point that is often overlooked. Provisions that are not explicitly discretionary can still be 'vague and open-textured, ambiguous syntactically and/or semantically, subject to structural indeterminacy, or be unintentionally ambiguous as a result of poor drafting practices'.[108]

Even where the meaning of a provision is relatively straightforward, coding errors can still lead to legal error. A case in point is the Transport for NSW's DRIVES system, which automates the issuance of some license suspension notices.[109] The way the system was initially programmed assumed that drivers would promptly reapply for their licence. This could lead to delays in issuing a suspension notice in breach of the common law requirement to issue a notice within a reasonable time when drivers delayed reapplying for their licence.[110]

Similar errors can be built into systems that sit behind or otherwise guide human decision-makers with discretionary decisions. Consider, for example, a system that is used for registration decisions, which collects and presents information to administrators and, in some circumstances, operates to prevent an administrator from making a decision where criteria are not met, such as where a required certificate is not current. While this can facilitate compliance with legal requirements, such a system can nevertheless contain coding that misrepresents the law. For example, the system could misapply the rules about what certificates are required. Another issue that can arise is where a system filters options via drop-down menus or click through pathways that leads to the oversimplification of statutory functions.

These risks underscore the importance of including legal experts in the ADM design process as discussed above. However, simply adding lawyers to an otherwise technical design team or seeking legal advice may be insufficient: interdisciplinary teamwork that effectively fuses the legal and technical aspects of the design process is required.[111]

In addition, not all challenges can be overcome in advance. As such, ongoing testing for legal compliance accuracy (in additional to technical accuracy) is likely required. The results of Survey 2 suggest that this is not routine, even for those systems involved in administrative decision-making. Of the 15 systems involved in administrative decision-making, internal legal advice had been sought about 8 systems (53%)

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[107] Justice Melissa Perry, 'iDecide: the legal implications of automated decision-making' [2014] Federal Judicial Scholarship 17.

[108] Anna Huggins 'Executive power in the digital age: Automation, statutory interpretation and administrative law.' In Boughey, Janina and Burton Crawford, Lisa (Eds.) *Interpreting executive power.* (Federation Press, 2020) pp. 111–128.

[109] *New Machinery Report* (n 23) 43–44.

[110] Ibid.

[111] Alice Witt et al., 'Encoding legislation: a methodology for enhancing technical validation, legal alignment and interdisciplinarity' (2023) *Artificial Intelligence and Law*, 1–32.

and external legal advice for 2 systems (13%) in the post roll-out phase. At the very least, agencies seeking to use ADM to support statutory functions, even where these systems preserve discretion, need to thoughtfully consider the risks of that the statutory functions will be 'lost in translation'.

4.6. ADEQUATE DOCUMENTATION

The fourth and final requirement for good administrative decision-making outlined in the *New Machinery Report* is 'adequate documentation'. This means agencies are required to keep appropriate records about each administrative decision, including basic details of the decision, the outcome and reasons for decision, and copies of relevant communications and file notes. ADM systems can create new record keeping challenges. This can include version control as systems are routinely updated for changes in algorithms and policies/rules, or when the decision-making algorithm is constantly evolving. This issue is particularly important when using external vendors that can alter their systems without clear consideration nor notification of the impact on their use by government. To illustrate, the chatbot Tessa used by the US National Eating Disorders Association, was upgraded without the Association's knowledge by its vendor from a closed rules-based chatbot to one using generative AI, resulting in ethically and medically inappropriate responses to users.[112] An audit of agency record keeping policies may be required to ensure that record keeping policies are fit for purpose in the face of an increasingly automated government sector. Such an audit was beyond the scope of the present study.

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[112] Kate Wells, 'An eating disorders chatbot offered dieting advice, raising fears about AI in health' *NPR* (Article, 9 June 2023).

05. SOME REAL-WORLD ADM SYSTEMS IN OPERATION

ADM systems are embedded in social and governmental contexts. Introducing a new ADM system into an agency, department or local council's activities is a public sector improvement project. As such, it may involve co-ordinating different kinds of expertise across separate teams within the organisation, from customer service provision and internal administration, to compliance, IT, and government record management. In some cases, it may also involve coordination between departments or agencies, or between government and private sector organisations, for example, in order to link data or interoperate with the systems of other organisations. ADM systems are introduced into – and must interoperate with – existing institutional and policy contexts and arrangements, and legacy IT and data systems, both paper-based and digital.

This makes introducing or upgrading an ADM system a complex undertaking. There are many points where things may go wrong (or right), and many design decisions which positively or negatively affect system outputs and outcomes, which can flow on to effects on people, their rights and interests.

We explored this complexity through five case studies focused on the development and operation of ADM systems in context. We conducted a small set of interviews with government employees involved in the development and/or deployment of specific ADM systems, in order more fully to understand the systems' history and context, as well as the processes by which they have developed, and the benefits, and challenges involved. The subjects of these 5 case studies are:[113]

1. the **Jury Management System**, which manages selection and empanelling of juries in NSW

2. **Online Birth Registration tool (and LifeLink),** an integrated system for the registration of births in NSW

3. **eTrac**, a new system for the management of greyhound racing in NSW

4. the **Water Markets system**, which assists in the management of water take in non-urban areas in NSW

5. the **development and use of computer vision by NSW local councils** for a range of purposes.

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[113] For more information on selection criteria for the case studies, and how this research was done, can be found in Section 8 Methodology and Data Annexure.

As can be seen from the list, we have undertaken case studies related to specific systems, and the use of a family of technologies at one level of government.

In addition we include some observations below regarding a portfolio that conducted its own mapping of ADM systems, in response to our request to take part in the survey. Included as a sixth, distinct case study is an outline and some accounts of this process, as it shows some of the complexities that confront departments, agencies and other organisations even in seeking to understand their own ADM system use.

5.1. GENERAL OBSERVATIONS

A number of general points can be made drawing on these case studies.

First, **close involvement from public servants in the development of significant ADM systems is important.** Agencies that were more closely involved in the design and development process seemed happier with the outcomes. This is demonstrated most clearly in case studies of the Jury Management System and Water Market System, where the agency was able to ensure the ADM system aligned with both the agency's goal and values, as well as the goal and values of Australian public service organisations. The ADM digital translation process was also used as an opportunity to refine, clarify or realign administrative systems in some cases. For example in eTrac, digital transformation was used by Greyhound NSW as a way to improve transparency and management processes in the greyhound racing industry, to align better with community expectations for animal welfare and improve the reputation of the industry.

Second, **there is a need to consider non-automated alternatives and 'humans in the loop'.** Some case studies illustrate the importance of backup and non-automated systems: to modulate system outputs (eTrac), or meet the needs of individuals, especially where there may be limited internet access or high levels of digital exclusion (Water Market system). Another positive learning from the case studies was how careful, gradual implementation processes can lead to better results, particularly in high-risk uses of the technologies. For example, LifeLink was not implemented until testing, including two failed trials, had been completed, and the Online Birth Registration system was carefully piloted in two very diverse settings. In another example, our interviewees indicated that the Water Market System is being rolled out gradually and cautiously, beginning with low-risk applications and building on learnings from there.

Third, government organisations deploying ADM systems need to **expect the unexpected:** they will not always be able to predict in advance what the challenges of the system will be, or the public response: i.e., the demand for, resistance to, or expectations of ADM systems. Here the Online Birth Registration (OBR) system and the Water Market System provide an interesting contrast: with demand outpacing the pilot of OBR, but more limited adoption slowing the deployment of the Water Market System). 'Expect the unexpected' is no doubt true of all significant IT projects, but takes on additional significance in the case of automation of government decisions affecting people, not least owing to the potential to impact the relationship between the people of NSW and state and local governments, especially for vulnerable

populations and populations dependent on government services. Interviewees with a clear, system-level plan for an ADM system, with clear articulation of the processes being automated (such as diagrams including data, data sources, points of human intervention, and outputs) could confidently explain how the system was designed, operated, assessed, tested and improved over time.

The case studies below are based on information available in the official websites, the contents of interviews with government employees and the documents shared by the interviewees about the systems. Where other information is used, this is specifically noted with a citation to the source.

5.2. CASE STUDY 1 – JURY MANAGEMENT SYSTEM (JMS)

The Jury Management System (JMS) is an automated decision-making system for the selection of jurors for courts in NSW. According to the information provided on the website of the NSW Department of Communities and Justice,[114] around 15,000 people are selected every year to serve on jury panels for specific trials, and empanelled as jurors. JMS is used across all steps of the selection process. Its main statutory basis is the *Jury Act 1977* No 18 (NSW). Subsection 12(5) of this act specifically envisages that '[a] computer may be used to make a selection' [of prospective jurors], although the research could not ascertain if the authorisation to use computers refers to the whole process or just the randomisation aspect of the selection. Similarly, subs 25(3) also envisages the use of computers for the selection of jurors for trials or inquests.

Public servants working with the JMS facilitated an overview of the steps. Selection starts with the creation of a list of around 200,000 potential jurors selected at random from a pool of names in the NSW Electoral Roll. This becomes the jury roll (list). Around three quarters of those in the jury roll are sent a jury summons notice, which means that they will have to come to one of the courts in NSW at some point during that year. At that stage they may be selected as a juror for a specific trial.

The description on the website does not indicate how this selection process actually happens. The machinery behind this series of steps is the Jury Management System (JMS). In the simplest terms the JMS is an ADM system used to establish jury pools and select and manage jury empanelment. Assessment of whether eligibility criteria are met is based on information from the Australian Electoral Commission which is augmented by information derived from other publicly held datasets.

Data

The eligibility criteria are determined through a process of consecutive checks against publicly held data (data matching). The process starts with information held by the Australian Electoral Commission. The

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[114] NSW Government, Communities and Justice, *About Jury Service* (Courts and Tribunals, 2023).

electoral roll after some checks against data held by government agencies is the starting point for the Jury Roll.

A human then triggers daily an automated lottery for a district. The address to allocate the court district is based on the address where a person appears to reside according to the electoral roll. That roll is then further checked against data held by other government agencies and criminal records in accordance with the *Jury Act*. It was not clear from the interviews or the data provided how the system assesses if the criminal record is 'relevant', in reference to Schedule 1 of the *Jury Act* (Persons excluded from jury service).

Notice of inclusions are generated by the system and transmitted to the mailing department. After 14 days from the date the jury roll for the district is created, the jury summons are printed and posted.

Technology and human interaction

The underlying technology of the JMS to the point of the jury summons is very simple, involving data matching in accordance with the *Jury Act* which was considered by interviewees as 'not technically complicated.' Details were provided but are not reproduced here.

The JMS also serves as a management system for jury selection and empanelment. After notices of inclusion are sent, humans interact with the system at several stages. First, possible jurors may request to be excused after receiving the notice of inclusion, which is evaluated by a human who then enters the information in the system, which then generates a new transmission to the mailing department to send excusals letters (mailed daily). In other cases, jurors summoned to a panel may also request to be excused, which is again processed by a human and entered into the system. The JMS is also used to manage notifications, recording of attendance, payments and fines for unjustified absences.

Humans can override the system at all points. According to our interviewees, this has allowed for the correction of any errors the system has generated to date.

Efficiency and other gains

JMS was launched in 2014, replacing a manual process. The gains in terms of efficiency through automation when compared to that manual process are relatively intuitive. The system is used to generate around 450,000 jury summons notices, currently involving the mailing of an equivalent number of letters, which are automatically printed.[115] Future iterations may include automated electronic notification, fully replacing humans in that part of the process. In the current state of affairs, staff can manually intervene at

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[115] There may be instances in which the same person is summoned more than once in the year in which they are on the roll.

almost all stages of the process, but otherwise the system is fully automated until it prepares the jury summons.

The *Jury Act* envisaged a resource intensive manual process whereby the sheriff had to maintain jury rolls for each jury district in accordance with sections 10 and 11 of that Act. This involved the Electoral Commissioner delivering copies of electoral rolls to the sheriff every 15 months, with no further checks to remove at that stage recent deaths. The JMS applies the legislative rules in a modern context where data sharing offers opportunities to increase efficiency and reduce risks. As noted in one interview, for example, incorporating data on recent deaths in the JMS mitigates the risk of families of a deceased person receiving a summon.

There are also efficiency gains from the point of view of the citizen. Having a system in which summoned jurors can enter their data and court officials can record attendances, excuses and unjustified absence also allows for automation of payments and fines, reducing the burden on court officials, the department and jurors themselves. From the moment a juror is summoned they may also receive SMS and email notifications, facilitating communication.

Impact on citizens and legal questions

The JMS as it is now can be distinguished in two parts. First, the creation of the Jury Roll and issuing notices of inclusion, which is a purely internal process. It is a clear case of almost completely automated decision making with effects towards citizens relevant for administrative law. This follows the letter and spirit of the *Jury Act* and improves its implementation. As noted above, sections 12(5); 25(3); 29(5) already refer to use of 'computers' for a range of functions under the Act. We note however that in the context of the interviews it was suggested that further refinements of the legal text could be considered for transparency purposes and to avoid potential regulatory obstacles to future automation developments.

The system in its current form does not automatically remove persons excluded from jury service in sections 5-8 of Schedule 1 of the Act (some public office holders, some public servants, lawyers and undischarged bankrupts). Access to the datasets holding that information would involve further simplification of the process from the point of view of the citizen and the administration. Furthermore, it should mitigate error rates, such as those involved in the manual processing of requests for excuses or the risk of individuals sitting in a jury against a compulsory exclusion unless the exclusion is raised by the citizen or in a secondary human-driven screening at the point of selection for a jury for a specific trial.

The second side of the JMS is a system for the management of people in the Jury Roll. It starts from the moment they receive the initial letter of their selection to the Jury Roll as 'active'. This part of the system is triggered by human actions (e.g., recording presence or absence), but also involves automation that triggers legal consequences (e.g., receiving payment or a fine). For example, in the case of fines when an absence without justification is recorded, the current system is not directly linked to the state debt

recovery office, Revenue NSW: relevant data is emailed to Revenue NSW. Nevertheless, all the previous steps up to that point (that is, to the moment it issues the penalty notices) are almost fully automated.

Opportunities for leading the development of automated tools

The JMS offers a positive story of government-led development in automation. JMS was developed within and by the Sheriff's Office. They brought in technical staff under contract to develop JMS in-house under their supervision. Once completed, the management of the application was transferred to an external service provider, who is now managing it on behalf of the sheriff. As other jurisdictions acquire the system for their use from this external provider, the office of the Sheriff receives royalties for these transactions.

5.3. CASE STUDY 2 – LIFELINK AND THE ONLINE BIRTH REGISTRATION SYSTEM

NSW residents are legally obliged to register their child's birth within 60 days of the birth. This can be done through a self-service portal made possible by the Online Birth Registration system (OBR) and LifeLink. The NSW Registry of Births, Deaths and Marriages (BDM or the Registry) sees LifeLink as a core digital system, which serves as the basis for the OBR. The OBR makes possible customer-driven registration of births online, but is not compulsory for the person registering the birth, who can still opt for an e-form or a paper-based registration by mail or in person. At the time of writing around 1% (perhaps less) of the applications are paper-based. For those paper-based cases, BDM officers will enter the data into the LifeLink system at a later stage.

LifeLink is the main system used at BDM. It is used for registration of different events that have access to the Registry (births, marriages, deaths and others). This case study focuses on the registration of births as it is the most common event and the one that incorporates a higher level of automation. According to the information provided on the website of the BDM, it is possible to complete registration of a birth fully online (including applying for a birth certificate),[116] although it does not explain what level of automation is involved at the back end of the process (i.e., within the BDM offices).

In 70% of the cases, this back-end process is fully automated. The OBR system automates that registration through a series of matches: of the information entered by the person registering the birth on the one hand, and on the other, the data transferred to BDM from the hospital where the child was born, or from the medical practitioner who attended the birth in cases of home delivery. If the relevant matches are confirmed, the system automatically creates a birth registration and, if requested and paid, automatically prints a birth certificate. A human then posts this certificate to the indicated address.

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[116] Births, Death and Marriages, *Birth Registration* (Online Form).

If the information from the different sources do not match or if there are other elements that trigger a separate automated rule, a human will then access and evaluate the file, investigate the causes of the non-automatic registration and, if necessary, contact the person requesting the registration and ask for further information to continue the registration process.

Data

The eligibility criteria are determined through a process of matching the information entered by the person registering the birth and the data transferred to BDM from the hospital or registered midwife. The process starts with the Notice of Birth, that is, the information transmitted by hospitals and health practitioners. They are required to notify BDM within seven days of a birth (within 48 hours for a stillbirth). Although it is possible that the person registering the birth could apply for registration before the hospital/practitioner information is received, the ADM process will not be triggered until the hospital/practitioner information is in the system. This data includes details of the birth and the birth mother: where and when the birth occurred, the sex and weight of the child, the identity of the mother (name, address, date of birth) and often gestation periods. It also includes whether the notifier is the hospital or the midwife.

The system is then activated by the birth registration statement (BRS) entered by one of the parents or a third person. The person is guided through an online form. When the form is completed, if the rules that determine sufficient level of matching are met (e.g., differences in recorded weight may not block registration, but differences in the date of birth do), automated registration can happen within minutes or hours. The person is then notified by email.

Once the data is in the relevant database, its management is done through LifeLink system. A report from the NSW Auditor-General from 2020 on the Integrity of data in the Births, Deaths and Marriages Register noted that although 'there are controls in place to prevent and detect unauthorised access to, and activity in the register, there were significant gaps in these controls. Addressing these gaps is necessary to ensure the integrity of information in the register'.[117] This highlights the importance of monitoring systems, both for the data they hold and for the functioning of the system, especially when some actions could be fully automated.

Creation of LifeLink and OBR, testing and accommodation for unusual cases

LifeLink went live on 23 June 2014, seven months late and, reportedly, $5.9 million over its original $11.4 million budget.[118] It was the third attempt since 2002 to move to an IT system that could replace the manual records. There is a view that LifeLink was one of the 'most ill-fated and drawn-out IT projects in

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[117] Audit NSW, 'Integrity of data in the Births, Deaths and Marriages Register' *Audit Office of NSW* (Media Release, 7 April 2020).

[118] Paris Cowan, 'NSW Spends Millions More Cleaning up LifeLink' *iTnews* (Article, 2015).

NSW public service'.[119] The implementation of LifeLink was a learning process cited in audit reports over the following years.[120]

However, people involved in its implementation stressed the thorough level of testing of LifeLink, learning from the two failed experiences. This may have been the cause of delays and cost overruns, but could also be seen as good practice in terms of processes of automation.

In contrast, the OBR and its automated functions discussed here were not introduced until 2018, in a project that cost $484,000, against a budget of $651,000.

The OBR was piloted in hospitals in Dubbo in the Western NSW Local Health District and in the Royal Prince Alfred (RPA) Hospital in the Sydney Local Health District. As noted by people involved in the development of the system, RPA was the biggest birthing hospital in Sydney and offered a diversity of language speakers. Dubbo had one of the highest rates of Aboriginal mothers. These were key elements in the choice of piloting settings and also provided some idea about urban and rural regional contexts, two different types of hospitals and allowed the implementation process to check for 'blockers' from a cultural perspective.

Technology and human interaction

The underlying technology of the OBR is relatively simple. It matches data and then applies a series of rules-based steps to decide if a birth can be registered automatically or if the application should be referred to a human. Humans are fully removed from the loop with automatic registrations, but no ADM-generated decision was identified that a human could not override at some point.

Efficiency and other gains

The online birth registration component was introduced in 2018. The gains in terms of economic efficiency are fairly straightforward for the public sector. BDM estimates savings of around $750,000 a year, or $4.5 million since its launch. According to BDM, close to 99% of birth registrations are initiated online. In any given year the system processes between 95,000 and 100,000 births. Interviewees noted that around 70% of births will be automatically registered. When the system started being used the figure was reportedly around 30%, but tweaks and confidence in the system as well as improvements have led to greater automation, to reach the current 70%. Maintenance and security, however, are essential for a system that not only holds critical information but that also feeds data to other entities (such as the NSW Electoral Commission and Centrelink).

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[119] Ibid.

[120] Audit NSW, 'Justice 2017' (Webpage, 2018) s 2.5.

In terms of legal efficiency, the Online Birth Registration component creates a structure conducive to the reduction of error rates in registrations. The interviewees offered one example about how automation could mitigate errors in the context of marriages. In the registry there were a number of registrations completed by humans of marriages that happened in the territory of Jervis Bay. Applications for those marriage registrations were incorrectly accepted and completed in NSW, instead of the ACT. An automated system where data is matched should not allow for these errors to be repeated. On the other hand, it allows for new errors when users force the boundaries of the system.[121]

From a user point of view, there are also evident efficiency gains, in terms of process and time savings. There was a clear demand for such a system. An excessive interest of users in an online system of registration during the pilot stage was even noted in interviews. Parents of children born in the hospitals where OBR was piloted started sharing the link to the OBR pilot form with parents of children born in other hospitals not covered by the pilot. This was not anticipated.

Also, the implementation has anticipated the possibility of users not wanting to engage with the system directly. Paper-based applications remain a possibility and other registration paths are possible for cases that are not adequately covered by the system. For example, the system excludes from its automated processing births that happened in a place other than a hospital, without a registered doctor or midwife at the birth and not taken to a hospital within 24 hours of the birth. In those cases, the process is initiated with a phone call and there is no automation involved. The BDM has actively engaged with communities where this practice is more common (namely in Northeast NSW) to address certain legal requirements (e.g., the need for two witnesses). This initiative of reaching out beforehand to sectors of the population for which the automation may not work can be seen as good practice. The existence of alternatives to the automation seems to be appropriate choice to accommodate different needs.

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[121] For example, it allowed the registration of the name 'Methamphetamine Rules', see Pip Christmass, 'What baby names are banned: Aussie journalist Kirsten Drysdale registers her boy as Methamphetamine Rules', 19 September 2023). BDM staff provided in February 2023 the following update regarding this incident: 'Prohibited names, including those that are obscene or offensive, cannot be established by refute or usage, or are contrary to the public interest, cannot lawfully be registered NSW. The error occurred because the online birth registration system did not include a name check. The component was intended as part of the design, but never completed. The Registrar corrected the child's name to a new name of the parent's choosing and has implemented the necessary controls to prevent the issue from reoccurring. As at today, a Registry staff member manually reviews every name to check before a birth is registered. The Registry is working with its IT vendor to implement additional system controls to prevent the auto-registration of births before names are checked. When these system controls are in place in mid-2024, the Registry will resume the auto-registration of births where a name has been determined as valid.'

Impact on citizens and legal questions

In its current state, the automation of the registration process is seen by BDM as two separate systems. One, the front-facing one that allows individuals to apply for registration, filling out an online form and adding all supporting documents. This part of the system pre-existed the ADM side of the system. In that context, legal advice in relation to signatures was requested and considered during the development and implementation of the OBR. On the paper form it was requested that if there were two parents, they both had to sign the form. To replace that step, it was agreed that ticking a consent tick and then also providing identification could be accepted as a signature. The identification for the parents became a de facto electronic signature for the parents and met the provisions of the *Electronic Transactions Act 2000* (NSW).

The back-end system generates different legal considerations. The ADM system matches the data and generates a decision with legal consequences and direct impact for the individuals. In 70% of the cases this decision is to register and facilitates access. In the other 30% it triggers human intervention, which is also a decision. In that sense, only the decisions that are beneficial for applicants (i.e., accepting the desired registration) are fully automated and a human is removed from the loop. It was not clear from the interviews what degree of legal advice was received about the 'delegation' of that decision to the ADM system.

The third automated activity with legal consequences is issuing a birth certificate. In the current state, this is mediated by a human, who is a member of the BDM staff. That person collects the certificate from the printer, checks it and posts it. This meets the requirement of the existing legislation as the registrar, who is responsible for these functions, can delegate them to her staff or to someone else. If BDM ever considers the creation of a digital birth certificate, as it exists in other foreign jurisdictions, allowing registration *and* receiving official proof of registration without human interaction, this may generate legal questions in relation to the delegation of statutory powers.

5.4. CASE STUDY 3 – ETRAC

eTrac is a comprehensive ADM system to support the regulatory tasks and implementation of policies by the NSW Greyhounds Welfare Integrity Commission (NSW GWIC).

As noted in the interviews, the history of eTrac follows the complicated recent history of greyhound racing in NSW. After public outcry regarding the low standards for animal welfare,[122] the NSW Parliament passed legislation in 2016 outlawing greyhound racing in NSW from 1 July 2017.[123] Three months later, the NSW

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[122] Special Commission of Inquiry into the Greyhound Racing Industry in New South Wales, *Report of the Special Commission of Inquiry into the Greyhound Racing Industry in New South Wales* (Report, 2016).

[123] *Greyhound Racing Prohibition Act 2016* (NSW).

government overturned that decision and promised instead 'to clean up the industry'.[124] The creation of NSW GWIC was a key recommendation of the Greyhound Industry Reform Panel, which was set up to provide advice on how to establish greater oversight and enforcement of integrity and welfare standards in the industry. As a result, the *Greyhound Racing Act 2017* (NSW) was passed, which created NSW GWIC as the regulatory entity for greyhound racing, separated from the commercial arm of the industry, Greyhound Racing NSW.

As part of the industry's overhaul, it was decided that NSW GWIC's activities would be supported by a comprehensive IT system that could host all the relevant data, record the activity of all actors in NSW (dogs, trainers, owners, etc.) and be incorporated in the decision-making process in relation to greyhound racing. eTrac is described on the NSW GWIC website as a '"one stop shop" online portal where participants can access their registration and greyhound information, and complete transactions such as vaccination notifications, registration renewals, updating kennel locations, owner/trainer transfers, and view details of greyhounds in their care'.[125]

eTrac was, at the time of data collection, in the process of being completed and functionalities were being added to it.[126] Its public release happened in November 2022 as a minimally viable product (MVP) with adequate performance according to its developers. The final module of eTrac was only released in July 2023. According to people involved in its day-to-day operation, there is still a lot of troubleshooting and tech support for the end users of that module. Yet, it was the view of the interviewees that, overall, the system seems to fit so far the needs of NSW GWIC in performing its functions. All participants are required to have an eTrac account since 1 November 2023, becoming the only entry point for all actors involved in greyhound racing in NSW.

Data

eTrac is described in the contract documents analysed for this case study as a comprehensive system that incorporates all existing and new data in relation to previously existing processes (at least) in the following areas: (i) Registration of the owner, trainer and breeders; (ii) Approvals and Licencing; (iii) Enquiries; (iv) Communications; (v) Appeals; (vi) Enforcement; (vii) Greyhound whole of life, such as:

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[124] Mary Ward, ['Five Years Ago, This Industry Was Facing a Ban. Now It's Reaping Record Profits'](#) *The Sydney Morning Herald* (Article, 14 January 2023).

[125] ['Greyhounds Welfare / eTrac'](#) G*reyhounds Welfare Integrity Commission* (Webpage, 2023).

[126] In August 2023, the final elements of the eTrac system were deployed across the Commission. A reconciliation of the majority of greyhounds owned in New South Wales has also been completed. Future developments currently being explored include nose print technology (similar to human fingerprints) to support the identification of greyhounds, check-ins and a new digital chain of custody for swabbing.

Breeding, Whelping, Rearing, Training, Retirement, Rehoming and End of Life Management; (viii) Check-ins; (ix) Veterinary, Health and Inspections; (x) Trial and Racing Management, (xi) Race Compliance; and (xii) Wagering and Intel Management and Knowledge.

Interviewees noted that incorporation of the pre-existing data involved an advanced degree of cleaning of previous records. New data is now added through two entry points: On the participants' side it addresses the needs of owners, breeders, trainers and syndicates. On the internal users' side, the portal is used by registration and welfare officers, compliance and legal officers, inspectors, NSW GWIC vets (mainly hired part-time) and NSW GWIC stewards (key officers on the ground).

The data feeds into a tailored SalesForce platform, built by an Australian company (FlowBuilders) specifically for this purpose. The automation aspects are discussed below, but it is worth noting that some outputs of the system and data held in the system feed into other systems, including OneGov and OzChase.

Data transfer with other jurisdictions: OzChase is the most common system in Australasia for race day management across the industries. However, not all industries in other states have completely adopted OzChase. Interviewees observed that greyhounds move considerably between owners and trainers, interstate (mainly to and from Victoria and Queensland) and internationally (there is quite a strong relationship with New Zealand, where greyhounds are moved to race, especially near the end of their careers). NSW also attracts many dogs and trainers from other states following the races with big prizes. Dogs are individually registered with a unique number for the whole of Australia, but to access and transfer the data relevant for that dog, eTrac had to be compatible with all these other systems and with the national database repository (NDR).

Technology and human interaction

The levels of automation in eTrac are determined by the capacities of the SalesForce platform. In its current state, the system incorporates a range of functionalities that automatically enforce underlying rules. One of these functionalities is not allowing entering a dog in a race, when a stand-down order for 30 days has been entered into the system after a recorded previous incident. This rules-based approach built into the system automatically enforces the stand-down order. It can also generate risk triggered check-in messaging (e.g., when there have not been any check-ins for 6 months), or scheduled messaging (e.g., to notify of changes to legislation). No data seems to be automatically entered into the system. All new data is mediated by a step involving a human. For example, scanning of dogs is still done by a human and the transfer of race results is approved by a human.

The system allows the day-to-day management of the industry, but it is in relation to races (particularly on race day) when its effects are fully deployed. Interviewees noted the overall importance of stewards in the correct functioning of the system, as those directly on the ground. Concretely, on race day, the outputs of the system are modulated by the stewards, who benefit from their previous experience without eTrac and

the learning processes it involved. For example, they are capable of identifying information incorrectly entered by veterinarians (who are contracted and perhaps not as experienced in greyhound racing) and correct it. In those cases, stewards seem to be allowed to bypass the decision of the system, and, for example, allow a dog to compete on the day.

The outputs generated by the systems are of particular relevance to the gambling industry, which are significant voices within the community. As an example, interviewees noted that when a race day is approved, the information, such as that about eligible dogs, is expected to flow very quickly. Equally, the confirmation of the results in each race is seen to be time-critical in this context.

Efficiency and other gains

Interviewees offered a positive view of the efficiency gains achieved with eTrac. Before the system was deployed, similar functions were performed via spreadsheets, using data fed from one of the pre-existing systems together with human-entered individual notations. According to documents of the company that developed the system, eTrac has allowed replacing the existing complex and largely paper-based processes, which captured incomplete data across multiple fragmented systems of records. Part of the logic of the creation of eTrac was to avoid duplicative administrative work and organisational inefficiencies, which resulted in compliance issues that restricted the capacity of NSW GWIC to focus on welfare and integrity matters.

Reception of the system was noted to be generally positive, insofar as it allows participants to significantly simplify certain processes. However, interviewees noted some adverse reactions, which could be linked to eTrac but also to the new regulatory requirements implemented through eTrac. Some stakeholders were on the record stating that the system had served the purpose of purging some 'bad actors'. From the regulator's point of view there was a degree of confidence that the system was allowing NSW GWIC to better perform its functions.

Automation as a tool for reform

As noted above, greyhound racing has a problematic history in NSW. In a moment of crisis, a decision was made to facilitate the 'cleaning' of the industry with the assistance of a data-driven tool. More than three million dollars were committed to the project, which was delivered roughly on time and with limited overruns in terms of budget.

In this context, it is assumed that automation facilitates enforcement of policies and decisions. The expectation that eTrac would improve the management of the industry and, therefore, its social acceptance, may explain why making eTrac compulsory has not raised significant internal criticism. For example, if eTrac works correctly, it should not be possible for a dog to enter a race if it was affected by a decision to stand it down for 30 days. This level of 'passive' enforcement, where there is only one channel to complete a task and all requirements have to be met and present in the system for that task to be

allowed, seems appropriate to this industry. NSW GWIC, when reviewing this case study, even reported a high level of interest from other State greyhound racing authorities in procuring eTrac to improve their regulatory functions.

In terms of gains of social acceptance for greyhound racing, which was one of the core objectives of the reform, the implementation of the system offers a slightly more mixed picture. First, it is doubtful that the general public is aware of the existence of this new monitoring system, even if there is some degree of information available online. Second, there are obvious limits to what can be achieved with a domestic ADM system. The initial ban (and ongoing public debate) was anchored around the domestic treatment of dogs and cases of illegal exports overseas. The system may work well in terms of introducing limits to domestic behaviour or exports of dogs to 'acceptable countries', but it has been reported that it still offers avenues to circumvent those rules through re-exporting: first to those acceptable countries, such as the United Kingdom, the United States or South Africa, and then to another country with lower animal welfare standards, such as China.[127]

Risks of deployment of a minimum viable product

Several interviewees noted that eTrac had to be in place 'by 27 November 2022'. The concrete reason is not clear, but there was clearly an interest from important actors in the industry for the system to be operational and assist in the recovery of the sector. It was also noted that the social legitimacy of the regulator also depended on the performance of the system, as the results of the regulatory overhaul will be partially determined by suitability of the system to deliver the objective of increasing animal welfare.

It is then interesting to observe that it was considered that it was not necessary to do more testing, or that a more advanced product than an MVP was necessary before deployment. In that context, eTrac is probably an example of the judgment call that is made in relation to the deployment of some ADM systems and their risk-assessments. In this case it was accepted that the system may not operate perfectly, but that the damage the MVP could generate could also be acceptable. Other considerations of a political nature could also be at play in green lighting these systems, and be equally legitimate. In other cases, setting a date beforehand or accepting the deployment of a MVP may not be a reasonable approach. For example, if we compare this case to LifeLink and the OBR (BDM), the ADM systems operate in a similar manner matching several sets of data and allowing a task to proceed or not. The technology of eTrac is more complex than LifeLink and that would suggest that more testing was necessary for eTrac than LifeLink. However, the nature of the data or the task the systems perform are very different. This explains why for some systems the public sector should be much more risk-adverse in their deployment, regardless of the technology used.

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[127] Rural and Regional Affairs and Transport Legislation Committee, particularly Senator Canavan, Customs Legislation Amendment (Commercial Greyhound Export and Import Prohibition) Bill 2021, Hansard (Webpage, 2023).

5.5. CASE STUDY 4 – WATER MARKET SYSTEM

The Water Market System is a workflow management system to support the assessment, approval and administration of water licences, work approval and metering for non-urban water take in NSW. At the time of the research the system was in the early stages of implementation. Water users in rural NSW (and across Australia) can buy or sell water rights, on a permanent or temporary basis in accordance with Commonwealth and State legislation and regulations. This aims to encourage efficient use of scarce water resources and good management by allowing water to be used where it is needed most. Australian water markets had in 2020-21 an estimated annual market turnover of $6 billion.[128]

While an essential and often scarce commodity in rural Australia, water prices fluctuate according to availability and demand, and the lack of clarity about availability and pricing has led to reported confusion and contention among stakeholders. The Water Market System is part of a suite of WaterNSW digital transformation initiatives, including WaterInsights.[129] The digitisation has been developed in consideration of both NSW and Commonwealth agency reviews that recommended a digitised, live, and clear portal for up-to-date water market information and licence applications would alleviate confusion and improve transparency.

A customer can register in the Water Market System portal, and then access various applications depending on their needs. At the time of data collection the system had around 1300 registered users (with a capacity for 40-50,000 once the system is fully operational) and processed 51 applications of the main type per month. Many customers tend to use the system a single time due to the nature of the applications currently available. Water is an expensive commodity, 'a bit like a mortgage', and one transaction tends to result in many years of water access.

The system is owned and managed by WaterNSW, a state-owned corporation that operates under the *Water NSW Act 2014* (NSW).[130] The *Water Management Act 2000* (NSW) is the other key piece of legislation applicable to this case study.

Self-service

Previously, WaterNSW customers would apply for all licences and trade water with paper-based applications or with the direct assistance of a customer service officer. The Water Market system portal allows a customer to apply for a Basic Landholder Rights (BLR) bore online, without assistance. In-person assistance is still available on request through a visit to WaterNSW office, via telephone or through secure

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[128] Australian Government, 'Australian water markets', *Department of Climate Change, Energy, the Environment and Water* (Webpage, 2023).

[129] Water NSW, *Water Insights*, (Webpage, 2023).

[130] Water NSW, *Annual Report 2021*, (Report, 2022).

live access to the customer's computer with permission. The new system was still in a transitional phase when the research was conducted. Transactions not yet available in the Water Market System can be accessed by WaterNSW customers through the legacy system.

To access the Water Market System, customers are required to upload identification and documents into the portal. Previously, verification of formal identification was not required.

Creation of the system, testing and accommodation for unusual cases

The interviewees provided an overview of the history of the system. The development and management of the Water Market System was originally outsourced to an international company under contract with WaterNSW. The core system licence was purchased by WaterNSW as a software base with modules that could be tailored to their needs. To address diverse issues, WaterNSW sought more control over the development and management of the system, and the system has been owned and managed by WaterNSW since 2023. While WaterNSW still contracts external private resources, it has developed processes for more direct involvement in the development of new products and upgrades. For example, the current configuration of the Manager, Digital Customer Enablement's role was reported to include task such as: holding staff and stakeholders accountable for what decisions they make, asking 'why we are doing this' and considering the reasoning behind it and the availability alternative options. The manager is also responsible for ensuring compliance with legal responsibilities and guidelines.

The roll out of the Water Market System was described as gradual, with the legacy system being retained for processing applications not yet available in the new system and as a back-up. This has been overseen by dedicated governance within WaterNSW including a panel of external expert advisors. Systems are developed in conjunction with business areas, tested by the business using detailed test scripts, and then monitored closely for issues and continuous improvement opportunities once it has gone live. There have been learnings through this process. For example, an early version of the system requested that landowners use an online digital mapping tool to map the location of bores on their land. Some customers had difficultly using these tools, and instead preferred to provide a photo of a hand-completed sketch of their land, or otherwise already owned planning maps, and preferred to upload that image. Now customers have the option to upload these documents and are not required to use the digital mapping tool.

Currently, the applications and amendments for BLR bore approvals is live. BLR bore approvals were the first service to be rolled out because it is considered a relatively straightforward and low-risk process that sets the groundwork to build on for future development. Errors or unexpected problems in this application are not high risk and can be managed and easily corrected by staff. More services will be gradually rolled out over 2023 and 2024, specifically, capacity to:

- approve Water Supply Works/Water Use and Combined Approvals and other associated functions, and
- amend customer approvals.

This gradual roll-out is a deliberate strategy to learn from any errors as more complex systems and higher risk systems are incrementally introduced.

Interviewees mentioned that some customers have been frustrated by the formal identification process required by the online system. Some farmers who have a long-standing relationship with local WaterNSW staff and intergenerational ownership of water licences, find the need to provide formal identification inconvenient and perplexing. These customers tend to prefer to apply using the legacy system and forms, which at the time of data collection were reportedly being maintained as an alternative to the Water Management system 'shop front', although those systems are progressively decommissioned as functionalities go live in the new system. WaterNSW justified the shift on the basis of increasing obligations pertaining to customers' personally identifiable information. It also noted that the customer verification processed through WMS is progressively utilised in other channels such as call centres.

Technology and human interaction

The underlying technology of the Water Market system is a data aggregation system in the form of a platform or 'shop front' that provides a portal for various applications from customers, like BLR bore applications. After a customer makes an application, the application is funnelled into various checks, including registries held externally to WaterNSW such as title searches. The automated part of the system pulls information from relevant registries using an Application Programming Interface (API) and displays the results to the water regulation officer for assessment. Other checks are manual, including Native Title searches. Assessment officers consider all details from searches and other criteria before making their recommendation.

The determining officer is able to view all searches and other documentation considered in the assessment and recommendation, and is able to easily see that all required searches and documents necessary for a determination have been included. The WaterNSW determining officer then confirms their determination by manually approving or refusing in the system. Many steps are still completed manually. However, using data matching and rules-based engines, the system does have the capacity to further automate this process. Interviewees also noted that there may be limits, not explicitly detailed, in the legislation that prevents full automation of water licensing determinations including the *Water Management Act 2000* (NSW), and the *Water NSW Act 2014* (NSW). WaterNSW confirmed on this point that full automation is unlikely to be progressed due to legislation that prevents it.

Efficiency and other gains

Early reports indicate the Water Market System saves time for officers. Further benefits were outlined by WaterNSW: 'both [for] its customers and the business, increasing visibility of applications and improving processing times.' The system does not accept an application until all the required information is provided by the customer. This saves time processing applications. Previously, incomplete applications led to multiple follow up emails from WaterNSW to provide the needed information.

In addition, WaterNSW has used the development of the Water Market System to clarify decision-making processes and identification protocols. For example, water supply works approvals are valid for 10 years, and are often renewed without change. Although it was clarified that responsibility to update information rests with the customer and it is not a requirement for WaterNSW to check and update details, previously, when an approval expired, there were instances of staff only partly checked the accuracy of details with the customer and amended the record if needed. Instead, with the current practice the approval period could lapse, and on-site visits would be needed to check eligibility, which is the first step of a compliance process that could result in prosecution against the client for unauthorised water extraction. The requirement to check the application details on expiry will be written into the Water Market System design, ensuring higher rates of compliance from WaterNSW and customers with the legislation.

Building on previous work done clarifying administrative processes and responsibilities, including working with partner agencies, has been another positive outcome of the digital transformation and the Water Market System. WaterNSW work closely with, for example, the NSW Department of Planning and Environment, NSW Department of Primary Industries, NSW Fisheries and the Native Title Corporation, to provide responsible water management across NSW, and outside NSW for catchment systems that are shared with other jurisdictions like the Murray-Darling Basin. The process of developing the automated assisted system allowed WaterNSW to identify previously unnecessary procedures in relation to Native Title checks. For example, Native Title checks were being requested for general applications, including freehold land despite Native Title not being applicable. This has reduced pre-existing unnecessary administrative burdens on NTSCORP (Native Title Service Provider), which reportedly had led in the past to some tardy responses to requests or no responses at all in some cases. Currently water licences on freehold land are not sent for Native Title checks, reducing the number of requests from WaterNSW and improving the response rate.

Impact on citizens and legal questions

Currently, customers can choose whether to use a paper-based or automated assisted system. This is seen as essential for rural and remote communities who may have limited internet access and where digital exclusion is overrepresented, while addressing possible resistance to digital self-service. Avenues for assistance from a person also remain to support clients in their application, with specialist staff available.

System operators considered that the legislation could be unclear on some matters. Working through the requirements of the Water Market system and issues in its implementation has been used as a mechanism for clarifying grey areas and identifying areas that require further clarification. This is perceived to be beneficial for clarity and future stability.

Interviewees also noted the issue of compatibility. Although the system has the capability to interface with other agencies, it does not yet integrate easily with other states and territories who have their own water markets. This may have implications for historical issues dealing with river systems and catchments that

cross State and Territory borders (e.g., with the Murray-Darling system). However, interviewees did not discount the possibility of future compatibility. Similar systems could work together to manage water resources equitably across jurisdictions, and that national protocols and data exchanges can be developed.

Ownership and control of the system

As mentioned earlier, initially WaterNSW contracted an international vendor under contract with WaterNSW to develop and manage the Water Management System. However, WaterNSW has now taken increased control over the system development and future development. The core system licence purchased by WaterNSW is dynamic so that it can easily be tailored to their needs. The system development and delivery has been managed by WaterNSW since 2023 and utilises external resources to undertake development and testing, while WaterNSW has developed internal capabilities and processes for ongoing system management.

This is an example of the contractual relationship between developer and agency being identified as an important consideration for ADM system usability and appropriateness for application by an Australian government agency. In this instance, in-house management and development has been the preferred arrangement as demonstrated by the move from an external contracting relationship to internal management.

Careful, cautious roll-out

The Water Market System roll out has been described as gradual and careful, beginning with the BLR bore licensing functionality, which is considered low risk, and expanding from there. Legacy systems are being kept in place for back-ups and to provide an alternative for customers who are uncomfortable with automated systems and prefer dealing with paper and people, at least during a transitional period. Considering Australia's regional internet connectivity issues, especially in rural and remote areas, as well as decreased digital literacy and access to technologies in rural and remote areas, maintaining a paper-based alternative is important for these customers. While WaterNSW has the capacity to readily add to the system functionality, and to fully automate many processes, they have explicitly decided to 'hold off' on this, notably due to the legislative limitations, showing a cautious and careful consideration of the use of automated technologies.

5.6. CASE STUDY 5: USE OF COMPUTER VISION BY LOCAL GOVERNMENTS

Computer vision, that is, the capacity of an AI system to classify an image and match it to a predefined category, is a promising technology for automation of processes of service delivery in the public and private sectors. In the public sector this is particularly evident in the agencies linked to day-to-day activities, such as those in charge of road safety or policing. In the mapping exercise, we could identify tens of ADM systems involving some element of computer vision. This trend was particularly noticeable in

local councils. This is not surprising as local councils are the level of government closest to the citizen and have service delivery at the core of their functions.

While the use of AI and cameras on roads or for policing functions has been well documented and analysed in the academic and policy literature, its use by local authorities has been much more under the radar. This case study joins together two types of ADM systems deploying computer vision in public sector activities in the specific context of local government: licence plate recognition (LPR) in connection with automobile parking and crowd monitoring in public spaces.

The systems analysed in this case study were not reportedly driven by an enforcement function. None of the systems studied were used to impose fines or make enforcement decisions. Instead adoption was reported to be driven mainly by efficiencies in service delivery. Among these, management of parking was noted by some interviewees as probably the primary area of interest for automation in local councils. But in the context of parking, service delivery and enforcement are ultimately intertwined and hard to distinguish. As one interviewee noted in frank terms, there had to be a business case for automation: the necessary investment in automation may need a stick (in this case referring to a parking ticket driven by automation, which would decrease staffing costs), to get users to appreciate the carrot (referring to the possibility of receiving notifications about real-time availability of parking in congested areas).

The technology in the case study

Computer vision is an AI-related technology that allows a system to generate meaningful outputs from digital images and videos. Often, these meaningful outputs are classifications according to pre-defined categories.

For licence plate recognition ('LPR'), the technology is relatively mature and reliable. Number and letter recognition has been a traditional problem addressed with machine learning. A classic practice exercise for teaching the inner workings of AI (and for AI developers to refine their skills) has been the creation of a system to recognise figures from a dataset of thousands of handwriting samples in bank checks. Over the years, systems have achieved a very high degree of accuracy in that task. In comparison, its application to licence plates, with their standardised styles and sizes, especially for stationary vehicles with a photo taken from the right angle, may seem trivial. In that sense, its use for automation in parking settings was not apparently restricted by limits in the technology. Indeed, LPR has been present in private parking lots for a long time.

However, when the technology was taken into the real world, to monitor on-the-street parking, existing systems revealed their limitations. As discussed below, recognising licence plates on parallel parked vehicles or distinguishing between parking and stopping with people inside the vehicle or cars with a disability parking permit hanging from the mirror, show that the LPR technology was just a minor part of a much more complex system.

The use of computer vision in crowd monitoring is probably a less developed technology, even if it has received much more attention in the media. Here we will not discuss some cases identified in the mapping that also try to classify the behaviour of individuals within a crowd. This case study focuses instead on much simpler computer vision systems, such as those 'counting people'.

Counting people can have many applications, from the regulation of traffic lights for pedestrians, through deciding where to place a public toilet, to knowing in real time where to allocate life-saving resources at beaches. This latter example is used in a well-known programme jointly developed by different local councils across NSW together with UTS called Smart Beaches.[131] Based on the current technical state of the art, the expected accuracy of these systems is high. Challenges are not related to computer vision or AI, but socio-technical concerns. Smart Beaches requires adequately covering the monitored area with cameras of sufficient image quality to allow the system to function. Interviewees noted that the very act of deploying a system with cameras can be sensitive if citizens have some expectations of not being observed or recorded, for example, in the clothing normally worn to the beach.

The use of computer vision across different types of local government areas

The applications discussed here may give the erroneous impression that computer vision is better suited to urban areas. However, a number of systems identified in the mapping using computer vision were serving geographically large councils with low population densities. For example, several local councils are using, piloting or planning the use computer vision on images collected from their vehicles to monitor the quality of road surfaces and the geolocation of potholes. As vehicles drive around local government areas to complete other tasks, they are also serving a road maintenance purpose thanks to these computer-vision systems. The insights generated by the analysis of these images can then inform road maintenance policy, allowing councils to rely less on individual reports and access better analysis of urgency in the repairs.

Nonetheless, it is not surprising that councils in heavily-populated areas, where more automation is present, are also those currently more actively deploying or exploring the use of ADM systems based on computer vision. The individuals interviewed for this case study work in councils that not only have relatively large populations, but where that population has relatively high income levels. They also see their councils as leaders in NSW in their use of IT for service delivery.

The function and the environment

In both use cases (LPR for parking, and crowd counting) the systems were designed to replace functions previously performed by humans. Crowd counting on beaches was a function previously performed by

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[131] 'Smart Beaches Project', *Northern Beaches Council* (Webpage).

lifeguards from beach towers. This information was used (and it is still used) for the allocation of resources, from emergency services to cleaning needs, but mainly to determine patrol times.

The incorporation of LPR into local government practices may have been driven, at least in some cases, by providers already working with local governments in the management of parking. Our interviews with at least two local councils noted that these companies have offered that capability to local officials for their consideration.

LPR for parking can be used in two separate settings. First, in local government parking lots, it allows councils to passively enforce time limits on use per day across several lots. In this case the implementation seemed to be straightforward and similar to use in the private sector. If, for example, a 2-hour limit is exceeded, the driver is forced to pay in an automated machine before exiting the parking lot. Perhaps the only meaningful difference with private uses is that the data can be shared across several parking lots. Implementation of the system is done through a private provider.

The use of LPR for on-the-street uses has proven to be much more challenging. Although some interviewees noted that similar systems are already common in Western Australia (although no clear publicly available record could confirm this), some local councils have experienced difficulty finding a system that meets their expectations and requirements. In particular, as noted above, parallel parking required much more advanced technology to be able to read licence plates. Distinguishing between parked cars and cars stopping with people inside the vehicle was necessary, so systems using infrared cameras were used. To determine if a car had a valid disability parking permit hanging from the mirror, much more intrusive digital photography was required than initially envisaged. Overall, humans proved hard to replace and in cases discussed in our interviews, piloting was discontinued. One council that ran a parallel test with two companies did not find any of their systems satisfactory for different operational reasons. Nonetheless, it was suggested in an interview that a combination of both systems could meet the desired requirements, which implied that the limitations were not technical in nature.

The gains and drivers of automation

For crowd counting in public spaces, the gains of deploying a reliable system are relatively evident. ADM systems can easily outperform humans in terms of accuracy. Automation also allows for real time monitoring, instead of reporting through calls or at certain times of the day. In the beach context, it allowed lifeguards to focus instead on other activities that could not be as easily automated. In some cases, implementation of the ADM system was further facilitated by using cameras already in place and deployed according to a pre-existing CCTV policy. ADM systems could use those digital images or cameras could simply be replaced with similar ones adapted to the crowd-counting task.

The reported motivations and gains for LPR systems for controlling parking lots and monitoring on-the-street parking are perhaps more surprising. The main drivers for electronic chalking of cars to assess the duration of parking was reported to be health and safety considerations. Rangers previously undertaking

the role were increasingly dissatisfied with their working environment and conditions, reporting injuries and assaults. Together with the tightening of the labour market, vacancies were becoming increasingly difficult to fill. Automation was then seen as a way to make the work of rangers more amenable, especially as no fines would be issued while the system was being tested and only notes stating the possible infringement were ever placed on the windshields. Nonetheless, efficiency was also noted to be a driver in deploying automated systems.

Deployment: Observations specific to local government and demands from local contexts

The employees interviewed for these cases studies all described their local councils as very 'risk adverse'. In discussing the steps towards implementation, all noted that officials had to pay attention to the ways the population will react to automation and the need to respect the 'feeling of the community'. In some cases, such as parking, there was also a need to cater for a demand to prioritise serving the local community ahead of visitors. The manner in which this activism was described provided an interesting insight into the often-diffused concept of responsibility for deploying an automated system. In the local council context, the community seemed very aware of the individual (or group of individuals) responsible for the decision to automate and determined to hold them accountable.

This was also linked by interviewees to the idea of imitation. Learning from other experiences is a key factor for automation in local government. Some local councils are seen as trailblazers and their experiences used by other local councils to decide on the implementation of ADM systems. This dynamic could be seen at different levels. First, a more natural one between councils themselves. They learn through their formal and informal coordination systems. Second, from the providers of the systems that can offer a solution to many local councils once a system is developed for one. Third, and more interestingly, learning can modify the expectations of the local population. Even if there are very council-specific dynamics and different local governments cater for different 'shared sensitivities', people travel and use services in different local government areas. In that process they get used to these systems and may be more likely to accept them in their own local government area.

Finally, the differences in capacities among local councils should be considered. The implementation of new automated systems requires certain levels of technical and legal advice that is not accessible to many councils or that is disproportionally costly. It was suggested that the state government could facilitate coordination among councils or provide advice in relation to automation for systems specific to local councils, perhaps in the shape of 'how to' guides or a specialised service for local councils to consult.

5.7. AN INSIGHT INTO THE INTERNAL MAPPING OF ADM SYSTEMS INITIATIVE WITHIN THE HEALTH PORTFOLIO

As well as seeking to understand ADM systems in context, the research team was keen to understand internal government perspectives on ADM systems and the process of mapping their use in government. We had therefore conducted a case study directed at the mapping process within one complex portfolio, namely the Health portfolio. In March 2024, the Ministry of Health (as it is formally titled) provided the research team with a description, in their own words, of the process of mapping, its challenges and obstacles, and internal developments within Health subsequent to our study. The Ministry's description, transcribed below, is one perspective, but usefully highlights challenges we have referred to earlier: in particular around understanding responsibility and information flows within a complex government department and how best to reach and interact with the right people, and, importantly, the difference between the internal Health perspective on what constitutes an ADM system and how that differs from the approach adopted for this project. The fact that there has been an internal discussion and process subsequent to our project is a positive development.

NSW Public Sector Automated Decision-making System Mapping

The institutional setting

The NSW Ministry of Health is a particularly complex structure within the NSW Government. On the one hand, similarly to other portfolios, it supports the executive and statutory roles of the Ministers with health-related tasks. On the other hand, as the "system manager" of the NSW public health system, it is central to the operation of more than 220 public hospitals and the provision of community health and public health services. This is delivered through a system collectively known as "NSW Health", which includes a number of local health districts, specialty health networks and affiliated health organisations.

Mapping experience

When initially contacted through Survey 1, the designated entity in the NSW Ministry of Health identified two people from within the Ministry to support the mapping initiative. The initial mapping was treated as a standalone initiative and did not leverage existing processes within the system for managing requests for information (executive and ministerial correspondence), and as such, had variable responses.

Subsequent mapping occurred in February 2024. The second round of mapping leveraged the established standard process within NSW Health for requesting information and aligned with the governance structure of the newly established NSW Health Artificial Intelligence Taskforce. A mapping request was sent across the Ministry and to local health districts, speciality health networks, pillar organisations, and statewide services. This mapping yielded a 100% response rate.

Obstacles and challenges to complete the mapping

The main challenge was in relation to the "ADM system" terminology that the project was applying. As noted at several points in this report, the first point of contention to a reliable mapping of the use of ADM in government is to correctly understand what an ADM system is in the first place. The report opted from a ground-truth, bottom-up approach where a strict definition was not provided, leaving it to the surveyed entities to establish the boundaries of what an ADM system was in their concrete operational setting within the boundaries determined by some general guidance.

Both the initial and subsequent mapping triggered a series of queries with different understandings of the project scope. The ADM Systems used within NSW Health are typically structured decision-making tools that support and/or lead a human through a decision, rather than the traditional definition of an ADM System which describes a computerised process that replaces the judgement of human decision-makers.

The limited timeframe to complete the mapping further exacerbated the challenges of definition and scope, as there was limited time to seek clarification.

NSW Health Artificial Intelligence Taskforce

Noting the gradual introduction of artificial intelligence in health service delivery NSW Health established in February 2024 an Artificial Intelligence Taskforce comprised of senior leaders and subject matter experts from across the system to inform and guide the use of artificial intelligence in the public health system.

The Taskforce will play an important role in overseeing the creation of a Framework that ensures the safe and successful use of artificial intelligence within NSW Health. The Framework will balance the opportunities and benefits presented by artificial intelligence, with consideration and management of potential risks around safety, ethics, privacy, security, and regulation.

The Taskforce will build on the work of the NSW Department of Customer Service, translating the whole of government approach into the healthcare context, as well as aligning with the Australian Governments Interim Response to the Safe and Responsible Artificial Intelligence consultation.

The establishment of the Taskforce also creates an additional governance structure, supplementary to pre-existing processes at a state and local level, to support and standardise the use of ADM systems within NSW Health.

06. CONCLUSIONS

This Report has presented a mapping and analysis of the use of ADM systems by state and local governments across NSW. Sections 2, 3, 4 and 5 present the reader with different lenses on ADM system use, based on data collected through several methods: direct survey, a systematised review of publicly available material, and interviews with public servants directly involved with implementing ADM systems.

In this final section, we pull together findings and observations based on this research. Our observations sit at two levels. On the one hand, we have findings about ADM system use across NSW state and local governments. But we have also learned much through the **process** of conducting this research, about how researchers, and governments might best meet increasing calls for transparency about ADM (and AI) use.

A shorter distillation of key findings and observations may be found in our Executive Report.

6.1. FINDINGS ON ADM USE ACROSS NSW STATE AND LOCAL GOVERNMENTS

NSW government sector use of ADM systems is widespread and increasing

It was striking that approximately one third of all the systems reported to us were in development, being piloted or planned within the next three years. Even allowing that survey respondents will think first of new and planned systems, and some planned systems will replace existing ones, this suggests an accelerated level of activity.

Our review of publicly available material confirms this finding. It indicates recent growth in mentions of automation and AI, linked to possible new systems. It is worth noting however that publicly available materials also show an earlier 'wave' of references to possible ADM systems around 2009–2011, driven mainly by the Communities and Justice portfolio.

The extent of use and planned use of ADM systems by local councils is also striking, and deserving of further researcher and policymaker attention.

NSW government organisations are interested in AI, but simpler forms of automation and data linkage and matching are widespread

Both direct survey responses and publicly available material provide evidence of widespread interest across both the state government and local councils in the adoption of various forms of AI, including predictive analytics, NLP, and generative AI. However, simpler technologies for ADM are more widespread, and heavily relied upon within government.

This affirms the need to continue to pay attention to the design, deployment and use of all ADM systems, and to ensure that all such systems are legal, and consistent with good administrative practice. The challenges typically arising from both AI and ADM are not associated with the specific technology, but from how it is used.

We found widespread use of sensors, computer vision and analysis, including use by local councils

Multiple existing and planned uses of image detection and analysis were reported. Some examples are well-publicised, including Transport for NSW's use of image detection and analysis for the enforcement of road rules, such as the Mobile Phone Detection Camera Program. Transport for NSW has demonstrated accountability and transparency by consulting with experts, and publishing an *Automated Enforcement Strategy*[132] outlining in some detail, for the public, how it plans to use this and other automated enforcement technologies, and the guardrails in place to manage risks.

Less widely publicised is the surprisingly common adoption of computer vision and automated sensors by local councils across NSW: from simple licence plate recognition in parking lots through to more advanced uses discussed in our case studies. The uses reported have clear public interest goals such as: efficient detection of road defects; targeting maintenance resources; analysing use of public facilities for resource allocation and management; or identifying other potential public issues such as urban heat.[133]

We would draw attention, however, to the potential surveillance and privacy implications of these technologies, and the need for explicit, limits or precautions, or perhaps consistent guidance adapted to common use cases. It is particularly notable that local council use of such technologies is occurring in the absence of a specific, legislative framework, published strategies or guidance for the use of these potentially sensitive technologies. Such use is not subject to the *NSW AI Assurance Framework* which applies to state government uses.[134]

Humans are mostly 'in the loop' for now, but further automation is a short step away

The most common type of ADM system reported to us at the state government level was structured decision-making. This suggests that, in many cases, ADM systems are being used in collecting, filtering and presenting information, and guiding decision-making, rather than to replace human decision-makers.

On the one hand, this may ensure that decision-making power remains in the hands of human delegates in many cases, which is conducive to ensuring there is a legal foundation and appropriate delegation for the

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[132] Transport for NSW, *NSW Automated Enforcement Strategy* (Policy, 31 July 2023).

[133] These developments are outlined in more detail in case study 5 in this Research Report.

[134] *NSW Artificial Intelligence Assurance Framework* (n 50).

decisions made. Involving human decision-makers can also address anomalies that are of such rarity that they may not be thought of when designing an ADM system. An example is provided in our Online Birth Registration case study, where system designers allowed for automated birth registration, provided the correct data was entered and matched. Designers did not foresee parents registering entirely inappropriate child names (like 'Methamphetamine Rules') in contravention of existing rules. The example illustrates that problems can arise with full automation, even where only apparently positive decision outcomes are automated.

As the *New Machinery Report* sets out, it is a short step from a system that provides information and/or a recommendation, to a system that automates (or effectively automates) the decision. It is noteworthy, too, that systems considered in our case studies, such as the Water Market System, have the technological capacity for further automation. To date, however, relevant organisations reported adopting a more careful and gradual approach, and recognised potential issues with full automation, especially when serving populations with lower levels of digital access and literacy. It is important, from an administrative law perspective, to ensure that human decision-makers do not *treat* AI/ADM recommendations as effectively binding, or promote their passive acceptance, and that any further automation is carefully considered in context, including considering issues such as Australia's digital divide: i.e. unequal access to internet and gaps in digital literacy documented by ADM+S researchers.[135] As ADM systems provide more intelligence, organisations may be tempted to replace workers with operational knowledge, with less knowledgeable system operators. Fully automating decisions can fundamentally upend administrative principles, as Robodebt did in reversing the onus of proof of an alleged debt.[136]

There is also evidence that public sector organisations are considering making use of features (such as additional predictive analytics, or generative AI) offered in updates to existing software and platforms procured from commercial providers. This is a new development: it may increasingly be the case that some forms of AI are ubiquitous, rather than specific, designed, and consciously incorporated. This raises what we might call the '**flick the switch' dilemma** in an 'AI everywhere' world. If a department or agency is offered the opportunity — or even simply told — that new versions of their product now come with 'AI-enabled by default' or by simply 'flicking the switch', when does, and when should this trigger an assessment using tools such as the *NSW AI Assurance Framework*? This is not a new procurement of a kind that might trigger detailed consideration of design or the implications of the technology.

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135 Thomas, J., McCosker, A., Parkinson, S., Hegarty, K., Featherstone, D., Kennedy, J. Holcombe-James, Il, Ormond-Parker, L., and Ganley, L. (2023) *Measuring Australia's Digital Divide : Australian Digital Inclusion Index : 2023* (ADM+S, 2023).

136 *Royal Commission into the Robodebt Scheme* (n 8).

There may be a need for wider expertise and testing at the development stage of ADM systems

Appropriate accountability for government use of ADM systems is best achieved from the beginnings of project inception and design, rather than reporting once in operation. Because of the multiple factors involved, designing accountability into ADM will necessarily require input from the perspectives of multiple professions (including digital tech/computing, legal, managerial, customer focus, and front-line service delivery professionals). One observation suggested in our more detailed look at ADM system development is that some known issues may not be considered at early stages of development. A number of organisations reported that legal expertise was not engaged during development. While this observation is not based on a large dataset, it may indicate, alongside historical examples,[137] that, in general, government departments, agencies and local councils need to give greater weight to the questions of legality in the design and implementation phases to ensure adopted systems are properly authorised by law.[138] We acknowledge that some agencies may have limited legal resourcing for this purpose; it is possible that better knowledge-sharing and transparency, as we advocate below, may assist. We also noted an absence of some testing, such as accessibility testing, from our responses to survey 2.

6.2. OBSERVATIONS ON THE PROCESS OF MAPPING AND ON FUTURE TRANSPARENCY OVER ADM SYSTEMS

The project has generated a second set of findings and observations, relating to the **process** of conducting this research, about how researchers, and governments might best meet increasing calls for transparency about ADM (and AI) use.

Transparency is one of the most important values reiterated in the literature on implementing AI/ADM systems (and indeed in administrative law more generally). The third of the five OECD *Principles on AI*, to which Australia is a signatory, is that '[t]here should be transparency and responsible disclosure around AI systems to ensure that people understand when they are engaging with them and can challenge outcomes.'[139] Principle 6 ('Transparency and explainability') of Australia's own *AI Ethics Principles* (from the Department of Industry, Innovation and Science) is also reflective of this commitment to transparency.[140]

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[137] See above nn 8–18 and accompanying text.

[138] See Section 4.3 above.

[139] OECD, 'Forty-Two Countries Adopt New OECD Principles on Artificial Intelligence - OECD' (*OECD*, 22 May 2019). See also: OECD, 'Recommendation of the Council on Artificial Intelligence' (OECD/LEGAL, 2019), s 1.3: Actors should commit to transparency and responsible disclosure regarding AI .

[140] Which states that 'There should be transparency and responsible disclosure to ensure people know when they are being significantly impacted by an AI system, and can find out when an AI system is engaging with them': Science Department of Industry, 'Artificial intelligence - Australian economy & industry' (*Department of Industry, Science, Energy and Resources*, 6 November 2019).

The Australian Human Rights Commission (AHRC) in its report, *Human Rights and Technology*, called on the Australian Government to 'commission an audit of all current or proposed use of AI informed decision making by or on behalf of Government agencies' (Recommendation 4).[141] The *New Machinery Report* emphasised transparency as an essential element of good administrative practice in the use of ADM systems in government. The Royal Commission into Robodebt highlighted the need for information on the use and process of the ADM to be in plain language and publicly available and for business rules and algorithms to be available to enable independent expert scrutiny.[142]

This project is a partial response to these calls: an effort to provide more visibility over ADM system use by governments. This Report provides a great deal of useful information; more could be drawn from the datasets generated.[143]

Based on our experience conducting this research, meeting these calls for transparency will require policymakers to take into account a range of considerations, and, we hope, learn from the experience recorded in this Report. Whoever undertakes the task of providing more transparency will need to address some of the same questions encountered by our research team: defining *what* is to be reported or audited/assessed, at *what level of detail, by whom* (who has the responsibility of providing information), and *how* to secure participation in a way that provides meaningful information while remaining sustainable in terms of the resources required. We summarise here some observations based on the process of conducting this project. The next section outlines some considerations based both on this research, and the team's broader experience, that may be useful for policymakers into the future.

The limits of voluntary disclosure

This project demonstrates that mapping ADM systems used by government can be done, but also the **limits** of an approach that relies on voluntary provision of information by governments (including local councils). All participation in the project on the part of public servants and government departments, agencies, and local councils has been **voluntary**. No compulsory powers of the NSW Ombudsman's Office have been invoked. Informed consent was sought from all participants in the research (public servants). We note that the project benefitted from support from the NSW Ombudsman's Office, and from within the

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[141] Sophie Farthing et al., 'Human Rights and Technology, Final Report' (Australian Human Rights Commission, 2021).

[142] The Commission also recommended that the Commonwealth consider legislative reform to establish a consistent framework and the establishment of a body to monitor and audit ADM in government services: *Royal Commission into the Robodebt Scheme* (n 8) Recommendations 17.1–2.

[143] For the benefit of researchers too, the Methodology and Data Annexure to this Report outlines our process in detail, including choices the research team made about terminology, how to communicate about the research project and data sources.

NSW government at various levels. Nevertheless, there are gaps in the data reported here. Organisations have had the ability to opt out and, in some cases, have exercised that option.

We observed that support for (voluntary) transparency in some parts of an organisation will not necessarily translate to support or engagement, capacity or prioritising of a response from other parts of the organisation, or, in the case of the complex state government, separate agencies.

We also observed that **sensitivity** is a consideration: important ADM systems may be considered sensitive by vendors, public servants, government departments and agencies, or all of them: perhaps leading to non-reporting, or vague, even meaningless descriptions of systems (we saw the latter in some survey responses). The process of writing up this research has involved discussions with a range of portfolios over what to report, how, and at what level of detail. Commercial-in-confidence provisions are standard in contracting arrangements in provision of computing services, where governments widely and heavily rely on such external services in addition to their own internal capacities. It is, however, important to ensure that overreaching claims to commercial sensitivity do not interfere with good administrative practice. Sensitivity can also be because of security concerns (particularly in policing and intelligence), and in ensuring that the transparency provided does not enable members of the public to game, alter or hack the system.

It follows that ensuring an effective future mechanism to secure transparency over ADM or AI use will be especially challenging if reporting is voluntary, or if no consequences attach to the failure to report a system.

The challenges of scoping, and conducting a mapping of ADM systems

Future efforts to conduct either an analogous mapping, or to construct a mechanism for transparency over ADM systems and their use, will likely confront similar questions in scoping the mechanism (or research) and implementing it. The research team make four observations about this project's scope which may be useful:

A first question relates to the **scope** of any mapping or transparency mechanism. Defining in advance which ADM systems were sufficiently important to include in a mapping involved trade-offs. Our broad scope made the process more challenging for researchers and public servants alike. Too narrow a scope, however, would have left out systems that impact people, and hence been inappropriate for this first attempt at a mapping. For example, focusing only on AI, or only on fully-automated systems would exclude much, or perhaps most of the NSW government's digital transformation.

A second observation relates to the challenges of **terminology, and the need to develop a common understanding of that terminology with reporting organisations.** Key terms – *AI*, *automation*, *systems*, and *decisions* – lack clear, generally accepted meanings. This complicated communication with public servants, and everyone's ability to understand what should be reported, and how it should be described.

Some people focussed on named systems, while others highlighted the particular functions or decisions being automated. Some public servants initially believed the project concerned AI rather than broader forms of ADM. We developed multiple modes to communicate the project's intended scope: a general description; a table of indicative examples; and heuristics, or rules of thumb.[144] Ongoing dialogue with our survey respondents was still necessary to settle on how systems should be reported in the survey.

A related observation concerns the term, **ADM systems**. In the course of this project, in our interactions with government departments, agencies and local councils, we experienced significant pushback from public servants when we characterised systems as ADM systems (according to our broad definition). Public servants to whom we spoke, whether in reviewing our case studies or reviewing our data, preferred to describe their systems as workflow systems, or digital systems, or self-service systems, or by reference to the functions being performed (e.g. as a 'registration system' or an 'online registration system'). Either our characterisation (i.e., our decision that a system was within scope), or how we described it in writing, or both was disputed. This illustrates a challenge to the mapping we have conducted (and may explain why systems were not reported in Survey 1). It also reinforces the need to take active steps to develop a common understanding of the terminology, in any research or transparency mechanism in the future. It may also be a challenge for members of the public currently seeking information about ADM systems in publicly available material. In the absence of common terminology, it is hard to know what to look for.

Another observation relates to **timing, when seeking to map dynamic systems.** ADM systems evolve over time, complicating how to report or describe them. We saw evidence of this, with some survey responses noting the addition of features by commercial providers (such as integration of AI) or planned expansions or system upgrades. This suggests the need for methods, and triggers for updating information about ADM systems that is provided publicly.

We also note a basic logistical consideration: finding the right people in complex organisations. **There is no consistent, publicly designated, single individual or team with full knowledge of ADM/AI system usage across NSW government departments, agencies or councils at present.** Each organisation may have a responsible person, team, or people, but their identity is not readily available to people outside the organisations. Responsibility for ADM systems is allocated differently in different parts of government, and, in some cases, it appears to be widely dispersed across the organisation. Providing informed insights about an ADM system typically required input from multiple professionals; e.g., IT, legal, service delivery, other managers. In constructing a future mechanism, it will be necessary to give consideration to how to allocate responsibility for reporting, and for maintaining the accuracy of information.

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[144] These are outlined in more detail in the Methodology and Data Annexure, Section 8.5.

6.3. CONSIDERATIONS FOR FUTURE POLICY

As we have found, government use of ADM systems and AI is extensive, and increasing. Continued commitment on the part of governments to be transparent about their use of ADM systems and/or AI will require governments to find ways to navigate the challenges we have outlined. In this last section, we outline some considerations that may assist NSW state and local governments in this process. The discussion below draws on the research reported here, but also the broader research of, and expertise and experience within, the research team.

Build on the data

Consideration should be given to sharing, and building on, the data collected in this project, in particular as a foundation for agencies and departments to map their own systems internally.[145] We note that in the time since our surveys were concluded, the NSW Ombudsman's Office has continued to build on and update the data gathered, which is a very positive development. NSW government organisations, including local councils, could use data from this project as a valuable source of information when considering automation, both as a repository of ideas, and a guide for organisations contemplating development, or deploying new systems.

Reconsider scope, and how it may impact on calls for transparency

We observed, in the data collected, a wide variety of systems, with very different levels and kinds of likely impact on members of the public in NSW.[146] A narrower scope of collection or reporting of ADM systems than we adopted for this project may be more sustainable for the public service. We would observe, however, that for the goal of transparency to be achieved in a way that responds to past concerns regarding government use of ADM systems,[147] the scope of ADM/AI systems of interest should be defined, not by the kind of technology (for example, not just AI, and not necessarily all AI), but by the role and purpose of systems within government operations, and their impact on citizens and businesses.

We note that the range of examples of ADM systems we have identified may assist in thinking about which kinds of systems warrant further transparency or accountability measures based on the various kinds of legal and social implications different systems and uses give rise to. Specifically, there are certain patterns of developing use of ADM systems that perhaps warrant more attention than they have received to date, as highlighted through this Report.

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[145] As noted in the Methodology and Data Annexure, datasets generated will be held by the NSW Ombudsman's Office at the completion of this project. For completeness we note that NSW government portfolios have been provided with survey data relating to their portfolio.

[146] This is best illustrated by the tabulated examples we provide in the Executive Report accompanying this Report.

[147] See discussion in Section 1.2.

We observe that it may be useful to consider staged, or graded disclosure levels. One model for this is provided in the contracts classes 1 to 3 in part 3 division 5 of the GIPA Act. For example, in the ADM context, a register might require more or less disclosure depending on whether the system is used for data capture, predictive analysis, decision support, decision-making, or enforcement.

Understand the benefits of transparency for government

Beyond a commitment to transparency as a foundational principle in public governance, it is important to understand that, based on our findings, there are clear additional benefits for government and/or public servants to be gained from transparency about ADM and AI use in government.

In the course of the project, we saw evidence that greater transparency would hold benefits for the NSW government sector, as a means for knowledge-sharing that may not be happening as much as it could or should. It was clear that some agencies and departments are further advanced in the use of ADM systems, and are generating knowledge of both challenges and good practice that could benefit others. Departments like Transport for NSW have developed explicit, and thoughtful strategies around automation of enforcement.[148] Conversations with public servants in the course of this project also suggest to us, anecdotally, that at least some public servants working in state government departments and agencies, and local councils would welcome the opportunity to learn from the experiences and best practices of others beyond one-off opportunities presented by NSW government events and summits that have occurred over the last several years.

Understand the benefits of a public register or similar transparency mechanism

Our research suggests that constructing a public register will have challenges. However, we think it important to highlight that a public register or analogous transparency mechanism specifically has benefits (as well as costs to be managed) for government and/or public servants. Benefits include the following:

- **Standardisation of key terminology**: in order to create a register or other transparency mechanism, it will be necessary to develop some standardised language and more generally, a common understanding of what kinds of ADM and AI systems should be reported, and how. This will develop understanding and capacity within and outside government, provide certainty for business, in particular the vendors who develop systems with and for government, and have the added benefit of contributing to standardising language for future research and audit and assurance.
- **Availability of information for government oversight, audit and analysis:** there is a shift, at a policy level, towards audit and assurance for some systems, especially AI systems, as illustrated through legislative and policy developments in Canada, the European Union and elsewhere. Consistent

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[148] *NSW Automated Enforcement Strategy* (n 132).

disclosure would provide a starting point for any such future audits. The process of conducting this research suggests to us that an audit-level review of government use of AI (as recommended by the AHRC[149]) would require considerable resources and the use of mandatory information collection powers. A disclosure register could provide a starting point for accessing information on the public agency engagement of vendors of concern, such as for security reasons.[150]

The use of algorithmic or AI registers is emerging as a trend, including in key jurisdictions of influence. It is timely for Australian jurisdictions to be planning and piloting solutions such as disclosure registers, as a means of staying abreast of international AI governance developments. Although there are no Australian jurisdictions that currently require the disclosure of ADM systems, a number of international jurisdictions have commenced early schemes to ensure transparency in this manner.

Programs have been launched simultaneously in the City of Amsterdam[151] and the City of Helsinki.[152] The information revealed on these algorithm registers regarding specific use cases (each to a page) includes: a descriptive overview; program contact and vendor information; key datasets utilised (and link to the privacy policy); data processing; assurance regarding non-discrimination; information on human oversight; and risk management (of the system and management methods).[153] The system permits feedback, including via an embedded contact form. The Dutch government has also published a *Standard for Algorithmic Transparency*, which is currently for voluntary disclosure by public organisations, but which may become mandatory for public organisations,[154] especially those using algorithms in key categories of concern.[155] Expanding further on examples from Amsterdam/Helsinki and the Dutch *Standard for Algorithmic Transparency*,[156] the Eurocities Digital Forum Lab, together with participating European cities,[157] developed an *Algorithmic Transparency Standard*, a relatively detailed standard that requests disclosure of close to 50 items of information.[158]

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[149] 'Human Rights and Technology, Final Report' (n 141) Recommendation 4.

[150] Daniel Hurst, '[Australian Intelligence Agency Advised Departmental Discretion on Using Chinese Equipment 14 Months Ago](#)' *The Guardian* (Article, 10 February 2023).

[151] City of Amsterdam, *[Algorithm Register](#)*, (Webpage, 2020).

[152] City of Helsinki, *[AI Register](#)*, (Webpage, 2020).

[153] Ibid; See also *Algorithm Register* (n 151).

[154] 'The Algorithm Register is not yet complete. Providing information about algorithms is not yet mandatory for government organizations. That obligation will come. Before then, more and more government organizations publish algorithms in the register of their own accord. Because they want to be open and transparent about their processes and the use of algorithms': Dutch Government, *[Algorithm Register](#)*, (Webpage).

[155] Ibid, *[FAQ](#)*.

[156] *[Dutch Algorithmic Transparency Standard](#)* (Webpage).

[157] Amsterdam, Barcelona, Brussels, Eindhoven, Mannheim, Rotterdam and Sofia: Eurocities, *[Algorithmic Transparency Standard](#)*, (Webpage, 2022).

[158] Ibid.

In the UK, a pilot is underway with respect to a new algorithmic transparency standard. This is designed to 'help teams be meaningfully transparent about the way in which algorithmic tools are being used to support decisions, especially in cases where they might have a legal or economic impact on individuals.'[159] The transparency pilot takes up a recommendation to the UK Government from the Centre for Data Ethics and Innovation to 'place a mandatory transparency obligation on all public sector organisations using algorithms that have a significant influence on significant decisions affecting individuals'.[160] Templates in support of the reporting standard are available as online content from the UK Government.[161] Other jurisdictions are experimenting with algorithmic transparency measures, including France and Chile.[162]

These registers and pilots vary according to what must be reported, and how. As such they may provide at least a benchmark for what could be developed in NSW. Table 13 illustrates at a high-level information required by various jurisdictions to date.

Table 13: Summary table of information required by overseas public AI/ADM registers

Information	Helsinki	Amsterdam	Dutch Government	UK	Canada	US
Overview/Purpose	Y	Y	Y	Y	Y	Y
Request more information	Y	Y	Y	Y	Y	Y
Accountability	N	N	Y	Y – detailed	Y	Y
External supplier / Procurement	N	N	N	Y	N	N
Technical description	Y – brief	Y – brief	Y	Y – detailed	Y	N
Human-oversight	Y	Y	Y	Y	Y	N
Methodology of creation	N	N	N	Y	N	N

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[159] Central Digital and Data Office, 'UK Government Publishes Pioneering Standard for Algorithmic Transparency' *GOV.UK* (Article, 29 November 2019). This initiative, launched by the UK Central Digital and Data Office, is currently limited to a handful of projects in diverse categories, including in health, food safety and policing. The pilot projects are listed here.

[160] See Centre for Data Ethics and Innovation, *Review into Bias in Algorithmic Decision-Making* (Report, 2020) Recommendation 16.

[161] See Central Digital and Data Office, *Algorithmic Transparency Template,* (Guidance, 29 November 2021).

[162] See especially Appendix 1 in Ada Lovelace Institute et al., 'Algorithmic Accountability for the Public Sector' (2021) 57.

Dataset (description)	Y	Y	Y	Y – detailed	Y	N
Non-discrimination	Y	Y	Y	Y	Y- detailed	N
Other Risk management (privacy, ethics, human rights)	Y	Y	Y	Y	Y- detailed	Y* - guidance yet to be provided.
Legal references	N	Y	Y	N	N	N

Notable from this table is the common requirement that an overview description of the system or algorithm be provided. Our research supports this conclusion: any effort to provide public transparency must include descriptions of ADM systems and their purpose. The free text descriptions provided in Survey 1 by public servants were a critical source for understanding what systems were intended to do, and potential impacts. Categorisations (such as categories of purposes, or type of technology) appeared to be difficult to answer for our survey respondents (survey responses frequently identified multiple categories), may not be as useful, and may be subject to varying interpretations. Descriptions of systems also helps the reader understand relevant context: i.e., in scholarly terms, how ADM systems are not just technical, but socio-technical, and embedded in society and government processes, laws and policies, and institutions.

Understand the limitations of a public register of ADM systems

Transparency is important, and there are good arguments in favour of an ADM register of some kind. It is important, however, to understand what such a system cannot do, as well as cost implications. In particular:

- **Unrealistic expectations:** there is a risk that agencies, legislatures and the general public may place too much faith in a registration/disclosure model, for example, as a source of complete relevant information, and as the way to address risks arising from the use of ADM systems. Transparency alone cannot resolve the risks of AI, such as bias and privacy/security issues.
- **Insufficient as notification:** a public register of algorithms or ADM systems does not address the separate obligation under administrative law and good administrative practice, to *notify* an individual of how and why a decision about them has been made, and on what basis. Members of the public cannot be expected to be aware of the contents of a public register unless referred to it.
- **A register is not the same as public engagement or participation:** the existence of a register does not address calls for the public to have a say over ADM or AI use, which would require notification in advance of a system going into use and involve public engagement beyond mere disclosure.

- **Resourcing:** government agencies are typified by overstretched resources. Additional compliance requirements, however small, can be expected to have a cost to agencies.
- **Excessive/inadequate information:** if the definition (and practical interpretation) of targeted systems for disclosure are too narrow or broad, then important information that is the most essential for disclosure may be excluded, or otherwise lost amongst excess data.

Identify (internally and publicly) a responsible officer or team

A system for assurance, and/or transparency and effective external oversight requires a designated person or multidisciplinary team responsible for identifying new (or sufficiently amended) systems requiring reporting/assurance. It was not evident to us that such people or teams existed within the NSW government, or at least could easily be identified.

Clear allocation of responsibility could be effective for both enhancing proper and safer implementation *and* identifying opportunities for beneficial automation. This links to our observation above regarding terminology and the efforts required in this project to develop an understanding of the mapping with reporting organisations. To the extent that external reporting or transparency is expected, the more people who separately hold responsibility for doing so, the more room there will be for differences in interpretation, and the more work (and repetition of work) will need to be done to build understanding of what is required.

We note that the US federal government has recently proposed requiring agencies to create 'Chief AI Officers' in a draft federal policy on *Advancing Governance, Innovation, and Risk Management for Agency Use of Artificial Intelligence*.[163] Related proposals have been made in Australia, and within NSW.

Given the widespread use of external contractors in developing, delivering and deploying ADM systems, clear responsibility arrangements between responsible officers or teams, and external providers must also be established early as to ensure adequate accountability where issues arise.

Consider how existing reporting mechanisms may assist in providing transparency

Transparency does not necessarily mean creating a new public register from scratch. Existing mechanisms for the reporting of public activity identified in our analysis of publicly available material (such as mandatory annual reports and other disclosures) could be a stepping stone to systematic reporting of automation by NSW government departments, agencies, and local councils. The best examples of annual reports identified with this method already include much of the data about ADM systems that interested audiences could reasonably expect to be placed by default in the public domain. In the alternative,

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[163] Office of Management and Budget, *Advancing Governance, Innovation, and Risk Management for Agency Use of Artificial Intelligence* (Draft Guidance, November 2023).

government could consider revising the GIPA Act list of information that agencies are obliged to make available as open access information and include a requirement to report at least certain ADM systems. The internal mapping within the Health portfolio, described in section 5.7, highlighted the importance of building any compulsory reporting or registration as part of existing procedures, such as a step in the current procurement process and guidelines.

The most important point is that a consistent approach is needed across government: at present, there may be more information published about automation across the NSW public sector than is generally appreciated, but finding this information is a labour-intensive exercise, and much of the reporting lacks important details. If government were to decide that a register was too resource-intensive, or premature, guidance about this reporting could be a first step, or preliminary step, which could facilitate more comparable and useful data in coming years, without significantly increasing the existing administrative burden.

A further consideration will be in determining whether information should be disclosed in a decentralised manner or supplied to a central agency. For example, the GIPA Act already requires agencies to disclose specific open access information on an agency website. However such agency websites lack common architecture, and it is not always obvious where information is located: for the purposes of this research, considerable active human review was required, and the dataset produced, while useful, has a degree of uncertainty embedded within it. Central reporting would overcome some of these problems, and perhaps facilitate knowledge and information sharing within government as discussed above, but would require additional resourcing and authority.

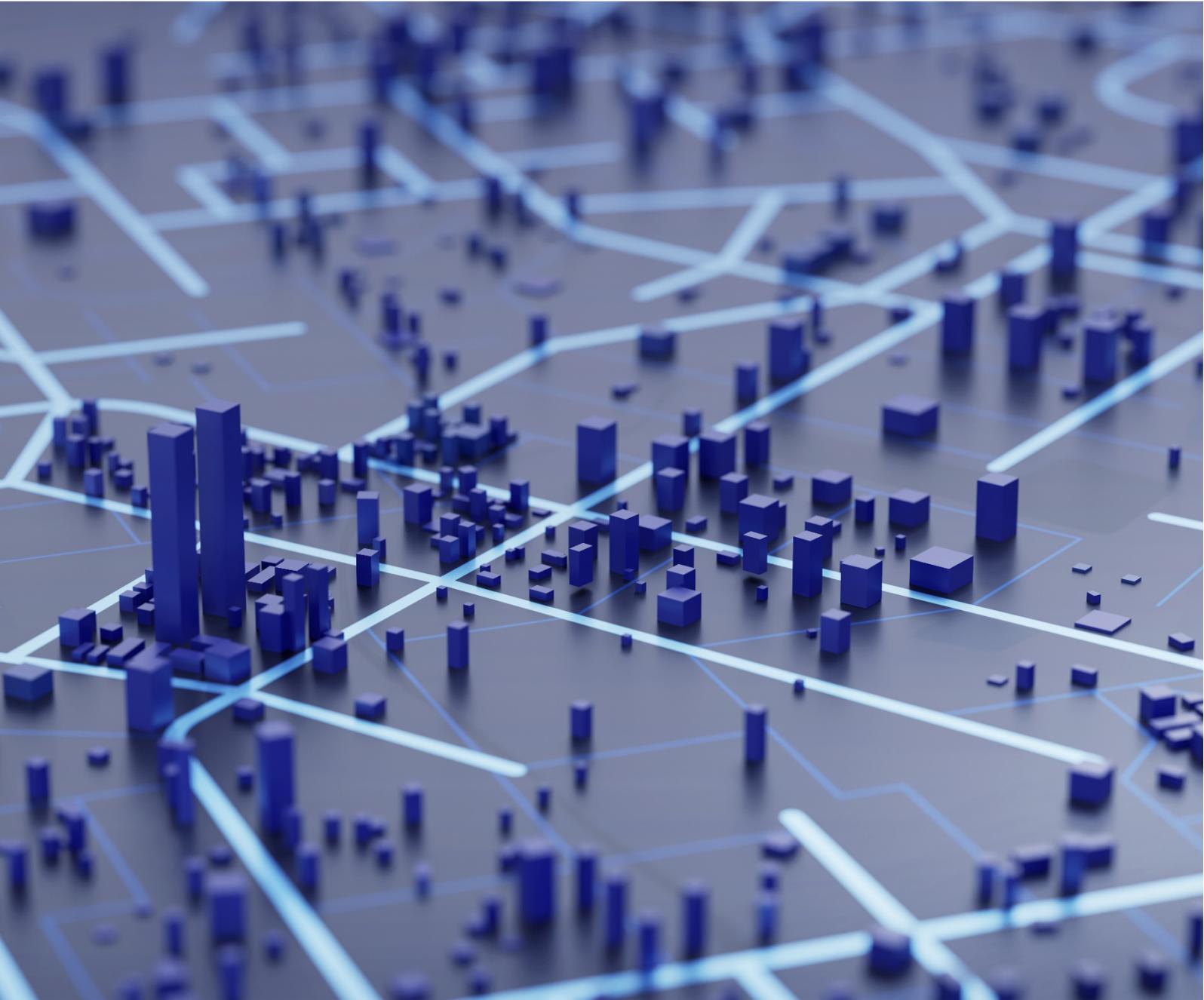## 6.4. A STARTING POINT, NOT AN END POINT

This Research Report, the accompanying Executive Report and the data on which they are based, together create a snapshot — or rather, a set of snapshots – of ADM and AI use in the NSW government departments, agencies and local councils. These snapshots reflect the position as of mid 2023, less than a year after the launch of ChatGPT heightened interest in the deployment of AI across both public and private sectors.

For departments, agencies and local councils, both the process of this research, and our collected Reports may contribute to understanding ADM systems: both their own, and others' practices. We observed some learning through the course of the project, where the process of answering the questions made some entities more conscious about the systems they are operating or considering. We hope that the circulation of these Reports and our results will likely trigger more awareness of other systems we have not captured here. This Report, in other words, is part of a broader, necessary process of building knowledge about ADM systems and their impacts. In this sense, this work builds on earlier work of the NSW Ombudsman through the earlier *New Machinery Report*, and many other activities undertaken within the NSW government and by other research centres and bodies.

Finally, this project is innovative globally, with few such extensive examples elsewhere of mapping of ADM in government. We note our hope that others can learn from our methodology, as well as the specific datasets gathered in this project may be a potential source of further research insights.

We look forward to continuing the conversation.

07. TABLES AND FIGURES

7.1. TABLES

7.2. FIGURES

08. METHODOLOGY AND DATA ANNEXURE

This Annexure sets out the structure of the project: the team, human research ethics, and timeframe. It also sets out methods used to conduct this research in more detail. It is followed by copies of lists and instruments used.

In order to try to map ADM system use across NSW, as comprehensively as possible without compulsorily requiring cooperation from government officials and taking into account the resourcing demands on government agencies to enable good engagement, the team developed a mixed research design using three broad techniques, or methods for gathering empirical data:

- Direct surveys consisting of Survey 1 (an initial survey to collect very basic data on ADM systems used and Survey 2 (a detailed, follow up survey on ADM systems of particular interest reported in Survey 1);
- A review of publicly available material: a systematised keyword search of material published by state government departments and agencies and local governments via a defined list of sources (official websites, annual reports, and procurement data), followed by human review;
- A small set of case studies, conducted via interviews with public servants.

A high-level summary of the methodology is provided in Section 1 of this Research Report. In this Annexure we provide more detail on each of the three methods: the surveys (Survey 1 and Survey 2); the review of publicly available material, and the case studies.

8.1. MEMBERS OF THE RESEARCH TEAM AND RESPONSIBILITY FOR PARTS OF THE REPORT

The project was a cross-institutional, cross-disciplinary project undertaken by researchers from the ARC Centre of Excellence for Automated Decision-Making and Society. Primary overall responsibility for the management and conduct of the project and the authorship of this Report and the accompanying Executive Report lies with Professor Kimberlee Weatherall (University of Sydney) (Chief Investigator), and Dr José-Miguel Bello y Villarino (Senior Research Fellow, University of Sydney), the project Principal Investigator. Dr Bello y Villarino also led the review of publicly available material and analysis of that dataset (Section 3 of this Report). He also prepared case studies for the project, together with Dr Lyndal Sleep (Central Queensland University).

Professor Paul Henman (University of Queensland), is the project's co-Chief Investigator, and project lead for survey and interview design, analysis and reporting (Section 2, and Section 4 of this Report). He worked closely with Dr Jenny van der Arend (Senior Research Assistant, University of Queensland), (survey data collection and liaison).

Associate Professor Rita Matulionyte (Macquarie University) and Dr Scarlet Wilcock (University of Sydney) contributed legal analysis of data from the project (Section 4 of this Report), with contributions and review by Emeritus Professor Terry Carney. Ms Melanie Trezise, Mr David Hua, Ms Isabella Greenhalgh and Mr Jacky Zeng also contributed to research, data collection and data analysis.

8.2. HUMAN RESEARCH ETHICS

Ethics approval and responsibility

Research ethics approval (UQ Ethics #2023/HE000009, approved 3 April 2023) was sought through the University of Queensland, and University of Queensland researchers conducted the survey and communications with initial cluster-level contacts provided by the NSW Ombudsman's Office. Data collection and data analysis has been conducted independently under that human research ethics approval, and responsibility for the data, and analysis presented in this Report lies with the university-based research team.

Voluntary participation

All participation in the project on the part of public servants and government departments, agencies, and local councils has been **voluntary**: no compulsory or investigative powers of the NSW Ombudsman's Office have been invoked. Organisations have had the ability to opt out and, in some cases, have exercised that option. Informed consent was sought from all participants in the research (public servants).

Confidentiality and data management

We have sought to provide for the confidentiality of individual persons and their contact details as a paramount concern. The confidentiality of the interviewees was maintained by not revealing their identity or any identifying details in the reporting of the research, as well as not sharing these details outside the University based research team, including with the Ombudsman or Ombudsman staff. Interviewees were also provided with a draft of the case study before the full report was completed, so they could omit any identifying or compromising information. Similarly we have not shared the identity or personal information of survey participants beyond the university-based research team the organisational staff involved in assisting survey recruitment (beyond the original high-level portfolio and organisational contacts provided by the NSW Ombudsman).

State government departments and agencies have been identified in this Report and the accompanying Executive Report. Not knowing the identity of a government organisational would make it hard to meaningfully interpret data, and some identifying information is inherent in descriptions of ADM systems (e.g. organisational identity can be inferred from describing a system as one for 'managing fishing licences' or 'issuing automated emergency warnings'). Information provided to participants in state government departments and agencies advised that their organisational identity would be reported. Given

local councils have greater homogeneity in their scope of activities and may be reluctant to participate, in reporting survey data the names of local councils have been kept confidential and reported only by regional category. Results from our review of publicly available material are identified, because this analysis is based on information already made public by organisations themselves.

Data management was described and approved via the research ethics process. It was managed primarily through a segmented password-protected, dual-authenticated SharePoint project folder managed by the University of Sydney. The SharePoint project included a folder where all the research team and collaborating NSW Ombudsman staff could access, while data requiring confidentiality were saved in a separate folder only accessible by members of the university research teams. Survey data was collected via the Qualtrics platform at the University of Queensland and various survey data files were downloaded and stored locally on a University of Queensland password-protected share folder for University of Queensland-based researchers for data cleaning and digestion prior to uploading onto the project SharePoint account.

The Survey 1 and 2 datasets (local councils and individual respondents de-identified) and the dataset from the review of publicly available material will be held by the NSW Ombudsman's Office at the conclusion of the project.

8.3. FUNDING AND SUPPORT

The mapping project received the support from the NSW State Government Secretaries Board and the Office of Local Government. The project commenced in January 2023 and was conducted under a research agreement between the Ombudsman and a consortium of universities led by the University of Sydney (led by Professor Kimberlee Weatherall) and the University of Queensland (led by Professor Paul Henman), with all researchers involved being members of the ARC Centre of Excellence on Automated Decision-Making and Society. The project has been funded by the NSW Ombudsman's Office, which has also supported this research via its staff members, Ms Christie Allan and Ms Katherine Whitworth, with assistance from Mr Chris Clayton. The NSW Ombudsman's Office sought throughout the project to raise awareness about (and support for) the project with correspondence sent to all State Government Secretaries and to local government General Managers by the Deputy Secretary of the Office of Local Government (OLG). The NSW Ombudsman's Office initially facilitated contacts across government for the initial stages of the research and provided feedback on research design and documents, including survey instruments and information sheets.

8.4. TIME FRAME

The project commenced in January 2023. The core data collection period (survey period) commenced on 11 May 2023, and concluded on 15 September 2023 (noting that we investigated systems currently in use, used within the last three years, or planned for the next three years). Interviews for the case studies were conducted in August and September 2023.

8.5. SURVEY 1 METHODOLOGY

Survey 1 design

The purpose of Survey 1 was to identify ADM systems in use, planned, or recently used; to obtain a brief description, categorise systems by operational purpose and type of technology, and to identify a contact officer for potential follow up (including via Survey 2). It consisted of eight questions, with a space provided for free text responses at the end of the survey to enable respondents to flag any issues not addressed by the closed structure of questions elsewhere. A copy of the survey instrument is included in the Appendix. The survey was designed by the research team, provided to an expert Advisory Group for feedback, amended and then tested by two NSW state government agencies of different size and work focus for comprehensibility and useability.

After questions asking the respondent to identify their organisation, Survey 1 asked respondents to:

1. Name ADM systems currently used, in development, in pilot, discontinued within the previous 3 years or planned within the next three years;
2. Give a brief free text description of each ADM system named;
3. Identify the organisational purpose or purposes of the ADM system;
4. Identify the technology or technologies used in the ADM system;
5. Provide a contact name/contact details for a follow up Survey 2 for each ADM system.

ADM systems within and outside scope

There, no single clear, widely-accepted definition of ADM, or 'system'.

As set out in Section 1.3, the scope of the study extends to fully and partially automated systems (including, but not limited to AI), where used by NSW government organisations (state and local government) in the course of government decisions and conduct that affect members of the NSW public.

This is a broad scope. While a narrower study scope (say, to the use of AI systems, or fully-automated systems) would have made the study easier, it would also have undermined a key goal of the project, which was to map automated decision-making that affects the NSW public, whether or not more advanced technologies such as AI are used.

Ensuring a common understanding of the scope of the phenomenon was an ongoing challenge during the project. The research team sought to manage this challenge by:

- providing guidance material as described below
- explicitly encouraging survey respondents to err on the side of including systems in their response (to leave decisions about inclusion or non-inclusion in any final mapping to the research team), and

- having conversations with survey respondents during the study period to help them decide which systems to include.

Survey 1 asked NSW government departments and agencies, and local councils, to identify their ADM systems. Rather than offering a strict *definition* of ADM systems, the survey instrument and participant information sheet described broadly what the research team was interested in examining as follows:

> We are seeking to map ADM systems that automate, whether fully, partially or as part of a bigger decision-making process, the exercise of government functions, and in doing so impact individuals or private entities. We are also interested in systems that members of the public interact with in relation to government activities. We are interested in both in systems that use artificial intelligence/machine learning, and those which use traditional forms of computer programming.

To provide additional guidance, we additionally provided a table of the kinds of systems that would be considered within, and outside scope. The full Participation Information Sheet including the table is the Appendix. Survey 1 also asked respondents for a brief text description of the system, so that the research team could exclude systems considered to be outside scope from further study.

Members of the research team had follow-up communications with public servants, in which further help was provided via *heuristics* or rules of thumb to guide questions of inclusion or exclusion. As the project was focused on the implications of ADM systems to the public, internal systems only focused on international operational systems (such as Human Resource systems) were excluded. To reduce the inevitable 'shades of grey' in such a description, public servants were given the heuristic applied by the research team: of considering whether such systems are likely to have publicly felt effects, and to include if they did. For example, a traffic monitoring system that enable transport authorities to intervene to enhance traffic flows might be included.

Automated data collection systems of themselves were also not considered as ADM systems, while recognising that they could be part of a larger ADM system. For example, vehicle registration identity systems were seen as important to include when used in combination with actions for speeding or parking fines.

The project team also decided to exclude **digital clinical and health diagnostic systems** in the health sector for several reasons. First, the health sector is massive, and clinical practice diverse, and we did not want to overload potential respondent agencies and health professionals. Second, medical and clinical practice have quite separate regulatory and oversight processes compared to the work of the NSW Office of the Ombudsman. The NSW Health portfolio have reported they have undertaken their own internal process: see section 5.7 above.

A further heuristic involved the **level of complexity** of automation. Some forms of automation involve basic calculations, for example, translating a manual checklist into a digital checklist, or data matching to pre-fill forms. To reduce the broad scope, simple automation was not regarded as a basis for inclusion in

the study. However, it was important to include simple automation when the impacts on people/residents was likely to be direct and significant, such as the calculation of social housing rents or local council rates.

Given the breadth and depth of automation, clarity around the level of reporting ADM systems was also sought from some areas. For example, we were asked: 'What level do we go to i.e. do we call out tools, platforms or ecosystems?' We advised that the level of granularity would depend on the number of ADM systems they might need to report; if they had many, then report at a higher system level.

Organisational purpose

For the purposes of this project, we derived our classification of **organisational purposes** from previous work on use of AI in USA Federal Agencies,[164] modified slightly to reflect the scope of this study. Survey respondents were asked to nominate one or more of a set of purposes, set out above.[165]

Technology type

In developing a classification of the technologies or tools used within an ADM system, we considered prior mapping work of the ADM+S that focused on ADM function[166] and the OECD's *Framework for the Classification of AI Systems* system tasks.[167] The final classifications draw on unpublished ADM+S Centre research on ADM taxonomy, workshopped with the project team and advisory board. A single ADM system may use more than one type of technology/tool;[168] survey respondents could nominate more than one from a list. The list is set out above.[169]

Survey 1 delivery

The NSW Ombudsman communicated about the aims of the research to each sector broadly in the first instance – with correspondence being sent to all Secretaries and the Commissioner of the NSW Police Force, and to all local governments via a letter from the Office of Local Government to all council General Managers, to raise awareness of the project. The research team then began contacting agencies directly to invite participation. As is usual with research of this kind, a range of follow-ups and reminders were

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[164] Engstrom et al. (n 52).

[165] See above at 23.

[166] Sleep, Coco and Henman (n 49).

[167] OECD, *OECD Framework for the Classification of AI systems*, (OECD Digital Economy Papers, No. 323, OECD Publishing, Paris, 2022) pp 50-51. These are listed as: recognition, event detection, forecasting, personalisation, interaction support, goal-driven optimisation, reasoning with knowledge structures, and other.

[168] For example, a chatbot will have NLP and search tools, and may also include voice recognition.

[169] See above at 27.

sent during the period the survey was live. The survey instrument was live for a period of 4 months in May – September 2023.

The survey instrument was accessible via the Qualtrics platform, with all agencies being provided with at least one survey link in which they could record up to 10 ADM systems. NSW state government departments were provided with five survey links each, to enable the survey to be completed at a Divisional/or Unit level versus centrally if this was considered more practical. Agencies who had more than 10 ADM systems to record in a survey were encouraged to contact the survey team for additional survey links as required, and these were created and sent. Links that were not opened within 60 days expired.

State government

Initial contact with state government organisations occurred at the portfolio level. The NSW Ombudsman, through portfolio Secretaries, sought a contact point for the portfolio. The research team emailed these contacts, inviting them to participate in the project and outlining several options for completing the surveys (to accommodate different governance arrangements across different portfolios). Methods for distributing the survey included:

1. The portfolio contact forwarded individualised survey links to each organisation within the portfolio, and advised that they contact the research team directly for support to complete the survey, or
2. The portfolio contact provided the research team with contact email addresses for organisations within their portfolio, so that the research team could distribute the survey directly to them, or
3. The portfolio contact co-ordinated the completion of a consolidated survey response across organisations in the portfolio, contacting the research team for support as required.

The research team was in regular contact with portfolio contacts and agencies, via email, telephone and online meetings to provide support and assistance.

We acknowledge that across all levels of government there was commitment to supporting the project. It is important to note, nevertheless, that there are reasons that surveys may not have been completed within the project timeframe for legitimate reasons:

1. We may not have reached the right people: the project timeframe included changes in personnel; an election; the end of a financial year; and restructuring of parts of the state government (including a move from 'clusters' to 'portfolios'). Given the breadth of the topic, and

different allocations of responsibility in different organisations, there were challenges in identifying the person or persons best placed to complete the survey.[170]

2. Public servants have other priorities.
3. Some portfolios took some time to understand the purposes and scope of the study: reflecting broader societal-level uncertainty over distinctions between automation, and AI.
4. Some portfolios/agencies are much further along in their digital transformation journey, meaning that the survey was more time consuming than anticipated. The research team worked with survey respondents to consider how ADMs could be reported in the most efficient way.

Local government

The Office of Local Government wrote to inform local council general managers of the project. This correspondence was followed by an email invitation from the research team, addressed to the General Manager, and sent to the publicly available, central email address for each local council: the expectation being that the General Manager was best placed to identify and forward the survey to the right person. Follow up emails were sent, and telephone calls to every local council to ensure that the survey had reached the General Manager and/or those with capacity to respond, given the risk that emails might be lost amidst other correspondence received by councils.

Data coverage and response rate

The research team took extensive steps undertaken to follow up, accommodate government arrangements, and encourage participation. There are nevertheless gaps in the data. In summary, the analysis presented in this Report only captures what was able to be reported to the research team in the available timeframe.

Gaps in the data, or the absence of some systems that readers may know about, should not be assumed to indicate unwillingness on the part of the relevant department to be transparent or to support the research project. Practical obstacles get in the way of the best designed, and most supported research. Importantly, lower levels of participation by some portfolios cannot be assumed to reflect the level of commitment to participate in the study.

The indirect application of the survey instrument involving the distribution of multiple survey links, together with the variety of approaches adopted by each administering agency, means that a survey response rate cannot be accurately calculated amongst state government agencies. For example, a response from a department does not necessarily mean that all relevant parts of that department have reported systems. Moreover, some organisations made decisions on what ADM systems to prioritise

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[170] On the importance of a clearly defined survey population, see Meng-Jia Wu, Kelly Zhao and Francisca Fils-Aime (n 32)

reporting according to their resourcing constraints. There are also differences in the granularity of ADM systems reported, with some single ADM systems being quite expansive with many parts that could be also considered as multiple ADM systems, while other ADM systems are quite specific and narrowly defined.

Data preparation and cleaning

In order to prepare data for analysis and reporting, a process of data cleaning was necessary. In particular, given that state government departments and large agencies received multiple survey links, it was necessary to not double count systems. In addition, 16 responses were deleted due to null responses from an organisation returning other surveys reporting ADM systems, one survey due to duplicate responses, and one removed because it was a 'no ADM system' response from a department that also reported in a different survey that they had ADM systems. One response from a council was also removed as they provided no information beyond the consent question.

The full dataset (with local councils de-identified) was provided to the NSW Ombudsman's Office.

8.6. SURVEY 2 METHODOLOGY

Survey 2 was designed as a system-specific follow-up: to give insight – at a system level – into a range of potential issues identified in ADM systems from the literature as well as the list of ADM system properties listed in the NSW Ombudsman's *New Machinery Report*.[171]

ADM system selection

Survey 2 was distributed selectively. Not all ADM systems reported in Survey 1 fell within the focus of the project in providing insights about designing and deploying effective and accountable ADM systems that impact on NSW residents. In addition, the research team had to consider feasibility: Survey 2 was long and detailed, it was therefore necessary to limit the number any single organisation or contact person was asked to complete.[172]

The following general selection criteria were used for Survey 2 selection:

- Include systems piloted or in use (excluding those in planning). Some exceptions were considered for systems that could have broad repercussions;
- Include systems that are part of a legally binding administrative decision-making process;

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[171] *New Machinery Report* (n 23), 78–79.

[172] For example, one contact person had 6 ADM systems shortlisted for Survey 2, in which case, Survey 2 was not sent for all systems.

- Include systems that have a potential impact on people in NSW, in particular where there is involvement of, or repercussion for more vulnerable groups;
- Include systems that had high levels of automation;
- Include systems that cannot be avoided;
- Include systems where the automation is not visible to the citizen (e.g., automated triage of emails) and exclude those that are mere guidance visible to the citizen (e.g., guidance through questions on a website);
- Include chatbots given their importance in customer-facing interaction, even though they are unlikely to be involved in decision-making.

Survey 2 was distributed via the Qualtrics platform to the contacts associated with each system, obtained via Survey 1. Survey 2 was sent out in waves, as Survey 1 responses were received and analysed for relevance. As with Survey 1, support (via email, phone calls and meetings) was provided by the research team to assist with Survey 2 completion. The surveys were delivered and completed over the period July–September 2023.

Survey 2 design

The survey was designed by the research team, consultation with the Advisory Group for the project was undertaken to tailor questions to the NSW State Government/Local Government context, and to ensure that they survey instrument addressed areas for exploration without becoming too unwieldy for respondents. The survey was piloted for several ADM systems with minor changes prior to the wider circulation of the survey.

As noted above, Survey 2 was designed to investigate range of potential issues identified in ADM systems from the literature and the *New Machinery Report*. For example, the first question asked by the in that report is whether an ADM system is *visible*. To assess the extent to which an ADM system is visible, the following three questions were included in Survey 2:

- Is there a generalised public statement that the ADM system is in use?
- What information about how the ADM system works and how it is used is publicly available?
- Are those subject to the administrative decisions advised that automation is/may be involved in their case?

The survey instrument and a table mapping the ways in which survey questions were designed to reflect existing frameworks for understanding ADM systems and/or to inform a better understanding of the potential risks (and strategies for risk management) associated with ADM systems is provided in the Appendix.

8.7. METHODOLOGY FOR REVIEW OF PUBLICLY AVAILABLE MATERIAL

Purpose

The review of publicly available material was initially designed as a triangulation through sampling for augmentation and quality assurance of the data collected through the surveys.[173] With the agreement of the NSW Ombudsman's Office, the search process was expanded, with the goal of making it comprehensive (with respect to a limited set of source types), and enhancing the data collected.

The purpose of this expanded review was to identify potential ADM systems in NSW state government departments and agencies, and local governments reported in publicly available, official sources, in a methodologically sound manner. It was intended instead to complement, rather than replace the survey process by:

1. supplementing survey results in the case of missing information (from partial or incomplete/unsubmitted questionnaires); and
2. providing some indicators of both the prevalence, and public description of ADM and related technologies in each department.

Approach

The research team conducted systematised searches across department/agency/local government websites, according to a list provided through the NSW Ombudsman's Office, supplemented from formal registries (e.g., procurement databases). A keyword search was conducted, followed by human review, between May and July 2023. Initial searches were completed iteratively by two or more people, to assess possible differences in the results, especially at the level of relevance. The observations derived from this initial testing were used to refine the methodology. For example, we initially sought to characterise ADM systems according to their relevance into four categories: 'high', 'moderate', 'low' or 'nil'. We experienced difficulty in ensuring consistency between the assessment of 'high' and 'moderate' relevance among different researchers. We therefore simplified the categorisation into three categories: 'high', 'low' and 'nil'. Revisions of the dataset and addition of information (dates, technologies used, purposes, etc.) for the systems previously identified were conducted by staff from the NSW Ombudsman's Office and researchers between July and December 2023.

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[173] As Nielsen notes, 'the term "triangulation" is often used to describe deployment of multiple methods': Laura Beth Nielsen, 'The Need for Multi-Method Approaches in Empirical Legal Research', *The Oxford Handbook of Empirical Legal Research* (2010) 952.

Sources

The sources set out in Table 14 were the subject of initial searches. Of these, **agency websites and procurement records** generated the most relevant results for the purposes of the project. The list of relevant, official government websites was provided by the Department of Costumer Services and the Office of Local Government.[174]

Table 14: Sources considered for review of publicly available material with comments

Source category	Sources	Comments
Third party sources	1A: Third party agency reports (external evaluations/reviews/determinations by other agencies e.g., Ombudsman, department portfolio level reports, IPC, NCAT decisions)	Very few results; not used
	1B: NSW Parliament Hansard	Results were too vague to be useful
	1C: Vendor websites	Inconsistent in information provided; used in case studies only, links noted when relevant for potential systems identified through other means
	1D: Applicable legislation (NSW legislation database)	Potentially relevant results were too anecdotal, discarded
Agency compliance documentation	2A: Policy (issued by agency)	Not easily accessible, discarded
	2B: Strategic planning (issued by agency)	Duplicated other information
	2C: Corporate reporting (annual and other periodic reports issued by agency)	Useful and included
	2D: Delegations register (issued by agency)	Irrelevant; there is no formal delegation to machines in NSW with statutory basis
	3A: Google media (media and another public announcements/reportage via	Very limited information; not used

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[174] Note that government restructuring and departmental and agency decisions have impacted the replicability of this dataset. Some webpages visited are no longer available.

Media and customer information	Google, not limited to 'news' results) **(limited to low-hit agencies only)**	
	3B: Agency website media (and related information)	Useful and used
	3C: Specialist media (e.g. Gov Tech Review, ACS publications)	Inconsistent in information provided; used in case studies only
Procurement resources	4A: TenderNSW	Useful and used
	4B: GIPA Act contracts register (agency-level GIPA Act contracts disclosure list)	Very limited information; not used

Search terms and parameters

Search terms are noted in the main body of the report, above Section 3.1. More detailed information is available from the research team with notes about the limitations of the search terms and others considered.

Dataset created

The review of publicly available material created a dataset of all instances of possible ADM system use, found via the keyword searches of the relevant source websites, together with information about both the search, and the instance as found by the (human) member of the research team. The database includes the following descriptive fields relating to each possible instance of ADM use:

- Source category (eg agency website; procurement data)
- Agency portfolio and name
- Brief search comments (e.g. zero hits, results via inurl)
- ADM system title (or approximation if unknown)
- Brief ADM system function
- Source (hyperlink)
- Third parties (if known, such as vendor or other entity involved, commonly universities or research centres)
- Potential relevance priority (with rationale)

The data provides historical and longitudinal data about automation (e.g. multiple past annual reports) that was online at the time of the search, and not just a picture of the current state of play of automation in NSW state and local government organisations.

In relation to **state government departments and agencies,** further information was later added, to assist in making the judgments about relevance more reliable:

- Type of publication in which the possible ADM system use is noted (e.g., agency annual report, agency media release)
- Potential use case, reassessing the initial judgement of potential relevance of the instance
- Time of deployment, in two fields:
  - One that refers to the possible use of a system in relation to the date of the document, which allows for an assessment of past, present or future use
  - Year of deployment and decommission date when that information appears

Also in relation to **state government departments and agencies,** we attempted to record similar data to that collected in Survey 1 and Survey 2:

- Technology used;
- Operational purpose of the apparent use (e.g., performance of statutory functions, human resources related pay and entitlements, approvals, etc.);
- Purposes of apparent use, which included, for example, enforcement, compliance, or community health and safety; and
- Populations distinctly affected.

This third attempt at acquiring richer data, similar to the information gathered through the surveys, showed the limitations of this approach when compared to the surveys. In many cases, information on these last set of parameters was simply not available.

The data collected was handed to the NSW Ombudsman's Office. We understand that that data has since been updated.

Testing the disparity between survey results and publicly available data within an agency

As noted in this Report, there is very limited coherence between the data collected through Survey 1 and the data found in the publicly available material. Only between 12 and 18% of the ADM systems reported in Survey 1 could be matched to possible instances of ADM system in the publicly available data. There is some uncertainty in this number because whether something is a match is not always clear. For example, systems described as performing similar functions, within the same agency, but with different names could be consider a match, but not with absolute confidence.

If the reasons for the mismatch were simply 'underreporting' we would have expected to see all our Survey 1 systems in the publicly available data – and then more. The fact that we did not see that suggests that other factors are at play.

The research team took the view that taking the publicly available data back to every government department, agency and local government and asking them to check their data would have been

unreasonable: both as an imposition on government capacity and the delay it would have imposed on reporting the results of this project.

Instead, to better understand the disparity, we undertook data analyses described in Section 3 above. We also offered information about potentially 'high' relevance systems in the dataset of publicly available materials to the Chief Information Officers (CIOs) of all portfolios at the state level through the ICT & Digital Leadership Group (IDLG), requesting their cooperation to assess the actual existence of an ADM system linked to the instances of possible uses of ADM systems identified from the publicly available data.

We undertook such an assessment with the Education portfolio, which considered the nine high relevance possible instances within that portfolio. Their response was very useful, but did not explain the disparity. The response considered each of the nine instances as not related to a 'real' ADM system. However the reasons provided suggested a different interpretation of what an ADM is.

For example, the Education portfolio response did not consider an instance described in our dataset as 'automation of some administration functions: absence reporting, data transfer, language translation for parents', as an ADM system because 'The automation here is more aligned towards usage of API and other approaches to transfer the data removing the manual intervention. This allows staff to focus on students and school but also provide them with relevant reports to review.' This could count as an ADM under our definition which extends to partial automation contributing to decision-making.

8.8. CASE STUDY AND INTERVIEW METHODOLOGY

The case study analysis aimed to describe ADM systems being used or in development by NSW state government departments and agencies and local councils. Case studies are ideal when the study involves contextually embed entities.[175] A case study research design was used because ADM systems are difficult to separate from their administrative, social and technical contexts.[176] A case study typically uses multiple methods of data collection, as it involves an in-depth study of a phenomenon.[177] In this project, interviews and document analysis were used. A descriptive multi-case study approach was undertaken, since the aim of the study was to 'describe' ADM systems in detail in their real-world context.[178] More than one ADM system was investigated because describing different types of systems, as well as different approaches to implementing them in administrative context, was an important aim of the study.

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[175] Robert K. Yin, *Case study research: Design and methods*, (Thousand Oaks, CA: Sage, 2009).

[176] Sleep, Coco and Henman (n 49).

[177] Yin (2009) 69-71. Case study research is not a method in itself but a research strategy or design: Trista Hollweck, 'Yin. R. K. (2014). Case Study Research Design and Methods' (2016) *Canadian Journal of Program Evaluation*, 30(1), 108-110.

[178] Ibid: Hollweck, 108-110.

Case study research design

The unit of analysis for four of the six studies was a single ADM system. This includes the administrative systems in which the ADM is situated, and legislation and policy that guides it. Case study 5 were concerned with a set of types of ADM system as deployed in local governments. The case studies section includes an insight into the mapping exercise in NSW Health.

Case study selection

Case studies were selected by the research team, in consultation with the Ombudsman and research reference group. A list of case study types that they were interested in investigating was compiled, based on key types of systems of interest and the terms of reference from the NSW Ombudsman. These were:

- a good example of ADM design/implementation
- a very challenging use for ADM
- a local council specific ADM
- an ADM used across different entities
- an ADM where problems were identified once implemented
- a machine-learning based ADM (evolving over time)
- a policy-assisting ADM
- an ADM with direct and immediate impact on individuals
- if identified, use (formal or informal) of generative AI.

Guided by this list, the research team conducted a number of meetings where each ADM system identified in Survey 1 was considered, and nominated for inclusion or exclusion with a reason. This process reduced the list of possible case studies, and also refined the inclusion and exclusion criteria. A shortlist of possible case studies was compiled and reviewed by the NSW Ombudsman. Potentially sensitive cases were excluded. Fifteen systems were identified for potential inclusion in the study. Twelve of these were from state organisations, and 3 were from local government. Nine were ADM systems that were in use at the time the study was conducted, 8 were in development, 4 were being piloted and it was unclear whether 2 systems were in development or deployment. The inclusion and exclusion criteria for case studies are recorded in Table 15. The list of systems identified as potential case studies has not been included for confidentiality reasons.

Table 15: Inclusion and exclusion criteria for case studies

Inclusion criteria	Exclusion criteria
Is a distinct ADM according to project definition	Not an ADM according to the project definition
Has a public interest dimension	Is of little or no public interest

Is identified by Survey 1 or structured review of publicly available material	Not identified in Survey 1 or the structured review of publicly available material
Relates to one of the key types of systems identified as of interest to the study	Does not relate to a key type of system that is of interest to the study
Is in use or piloted, or in advanced development and particularly interesting for other reasons	Identified as planned in the next 3 years or (generally) in development
Not excluded by the NSW Ombudsman	NSW Ombudsman's Office staff suggested excluding as a case study.

Out of the 15 systems identified for possible inclusion in the study, interviewees were successfully recruited for 6 of them. Two case studies from local government are presented together as there are significant connections among them.

Data collection

The primary data collection method was interviews with key public service experts on each system, supplemented with some analysis of publicly available material.

Semi-structured interviews

Semi-structured interviews were conducted with senior public servants who had been involved in the development, governance, implementation, and use of the selected ADM systems. Interviewees were from legal, policy, IT/systems, and frontline management departments. The interviews were semi-structured as this approach provided the combination of targeted interview questions with flexibility to craft new questions which could applied to different roles and institutional contexts, as well as to accommodate unexpected information needed to gain the deep qualitative insights needed to inform the case study analysis.

The interviews were approximately 1 hour in duration, and were conducted online, recorded and auto transcribed using Teams or OtterAI.

Sampling

The selection of case studies is described above. For the interviews themselves, a purposive sampling technique was employed,[179] where participants with specialised knowledge of each system were identified and invited to participant. We aimed to recruit people from a group of Chief Information Officers (CIO), and others who have expertise in the ADM systems that been selected for further investigation. The primary

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[179] Earl R. Babbie, *The practice of social research*, (Cengage learning, 2020).

form of identification of participants for invitation was Survey 1, where key participants in the survey responses to each system were emailed to participate. Other participants were identified through searches of governmental web sites, professional networks of the research team, and contacts obtained through earlier stages in the research. Participants were also asked to identify colleagues who may be interested to take part in the study, in a snowballing sampling approach.

Participants were invited to interview via email. A Participant Information Sheet (see Appendix) was provided to all participants to provide further information about the study. Informed consent was provided by participants (see Appendix for Informed Consent Form). A total of 22 potential interviewees covering 15 potential case studies were invited to participate in the study. Eleven interviewees agreed to participate, covering 6 case studies with 1 to 4 interviewees per case study. Interviews were conducted over a 5 week period, beginning 22 August 2023 with the final interview conducted on Monday 25 September 2023.

Interview questions

The interview questions are provided in the Appendix. The questions were shaped by the conceptual framework of the project and refined with an aim to supplement the survey results, and achieve a more in-depth understanding of the ADM system, including its genesis, purpose, operation, legal and governance settings, and technical arrangements. There was also a focus on exploring a participant's experience, to understand the key risks and issues relating to good administrative conduct and administrative law that are associated with different kinds and contexts of ADM use.

Analysis

The interview transcripts were coded according to thematic categories derived from the key aims of the study, in consultation with the research team and Ombudsman. These themes included:

- creation of the system, testing and accommodation for unusual cases
- technology and human interaction
- efficiency and other gains
- data transfer with other jurisdictions
- impact of citizens and legal questions

This information was then combined with the survey data and other available literature to draft case studies of the selected ADM systems. Once a case study was drafted, it was emailed to the interviewees who were given the opportunity to review and provide corrections, ensuring the accuracy of the analysis.

09. APPENDIX: FURTHER INFORMATION: RELEVANT ORGANISATIONS AND RESEARCH INSTRUMENTS

9.1. LISTS OF NSW GOVERNMENT ORGANISATIONS WITHIN AND OUTSIDE SCOPE

State government organisations included and excluded

The target population for Survey 1 constituted 206 NSW government departments and agencies, and all 128 NSW local government councils, as listed below. Although the total number of entities in the NSW government is higher, those 206 departments and agencies were considered, following the suggestion of the NSW Ombudsman, to cover the overwhelming majority of entities relevant for the work of Government as a public entity. Table 16 below lists state government organisations included in the scope of Survey 1. The list (current on 8 February 2023) was compiled from the following sources:

- NSW Government Directory;[180]
- Financial Audit: State Finances 2021 Report;[181] and
- Report on the state finances 2021-2022.[182]

An important note: subsequent to this research, as the NSW Ombudsman's Office has undertaken further consultations with departments to update and expand the list of ADM systems, it has become apparent that some organisations are not correctly categorised or named in Table 16. For the purposes of being transparent about the research, and for context for the results we report, we have retained and here report the list we used.

'Organisations' includes departments, agencies, units and independent agencies identified from the above sources (noting that in some instances surveys were distributed to discrete operating units within larger organisations).

In April 2023, during the project and after surveys were sent out, the NSW Government made some minor adjustments to portfolio groupings and naming. Survey findings are reported in cluster groupings as they stood as of February 2023: that is, no attempt has been made to regroup agencies or re-analyse the data. Any differences are likely to have been at the margins. As noted in the Report, however, we have used the

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[180] NSW Government Directory, *Service NSW* (Webpage).

[181] Audit Office, 'Financial Audit: State Finances 2021' (Report, February 2022) pp 82–86.

[182] NSW Treasury, 'Report on the state finances 2021-2022' (Report, 2022) pp 198–202.

new nomenclature (of portfolios, and portfolio names) through this Report, as being language that is more meaningful to readers.

Organisations marked with an asterisk (*) in Table 16 below have been identified subsequent to the research as involving an error (incorrect category, name, or did not exist as at February 2023).

Table 16: State government organisations within scope, by portfolio

Communities & Justice Portfolio	Customer Service Portfolio
NSW Department of Communities and Justice	NSW Department of Customer Service
NSW Police Force	Service NSW
Crown Solicitors Office	Independent Pricing and Regulatory Tribunal
Fire and Rescue NSW	Independent Review Office
Multicultural NSW	Subsidence Advisory NSW
NSW Reconstruction Authority	Information and Privacy Commission NSW
Rural Fire Service NSW	Personal Injury Commission
State Emergency Service	Small Business Commissioner
Office of the Children's Guardian	NSW Fair Trading
Office of the Director of Public Prosecutions	Revenue NSW
Legal Aid NSW	State Insurance Regulatory Authority
Registrar of Community Housing	NSW Telco Authority
State Parole Authority	NSW Architects Registration Board
NSW Ageing and Disability Commission	Board of Surveying and Spatial Information
NSW Crime Commission	Geographical Names Board of NSW
NSW Judicial Commission	Hardship Review Board
NSW Law Reform Commission	Rental Bonds Board
Office of the Legal Services Commissioner	Long Service Corporation
Crime Prevention Programs	Office of the Professional Standards Councils
NSW Civil and Administrative Tribunal	Office of the Registrar General
Office of the Sherriff	SafeWork NSW
DCJ Community Services Centres*	Surveyor General of NSW
DCJ Housing	Registry of Births Deaths and Marriages
Dust Diseases Tribunal	
Family and Community Services*	
Volunteering NSW	
NSW Trustee and Guardian	

Public Guardian	
Office for Veterans Affairs	
Anti-Discrimination NSW	
Advocate for Children and Young People	
Corrective Services NSW	
Youth Justice NSW	
NSW Sentencing Council	
Victims Services	
Legal Profession Admission Board of NSW	
Education Portfolio	**Enterprise, Investment & Trade Portfolio**
NSW Department of Education	NSW Department of Enterprise, Investment and Trade
NSW Education Standards Authority	Destination NSW
TAFE Commission Board	NSW Institute of Sport
Early Childhood Education and Care Directorate	NSW Office of Sport
TAFE NSW	State Archives and Records Authority
NSW Board of Vocational Education and Training	Sydney Opera House Trust
	Venues NSW
	Western Parkland City Authority
	Create NSW
	Investment NSW
	Office of the Greyhound Welfare and Integrity Commission
	Library Council of NSW
	Art Gallery of NSW
	Australian Museum
	Museum of Applied Arts and Science (Powerhouse Museum)
	Marine Estate Management Authority
	Independent Liquor and Gaming Authority[183]
	NSW Independent Casino Commission
Health Portfolio	**Planning & Environment Portfolio[184]**
NSW Ministry of Health	NSW Department of Planning and Environment
	Environment Protection Authority

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[183] Should be 'NSW Independent Liquor and Gaming Authority'.

[184] Should also include: Western Parkland City Authority; Natural Resources Access Regulator

Aboriginal and Torres Strait Islander Health Practice Council of NSW

Chinese Medicine Council of NSW

Chiropractic Council of NSW

Dental Council of NSW

Medical Council of NSW

Medical Radiation Practice Council of NSW

Nursing and Midwifery Council of NSW

Occupational Therapy Council of NSW

Optometry Council of NSW

Osteopathy Council of NSW

Pharmacy Council of NSW

Physiotherapy Council of NSW

Psychology Council of NSW

Cancer Institute NSW

Clinical Excellence Commission

Health Care Complaints Commission

Mental Health Commission of NSW

Health Professionals Councils Authority

Ambulance Service of NSW

Bureau of Health Information

eHealth NSW

Garvan Institute of Medical Research

Health Education and Training Institute NSW

Health Infrastructure

HealthShare NSW

NSW Agency for Clinical Innovation

NSW Health Pathology

Illawarra Shoalhaven Community Health Centres

Nepean Blue Mountains, Community Health Facilities

Northern NSW LHD, Community Health

Central Coast Local Health District

Child Health Networks

Far West Local Health District

Independent Planning Commission

Aboriginal Housing Office (Parramatta Head Office)

Heritage Council of NSW

National Parks and Wildlife Advisory Council

Central Coast Regional Development Corporation

Crown Land

Housing Services (Teacher Housing Authority and Police Force Housing)

NSW Land and Housing Corporation

Office of Local Government

Local Government Boundaries Commission

Local Government Grants Commission

Lord Howe Island Board

National Parks and Wildlife Service

Place Management NSW

Property and Development NSW

Sydney Olympic Park Authority

Office of the Valuer General

Water Infrastructure NSW

NSW Environmental Trust

Taronga Conservation Society Australia (Taronga Zoo)

Centennial Park and Moore Park Trust

Jenolan Caves Reserve Trust

Parramatta Park Trust

Western Sydney Parklands Trust

Sydney Water Corporation

WaterNSW

Hunter and Central Coast Development Corporation

Manly Hydraulics Laboratory

Waste Assets Management Corporation

Natural Resources Commission

NSW Threatened Species Scientific Committee

Regional Growth NSW Development Corporation

Office of Strategic Lands

Hunter New England Local Health District

Illawarra Shoalhaven Local Health District

Justice Health and Forensic Mental Health Network

Mid North Coast Local Health District

Murrumbidgee Local Health District

Nepean Blue Mountains Local Health District

Northern NSW Local Health District

Northern Sydney Local Health District

South Eastern Sydney Local Health District

Southern NSW Local Health District

St Vincent's Health Network

Sydney Local Health District

The Sydney Children's Hospitals Network

Western Sydney Local Health District

UrbanGrowth NSW

Essential Energy

Hunter Water Corporation

Landcom

Premier & Cabinet Portfolio

NSW Department of Premier & Cabinet (incl. Aboriginal Affairs; ORALRA; Women NSW; Industrial Relations)

Parliamentary Counsel's Office

Public Service Commission

Local Government Renumeration Tribunal

Office of the Inspector of the Law Enforcement Conduct Commission

NSW Aboriginal Land Council

Office of the Inspector of the Independent Commission Against Corruption

IPART NSW*

Regional NSW Portfolio

Department of Regional NSW

Local Land Services

Office of the Cross-Border Commissioner

Mining, Exploration and Geoscience

Department of Primary Industries[185]

NSW Public Works

Regional Growth NSW Development Corporation

Soil Conservation Service

Resources Regulator NSW

NSW Rural Assistance Authority

NSW Food Authority

NSW Fisheries

Forestry Corporation of NSW

Transport Portfolio

Transport for NSW

Treasury Portfolio

Treasury

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[185] Should be 'Primary Industries'.

Greater Sydney Commission*	SAS Trustee Corporation (State Super)
Point to Point Transport Commissioner	iCare (Insurance and Care NSW)
NSW Trains	Lifetime Care and Support Authority of NSW
NSW TrainLink	NSW Treasury Corporation
Sydney Trains	Infrastructure NSW
Transport Management Centre	
Office of Transport Safety Investigations	
Transport Asset Holding Entity of NSW	
Sydney Metro*	
Maritime*	
Port Authority of NSW	
Newcastle Port Corporation*	
Independent Integrity Agencies	
Audit Office NSW	
NSW Ombudsman	
NSW Electoral Commission	
Law Enforcement Conduct Commission	
Independent Commission Against Corruption	

State government organisations were **excluded** if they met **one** of the following criteria:

- **Trusts/Funds/Foundations:** the primary purpose of the entity is to hold money.
- **Corporations:** the primary decision-making functions are fiscal rather than administrative and these decisions have limited human impact.
- **Sub-Unit**: the entity's functions are administered by a larger General Sector Government Sector Controlled Entity that will be asked to respond to the survey. For example, the Combat Sports Authority was not asked to respond as it is administered by the Office of Sport, which was asked to respond.
- **Not material**: the entity is 'not considered material for whole of government reporting' as defined in the Total Sector Accounts Report.[186]

Excluded state government organisations are listed in Table 17 below.

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[186] Ibid: 'Report on the state finances 2021-2022' pp 198–202.

Table 17: Excluded state government organisations

Entity Funds	General Government Sector Controlled Entities
AustLII Foundation Limited	Aboriginal Languages Trust
Belgenny Farm Agricultural Heritage Centre Trust	Alpha Distribution Ministerial Holding Corporation
The Brett Whiteley Foundation	Art Gallery of NSW Foundation
Cowra Japanese Garden Maintenance Foundation Limited	Belgenny Farm Agricultural Heritage Centre Trust
Cowra Japanese Garden Trust	Biamanga National Park Board of Management(a)
Crown Employees (NSW Fire Brigades Firefighting Staff Death and Disability) Superannuation Fund	Biodiversity Conservation Trust of New South Wales
Eif Pty Limited	Border Fence Maintenance Board
Energy Investment Fund	Building Insurers' Guarantee Corporation
Central Coast Council Water Supply Authority	C.B. Alexander Foundation
New South Wales Treasury Corporation	Cemeteries and Crematoria NSW
Macquarie University Professorial Superannuation Scheme	Combat Sports Authority of NSW
National Art School	Consolidated Fund
NSW Fire Brigades Superannuation Pty Limited	Corporation Sole 'Minister Administering the Heritage Act, 1977'
Parliamentary Contributory Superannuation Fund	Dams Safety Committee
Sydney Education Broadcasting Limited	DPE; Water Administration Ministerial Corporation
SAS Trustee Corporation Pooled Fund	DPE; Lands Administration Ministerial Corporation
The Art Gallery of New South Wales Foundation	Electricity Assets Ministerial Holding Corporation
Trustees of the Farrer Memorial Research Scholarship Fund	Electricity Retained Interest Corporation (ERIC-A)
United States Studies Centre	Electricity Retained Interest Corporation (ERIC-E)
University of Sydney Professorial Superannuation System	Electricity Transmission Ministerial Holding Corporation
	Epsilon Distribution Ministerial Holding Corporation
	Gaagal Wanggaan (South Beach) National Park Board of Management
	Generator Property Management Pty Ltd
	Gulaga National Park Board of Management
	Home Purchase Assistance Fund
	Jobs for NSW Fund
	John Williams Memorial Charitable Trust
	Liability Management Ministerial Corporation
	Liability Management Ministerial Corporation
	Luna Park Reserve Trust

Ministerial Holding Corporation

MoH; Albury Base Hospital

MoH; Albury Wodonga Health Employment Division

MoH; Graythwaite Charitable Trust

Mt Grenfell Historic Site Board of Management

Mutawintji Board of Management

NSW Crown Holiday Parks Trust

Northern Rivers Reconstruction Corporation

Planning Ministerial Corporation

Responsible Gambling Fund

Skills Board

Sporting Injuries Compensation Authority

State Rail Authority

Residual Holding Fund

State Rescue Board of NSW

Statutory Land Managers

Technical Education Trust Fund

Trustees of the Museum of Applied Arts and Sciences

Water Investment Trust Fund

Worimi Board of Management

Public Financial Corporations

First Australian Mortgage Acceptance Corporation (FANMAC) Trusts

Insurers' Guarantee Fund Investment Trust

Long Service Corporation Investment Fund

NSW Generations (Debt Retirement) Investment Trust

Snowy Hydro Legacy Fund Investment Trust

Social and Affordable Housing NSW Fund Investment Trust

TCorpIM Absolute Return Multi-Asset Class Fund

TCorpIM Alternative Risk Premia Fund

TCorpIM Australian Bond Fund

TCorpIM Australian Inflation Linked Bond Fund

TCorpIM Australian Share Fund

TCorpIM Bank Loan Fund

Public Non-Financial Corporations

Catholic Metropolitan Cemeteries Trust

Cobar Water Board

Northern Metropolitan Cemeteries Land Manager

Rookwood General Cemeteries Reserve Land Manager

Rookwood Necropolis Land Manager

State Sporting Venues Authority

Southern Metropolitan Cemeteries Land Manager

Sydney Ferries

Wentworth Park Sporting Complex Trust

Zoological Parks Board of NSW

TCorpIM Cash Fund

TCorpIM Core Alternatives Fund

TCorpIM Defensive Alternatives Fund

TCorpIM Developed Market Equities (Hedged) Fund

TCorpIM Developed Market Equities (Sovereign Investor – Hedged) Fund

TCorpIM Developed Market Property Fund

TCorpIM Direct Infrastructure Fund A

TCorpIM Direct Investment Fund B

TCorpIM Direct Investment Fund C

TCorpIM Direct Investment Fund D

TCorpIM Direct Investment Fund E

TCorpIM Direct Investment Fund F

TCorpIM Direct Investment Fund G

TCorpIM Direct Investment Fund K

TCorpIM Direct Investment Fund M(

TCorpIM Direct Investment Fund N

TCorpIM Emerging Market Debt Fund

TCorpIM Emerging Market Share Fund

TCorpIM Global Credit Fund

TCorpIM High Yield Fund

TCorpIM Liquidity Cash Fund

TCorpIM Listed Property Fund

TCorpIM Long Term Growth Fund

TCorpIM Medium Term Growth Fund

TCorpIM Multi-Asset Class Fund

TCorpIM Opportunistic Fund A

TCorpIM Opportunistic Fund B

TCorpIM Opportunistic Fund C

TCorpIM Opportunistic Fund E

TCorpIM Short Term Income Fund

TCorpIM Sustainable Development (Infrastructure) Fund

TCorpIM Unlisted Infrastructure Fund

TCorpIM Unlisted Property Fund

NSW local councils

Table 18: NSW local councils by category

Regional Town/City	Large Rural
Albury City Council	Bellingen Shire Council
Armidale Regional Council	Berrigan Shire Council
Ballina Shire Council	Bland Shire Council
Bathurst Regional Council	Blayney Shire Council
Bega Valley Shire Council	Cabonne Council
Broken Hill City Council	Cobar Shire Council
Byron Shire Council	Cootamundra-Gundagai Regional Council
Cessnock City Council	Cowra Shire Council
Clarence Valley Council	Dungog Shire Council
Coffs Harbour City Council	Edward River Council
Dubbo Regional Council	Federation Council
Eurobodalla Shire Council	Forbes Shire Council
Goulburn Mulwaree Council	Glen Innes Severn Council
Griffith City Council	Greater Hume Shire Council
Kempsey Shire Council	Gunnedah Shire Council
The Council of the Municipality of Kiama	Gwydir Shire Council
Lake Macquarie City Council	Hilltops Council
Lismore City Council	Inverell Shire Council
City of Lithgow Council	Junee Shire Council
Maitland City Council	Kyogle Council
Mid-Coast Council	Lachlan Shire Council
Mid-Western Regional Council	Leeton Shire Council
Newcastle City Council	Liverpool Plains Shire Council
Orange City Council	Moree Plains Shire Council
Port Macquarie-Hastings Council	Murray River Council
Port Stephens Council	Muswellbrook Shire Council
Queanbeyan-Palerang Regional Council	Nambucca Valley Council

Richmond Valley Council	Nambucca Valley Council
Shellharbour City Council	Narrabri Shire Council
Shoalhaven City Council	Narrandera Shire Council
Singleton Council	Narromine Shire Council
Snowy Monaro Regional Council	Oberon Council
Tamworth Regional Council	Parkes Shire Council
Tweed Shire Council	Snowy Valleys Council
Wagga Wagga City Council	Temora Shire Council
Wingecarribee Shire Council	Tenterfield Shire Council
Wollongong City Council	Upper Hunter Shire Council
	Upper Lachlan Shire Council
	Uralla Shire Council
	Walgett Shire Council
	Warrumbungle Shire Council
	Wentworth Shire Council
	Yass Valley Council

Rural	**Metropolitan Fringe**
Balranald Shire Council	Blue Mountains City Council
Bogan Shire Council	Camden Council
Bourke Shire Council	Campbelltown City Council
Brewarrina Shire Council	Central Coast Council
Carrathool Shire Council	Hawkesbury City Council
Central Darling Shire Council	The Hills Shire Council
Coolamon Shire Council	The Council of the Shire of Hornsby
Coonamble Shire Council	Penrith City Council
Gilgandra Shire Council	Wollondilly Shire Council
Hay Shire Council	
Lockhart Shire Council	
Murrumbidgee Council	
Walcha Council	
Warren Shire Council	
Weddin Shire Council	

Metropolitan	
Bayside Council	

Blacktown City Council

Burwood Council

City of Canada Bay Council

Canterbury Bankstown Council

Cumberland Council

Fairfield City Council

Georges River Council

The Council of the Municipality of Hunters Hill

Inner West Council

Ku-ring-gai Council

Lane Cove Municipal Council

Liverpool City Council

Mosman Municipal Council

North Sydney Council

Northern Beaches Council

Council of the City of Parramatta

Randwick City Council

Council of the City of Ryde

Strathfield Municipal Council

Council of the City of Sydney

Waverley City Council

Willoughby City Council

Woollahra Municipal Council

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9.2. SURVEY 1 DOCUMENTS

Survey 1 text

Introduction

Research Title: Mapping automated decision-making tools in administrative decision-making

Researcher(s): Professor Paul Henman, School of Social Science, University of Queensland Professor Kimberlee Weatherall, Law School, University of Sydney Dr Lyndal Sleep, School of Social Science, University of Queensland Jose-Miguel Bello y Villarino, Law School, University of Sydney Dr Jenny van der Arend, School of Social Science, University of Queensland Emeritus Professor Terry Carney, Law School, University of Sydney Dr Scarlet Wilcock, Law School, University of Sydney Dr Rita Matulionyte, Law School, Macquarie University Associate Professor Jeffrey Chan, School of Computing Technologies, RMIT ARC Centre of Excellence for Automated Decision Making and Society (all)

Thank you for your interest in participating in this research project.

This survey is part of a project, initiated and funded by the NSW Ombudsman as a follow up to its 2021 special report to Parliament, The new machinery of government: using technology in administrative decision-making. The project is a step toward increased understanding of government use of automated decision-making (ADM) systems, by systematically identifying all current and planned uses of ADM. The project findings will inform the Ombudsman's overall aim of proactively supporting public agencies to develop and deploy responsible, inclusive and accountable ADM.

The research is being conducted by academic researchers (listed above), all connected to the Australian Research Council Centre of Excellence on Automated Decision-Making and Society, and conducted with University of Queensland (UQ) academic leadership and under the supervision of UQ Human Research Ethics.

We understand that you have already received a copy of the project's Participant Information Sheet. If you need an Information Sheet, or if you have further questions, please contact Dr Jenny van der Arend or Professor Paul Henman via uqadmsadmin@uq.edu.au. You can also find more information about the project at this website.

_____

Instructions *What are we asking you to do?*

This survey is a first, important step in our process - seeking a high level picture of ADM system use across the NSW government, agencies, and local governments. This survey should have reached you because you are in a position to have an overall sense of ADM use in your organisation, We will ask you:

- to identify ADM systems in use in your organisation (including current or recently used, and systems planned in the next three years);
- to describe (briefly) what they do, and

- to provide a name and contact details for someone who understands the system, to whom we can direct additional questions if required (this could be you, or one person across lots of systems, or different people for different systems).

In filling out this survey:

If you are uncertain about whether something might be in focus (this is discussed more later in the survey), please include the system with a brief explanation.

Please note you can:

Save your progress if you need to check with someone else for information - your responses will be saved as you move from one page to another on the form. If you wish to return to the survey and complete it at a later time, then it is possible to close your browser and resume where you left via the survey link. Other people in your organisation can also contribute to the response using the same survey link.

Move forwards and backwards throughout the survey using the arrows at the bottom of each page - for example, you can return to a previous question to add a system that you may have forgotten.

Get in touch with one of the researchers (Dr Jenny van der Arend or Professor Paul Henman - uqadmsadmin@uq.edu.au) if you have any questions.

Consent

By clicking on the 'I consent' button below, you confirm that:

- you and your organisation consent to participating in this research project;
- the project and its purpose have been adequately explained;
- your participation is entirely voluntary and you may withdraw anytime by ceasing the survey;
- the data collected for this research will be stored on a dual authenticated SharePoint account;
- the possible risks of participating in this research have been explained;
- your organisational name will be identified (unless otherwise advised);
- results from the study will be provided to the NSW Ombudsman and reported to Parliament.

If you do not wish to participate, please exit the survey by closing this window on your browser.

I consent (1)

Q1 **Is your organisation a New South Wales state or local government agency?** *(please indicate your response by clicking on the relevant button below)*

- State Government (1)

- Local Government (2)

If answer is State Government, proceed to Q1a and Q2a. If answer is Local Government, proceed to Q1b and Q2b.

Q1a Which NSW state government cluster/s does your organisation fall within? (please select those that apply from the list below - there may be more than one)

- Premier & Cabinet (1)
- Regional NSW (2)
- Enterprise, Investment & Trade (3)
- Treasury (4)
- Health (5)
- Education (6)
- Stronger Communities (7)
- Transport (8)
- Customer Service (9)
- Planning & Environment (10)
- Other - Please describe in the text box below (11)

Q2a What is the name of your organisation/Department? [*free text box provided*]

Q1b Which of the following best describes your local council? (please indicate your response by clicking on the relevant button below)

- Rural (1)
- Large rural (2)
- Regional town/city (3)
- Metropolitan fringe (4)
- Metropolitan (5)

Q2b **What is the name of your local council?** [*free text box provided*]

Study Scope Study Focus

Our research team is aiming to understand, and map the use and planned use of automated decision-making (ADM) systems by NSW Government departments, agencies, and local governments.

In this initial survey, we are seeking to obtain a broad understanding of the use of technologies that automate (whether fully, partially or as part of a bigger decision-making process) the exercise of government functions. Generally, we are seeking information on systems that are used by public entities in NSW that impact individuals or private entities. We are also interested in systems that members of the public interact with in relation to government activities.

Which systems should I include in my response?

Please include:

- Both AI and non-AI technology,

- Simpler technologies can be used to automate processes - e.g. more traditional (e.g. rules-based) forms of computer programming, decision-support systems, business process automation tools (BPA). Digital data is not an ADM system by itself but can be used in an ADM system - e.g. where decision-making functions are added to or use a database.

- Both fully automated systems and partially automated systems - e.g, systems that recommend a decision to a decision-maker; systems that triage cases or classify people, cases or data in ways that are then drawn on in decision-making.

- Both systems that generate decisions or suggestions, and those that are part of a decision-making process at non-final stages but can influence the outcomes - e.g. systems that make predictions, apply labels, detect anomalies or possible infringements.

- Off the shelf, commercial systems as well as internally developed systems.
- ADM systems operated by third parties, where elements of government administrative decision-making are outsourced - e.g. to a commercial provider or platform.

We understand the functions performed by an organisation can be diverse and they may be supported by a wide range of systems. You can click on the file link below if you would like to see a table with some examples of systems that your agency might use, and whether you should include them. The list is not intended to be prescriptive or exhaustive, rather we hope that it helps you to think about the kinds of systems to include in your response.

If you are not sure whether a system falls within the remit of the project, please include it.

Q3 **Does your agency currently use, or plan to use in the next 3 years, any ADM systems that may fall within the scope of the mapping project?** (*please indicate your response by clicking on the relevant button below).*

- Yes (1)
- No (2)

If answer is No, skip to end of survey. If answer is Yes proceed to remaining questions.

Q4 **What is this ADM system/s called within your agency and what is its current status?** *(please enter the system name in the text box, and then indicate the system's status by clicking on the button that applies).*

We anticipate that larger organisations will have more than 10 ADM systems. In this case, we can provide additional survey links to enable these to be mapped fully.

*Please contact Dr Jenny van der Arend (*uqadmsadmin@uq.edu.au*) for additional link/s.*

	Currently in use (1)	Currently being piloted (2)	Currently in development (3)	Planned in the next three years (4)	Discontinued within the last three years (5)
Click to write name of ADM system (1)					
Click to write name of another ADM system (2)					
Click to write name of another ADM system (3)					
Click to write name of another ADM system (4)					
Click to write name of another ADM system (5)					
Click to write name of another ADM system (6)					
Click to write name of another ADM system (7)					
Click to write name of another ADM system (8)					
Click to write name of another ADM system (9)					
Click to write name of another ADM system (10)					

Q5 **We would like to understand the nature of each of your ADM systems. In a few short sentences, please describe what the ADM system does and how it is used in your agency in the box below. Please include some comment on what otherwise human process or activity it automates (in part or fully).** *You can cut and paste this description from another source or you may choose to include a web-link to this ADM system if available.*

[*free text box provided*]

Q6 **For each of your ADM systems, please indicate which of the following organisational purpose/s it is used for (you may indicate more than one purpose).**

Use the arrow next to the ADM system name box to scroll to the next ADM system if you have identified more than one system in the survey so far. You may need to scroll down to view all of the "purpose" options in order to select those that apply.

Once you have provided a response for all systems, please use the arrows at the very bottom of the page to move to the next (or previous) question in the survey.

	System (1)	System (2)	System (3)	System (4)	System (5)	System (7)	System (8)	System (9)	System (10)
Enforcement: including identifying infringers and sending notices; licence or permit termination; preliminary assessment of possible infringements; application & collection of fines (1)									
Compliance: including systems that enable compliance - e.g. systems for applying for/renewing licences and permissions; systems that enable regulated actors to submit information (2)									
Adjudication and Justice: tasks that support formal or informal agency adjudication or rights or entitlements (3)									
Public service delivery & user interaction: direct provision of services to the public (e.g. delivery of education services to students); Chatbots and other automated systems for engagement with or service delivery to the public (4)									
Resource allocation & planning: using data-driven insights to make operational and resource allocation decisions (e.g. identifying communities to prioritise for street maintenance, policing or public health interventions) (7)									
Policy design: monitoring or analysing effectiveness of government actions or policies; profiling or cohort analysis for policy purposes (6)									
Public service operations: e.g. procurement; monitoring service delivery & performance; internal fraud detection (13)									
Other (please describe in the text box below) (9)									

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Q7 **For each of your ADM systems, please indicate what kind of technology is utilised (you may indicate more than one).**

Use the arrow next to the ADM system name box to scroll to the next ADM system if you have identified more than one system in the survey so far. You may need to scroll down to view all of the "technology" options in order to select those that apply. Once you have provided a response for all systems, please use the arrows at the very bottom of the page to move to the next (or previous) question in the survey.

	System (1)	System (2)	System (3)	System (4)	System (5)	System (7)	System (8)	System (9)	System (10)
Fully automated, rule-based system (1)									
Structured decision-making tool (2)									
Risk assessment/ predictor/ profiling/ classifier tool (3)									
Automated data gathering system or sensor (5)									
Natural language processing (including chatbots & large language models such as ChatGPT) (6)									
Visual, audio or biometric processing (7)									
Geo-location tool (4)									
Modeling/ simulation systems (e.g. digital twins) (11)									
Recommender systems (e.g. for individualising content for a user) (8)									
Optimisation tools (10)									
Anomaly detection (14)									
Other/ Unsure (please describe in the textbox below) (9)									

Q8 **We are seeking a contact email address/es to distribute the second, more detailed mapping survey.** Please enter a contact email address in the box next to each ADM system you have identified in this survey as required (if there is only one contact for your organisation, please enter details in the first box and leave the others blank). [*free text box provided*]

Q9 **You have reached the end of the survey. If there is anything else that you would like to add, please feel free to capture this in the box below. If not, then please click on the arrow at the bottom of the page to progress to the next page.**

Pause & Review

Click on the button below if you are ready to submit your survey responses. *Once you submit you can not return to the survey to add to or amend your responses.* If you have not yet completed all questions in the survey, you can navigate backwards now. Alternatively you can close your browser and return to the survey via the original survey link provided to add to or amend your responses at a later time.

If you would like to receive an email with a copy of your survey responses, please enter an email address for this to be sent to below.
[*free text box provided*]

Survey 1 Participant Information Sheet

Participant Information Sheet – Survey (Part 1)

Research Title: *Mapping automated decision-making tools in administrative decision-making*

Researcher(s) *Professor Paul Henman, School of Social Science, University of Queensland; Professor Kimberlee Weatherall, Law School, University of Sydney; Dr Lyndal Sleep, School of Social Science, University of Queensland; Jose-Miguel Bello y Villarino, Law School, University of Sydney; Dr Jenny van der Arend, School of Social Science, University of Queensland; Emeritus Professor Terry Carney, Law School, University of Sydney; Dr Scarlet Wilcock, Law School, University of Sydney; Dr Rita Matulionyte, Law School, Macquarie University; Associate Professor Jeffrey Chan, School of Computing Technologies, RMIT; ARC Centre of Excellence for Automated Decision Making and Society (all)*

Thank you for your interest in participating in this research project. Please read the following information about the project so that you can decide whether you would like to take part in this research. Please feel free to ask any questions you might have about our involvement in the project.

Participation is voluntary. If you do not wish to take part, you do not have to. If you decide to take part and later change your mind, you are free to stop at any time, and you would not need to give any explanation for your decision to stop participating. If you choose to stop participating, simply close the survey and incomplete responses will be deleted.

Your decision whether to take part, not take part, or take part and then withdraw, will not affect your relationship with the University of Queensland, the University of Sydney or the NSW Ombudsman (the funder of this project).

What is this research about?

This project is seeking to undertake a comprehensive mapping of existing and proposed use (within the next 3 years) of automated decision-making (ADM) in administrative decision-making by NSW Government departments, agencies, and local governments, in order to understand ADMs' implications for administrative law and good administrative decision-making practice.

The project, being funded by the NSW Ombudsman, follows its 2021 special report to Parliament entitled, *The new machinery of government: using machine technology in administrative decision-making* that highlighted the need for this research to:

- increase visibility of when and how administrative decisions are automated,
- understand the impact of increasing digitisation in the public sector, and
- proactively support agencies to develop and deploy ADM in a way that complies with administrative law and good administrative conduct requirements.

What is Automated Decision-Making (ADM)?

As government processes are now heavily computerised and digitised it can be difficult to identify what is ADM and what is not. These ADM systems can be called ADM tools, ADM mechanisms or ADM processes. For this survey, we will refer to them as **ADM Systems**.

We are seeking to map ADM systems that automate, whether fully, partially or as part of a bigger decision-making process, the exercise of government functions, and in doing so impact individuals or private entities. We are also interested in systems that members of the public interact with in relation to

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government activities. We are interested in both in systems that use artificial intelligence/machine learning, and those which use traditional forms of computer programming.

We understand that the functions performed by an organisation can be diverse and they may be supported by a wide range of systems. The table below gives some examples of the kinds of systems that your agency might use - it is not intended to be prescriptive or exhaustive, rather we hope that it helps to think about the kinds of systems to include in your response.

Systems to include	Systems that are not our focus
Fully automated operations impacting people, such as: • Systems that automatically issue notices, orders, licences, registrations, accreditations, approvals, permits, or vouchers – or that automatically exempt or exclude people from any of the above Structured decision-making tools (i.e. that lead a human through a decision-making process) with a substantial impact on one or more members of the public, such as: • a digital tool for assessing safety risk that will precipitate a government decision (e.g. parole, intervention) • a digital tool to guide a decision-maker through relevant facts, legislation and policy, closing off irrelevant paths as they go • a tool that guides applicants through the process of lodging an application or to understand compliance obligations • an automated preliminary assessment tool that substantially impacts a government administrative decision, such as a decision whether a person is eligible for a benefit, support or intervention Risk prediction, anomaly detection, profiling, classification or automated data gathering tool for decision-making, such as: • data analysis tool to make or guide choices about who/which cases to investigate • an automated tool to gather data for decisions about targeting/delivering government services (e.g. garbage collection; pothole fixing) • filtering a population to identify those that will be subject to different attention, action or process (whether that filtering is by exclusion or inclusion) and/or triaging a population Natural language processing tools, such as Chatbots, interacting with the public to provide advice/information Visual processing or audio processing, such as: • facial or object recognition (e.g. identifying numberplates or prohibited activities, such as mobile phone use in cars) • facial/crowd analysis in event or protest management	Standalone databases holding digital data Clinical health decision-making or health diagnosis tools (e.g. systems that analyse x-rays; sepsis prediction tool). Data analytics or automated systems that manage or impact activities that are not government administrative decisions, such as: • systems to manage traffic flow • automated speed sensing cameras that tell motorists how fast they are going (without sending infringement notices) • sensors that detect a fire hazard or fire and alert the fire service Simple automated identity verification system such as used in Service NSW app. Systems for the internal management of human resources.

What will you/your organisation need to do?

We are undertaking a two-stage survey approach to the mapping, with this initial survey seeking to inform an overview of current and planned ADM systems, and a more detailed follow-up survey informing a more comprehensive understanding of selected ADM systems.

If you agree to participate, we are asking your agency to complete the first overview survey. Please **complete the online survey for your organisation**, capturing all ADM systems in use, in planned use in the next 3 years, or that were used within the last 3 years but have now been discontinued. The survey questions seek basic information to understand the systems, including in the name of each system, a short description, an indication of its purpose, and a sense of the technology used. We also invite you to identify contact officer/s to complete the second, more detailed survey on selected ADM systems at a later date. The survey instrument is accessible via the Qualtrics platform, a link to which will have been provided to you in your invitation email.

What are the possible benefits of taking part?

Automated decision-making in government administration is a growing phenomenon. There are many benefits from automating decisions - including efficiency gains and consistency of decisions - but there have also been downsides - such as non-legally authorised decisions, lack of accountability and transparency.

This project is being conducted to identify the areas in which ADM and the types of ADM being used may create legal, ethical and other challenges. In doing so, the project may identify better policy, legal, organisational and operational approaches to assist the legal, fair and reasonable adoption of ADM in governments to enable the positive benefits of ADM to be utilised. It is anticipated that your contribution will directly assist in providing a snapshot of current and planned uses of ADM.

What are the possible risks of taking part?

We are not asking any questions about individuals or their actions in the survey: only what systems your institution has used or might use in the future. This means that there are no risks for individual participants. As a result of the project, the NSW Ombudsman and (following publication of a report) members of the public may become aware of automated decision-making that they were previously not aware of.

What will happen to the information about you/your organisation?

Apart from details for a contact officer for each organisational response, we are not collecting any personal information about you or other members of your organisation. However, unless otherwise requested, we will collect your organisational identity and may use that in reporting study results.

Results from the survey will be downloaded from Qualtrics and then stored on a double authenticated and segmented SharePoint account. An analysis of the findings will be provided in a report to the NSW Ombudsman which will then use this for the basis for a report tabled in the NSW Parliament. In any publication and/or presentation, information will be provided in such a way that you cannot be identified.

Can you hear about the results of this research?

Yes. A report of this research will be provided to the NSW Ombudsman, after which the NSW Ombudsman will prepare a report based on the findings to be tabled in the NSW Parliament (expected late 2023). As per usual practice, sections of the draft report that have substantive references to an organisation will be provided to them prior to tabling.

Who can you contact if you have any concerns about the project?

This study adheres to the Guidelines of the ethical review process of The University of Queensland and the National Statement on Ethical Conduct in Human Research. Whilst you are free to discuss your participation in this study with the researcher contactable on p.henman@uq.edu.au or kimberlee.weatherall@sydney.edu.au if you would like to speak to an officer of the University not involved in the study, you may contact the Ethics Coordinator on +617 3365 3924 / +617 3443 1656 or email humanethics@research.uq.edu.au

Should you wish to contact the NSW Ombudsman that is funding this research, you may contact Christie Allan, Executive Strategy Officer, callan@ombo.nsw.gov.au.

This research Ethics ID number: 2023/HE000009

9.3. SURVEY 2 DOCUMENTS

Mapping Survey 2 to issues

Below we reproduce the text of the Survey 2 instrument. To assist readers in navigating the instrument, the table immediately below shows the mapping of Survey 2 questions to:

1. Existing frameworks for analysing ADM systems:
    a. OECD (2022), *OECD Framework for the Classification of AI systems*, OECD Digital Economy Papers, No. 323, OECD Publishing, Paris, https://doi.org/10.1787/cb6d9eca-en
    b. Sleep, L., Coco, B. A., and Henman, P. (2022). Mapping ADM in Australian social services, https://apo.org.au/node/321337
2. Criteria for good administrative practice in respect of ADM systems, expressed by the NSW Ombudsman in the *New Machinery Report*.

Table 19: Mapping Survey 2 questions to the literature

Existing ADM Frameworks	*New Machinery Report* criteria	Survey Question/s
OECD Framework - displacement potential of ADM system		Q3
Sleep et al (2022) – institutional objectives		Q4
OECD Framework & ADM+S Centre – users of systems		Q6
OECD Framework – impacted stakeholders, optionality & business model		Q7
	Is it visible? What information does the public, and especially those directly affected, need to be told regarding the involvement of the machine, how it works, its assessed accuracy, testing schedule etc? Are the design specifications and source code publicly available – for example as 'open access information' under the GIPA Act? Is an impact assessment required to be prepared and published?	Q8; Q9; Q12; Q14; Q14a
OECD Framework - optionality	**Is it avoidable?** Can an individual 'opt out' of the machine-led process and choose to have their case decided through a manual (human) process?	Q 11; Q13
	Is it subject to testing? What testing regime must be undertaken prior to operation, and at scheduled times thereafter? What are the purposes of testing (eg compliance	Q32

	with specifications, accuracy, identification of algorithmic bias)? Who is to undertake that testing? What standards are to apply (eg randomised control trials)? Are the results to be made public?	
	Is it explainable? What rights do those affected by the machine outputs have to be given reasons for those outcomes? Are reasons to be provided routinely or on request? In what form must those reasons be given and what information must they contain?	Q9; Q12; Q14; Q14a; Q14b; Q15
	Is it accurate? To what extent must the predictions or inferences of the machine be demonstrated to be accurate? For example, is 'better than chance' sufficient, or is the tolerance for inaccuracy lower? How and when will accuracy be evaluated?	Q32; Q20; Q21; Q22; Q27
	Is it subject to audit? What audit records must the machine maintain? What audits are to be conducted (internally and externally), by whom and for what purpose?	Q32
OECD Framework – machine learning	**Is it replicable?** Must the decision of the machine be replicable in the sense that, if exactly the same inputs were re-entered, the machine will consistently produce the same output, or can the machine improve or change over time? If the latter, must the machine be able to identify why the output now is different from what it was previously?	Q26; Q27
	Is it internally reviewable? Are the outputs of the machine subject to internal review by a human decision maker? What is the nature of that review (eg full merits review)? Who has standing to seek such a review? Who has the ability to conduct that review and are they sufficiently senior and qualified to do so? **Is it externally reviewable?** Are the outputs of the machine subject to external review or complaint to a human decision maker? What is the nature of that review (eg for example, merits review or review for error only)? Who has standing to seek such a review? If reviewable for error, what records are available to the review body to enable it to thoroughly inspect records and detect error?	Q9; Q10; Q10a; Q10b; Q11; Q14; Q14a; Q14b; Q15; Q16
	Is it compensable? Are those who suffer detriment by an erroneous action of the machine entitled to compensation, and how is that determined?	Q15; Q16
OECD Framework – nature of data		Q30; Q28
	Is it privacy protective and data secure? What privacy and data security measures and standards are required to be adhered to? Is a privacy impact assessment required to be undertaken and published? Are there particular rules limiting the collection, use and retention of personal information?	Q28; Q29; Q31; Q32

ADM +S

Survey 2 Text

Research Title: Mapping automated decision-making tools in administrative decision-making

Researcher(s): Professor Paul Henman, School of Social Science, University of Queensland Professor Kimberlee Weatherall, Law School, University of Sydney Dr Lyndal Sleep, School of Social Science, University of Queensland Jose-Miguel Bello y Villarino, Law School, University of Sydney, Dr Jenny van der Arend, School of Social Science, University of Queensland Emeritus Professor Terry Carney, Law School, University of Sydney Dr Scarlet Wilcock, Law School, University of Sydney Dr Rita Matulionyte, Law School, Macquarie University Associate Professor Jeffrey Chan, School of Computing Technologies, RMIT ARC Centre of Excellence for Automated Decision Making and Society (all)

Thank you for your interest in participating in this research project. This survey is part of a project, initiated and funded by the NSW Ombudsman as a follow up to its 2021 special report to the NSW Parliament, The new machinery of government: using technology in administrative decision-making. The project aims to increase understanding of public sector use of automated decision-making (ADM) systems, by systematically identifying all current and planned uses of automated decision-making. The project findings will inform the Ombudsman's overall aim of proactively supporting public agencies to develop and deploy ADM in a responsible, inclusive and accountable way.

The research is being conducted by academic researchers (listed above), all connected to the Australian Research Council Centre of Excellence on Automated Decision-Making and Society, and conducted with University of Queensland (UQ) academic leadership and under the supervision of UQ Human Research Ethics.

We understand that you have already received a copy of the project's Participant Information Sheet. If not, you can access one via this link: Participant Information Sheet. If you have further questions, please contact Dr Jenny van der Arend or Professor Paul Henman via uqadmsadmin@uq.edu.au. You can also find more information about the project at this website.

Instructions: *What are we asking you to do?*

This second survey in our mapping project aims to develop a more in-depth understanding of specific ADM systems. In this particular survey, we seek to understand more about [NAME OF SYSTEM], identified from your organisation's first survey response. We encourage you to prepare a coordinated organisational response for this ADM system, to provide as holistic and complete response as possible. This may be facilitated by holding a meeting of key organisational staff to complete the survey together.

The survey includes the following sections:

- About the ADM system and organisational context
- Governance, legal settings and review
- Technology procurement and operation
- Technical aspects of the ADM system
- Input and output data
- Testing, auditing and accuracy

In filling out this survey:

- You can save your progress if you need to check with someone else for information.

- Your responses will be saved as you move from one page to another on the form.

- If you wish to return to the survey and complete it later, you can close your browser and resume where you left off.

- You can move forwards and backwards throughout the survey using the arrows at the bottom of each page - for example, you can return to a previous question to amend or add to an answer.

- You can get in touch with one of the researchers (Dr Jenny van der Arend or Professor Paul Henman) via the following email address - uqadmsadmin@uq.edu.au - if you have any questions.

Consent

By clicking the 'I consent' button below, you confirm:

- you/your organisation's consent to participating in this research project;

- that the project and its purpose have been adequately explained;

- that your participation is entirely voluntary, and you may withdraw anytime by ceasing the survey;

- that the data collected for this research will be stored on a dual authenticated SharePoint account;

- that the possible risks of participating in this research have been explained;

- that your organisational name will be identified (unless you otherwise advise us);

- and that results from the study will be provided to the NSW Ombudsman and reported to NSW Parliament.

If you do not wish to participate, please exit the survey by closing this window on your browser.

I consent (1)

About the ADM system & organisational context

This first block of questions seeks to find out a little more about the background of [NAME OF SYSTEM] and how it works.

Q1 When was [NAME OF SYSTEM] first deployed? (please provide an approximate year in the numerical box below)

Q2 Who made the formal decision to initially deploy [NAME OF SYSTEM]?

- Cabinet (1)
- Minister (2)
- Secretary/Head of agency (3)
- Mayor (4)
- Council (5)
- Council Chief Executive (6)
- Chief Information officer or similar (7)
- Head of division (8)
- Head of relevant unit (9)
- Other (10)
- Unsure (11)
- Not applicable (12)

Q3 Which of the following best describes the operation of [NAME OF SYSTEM]? *(please select one)*

- It is/was to augment human processing (1)
- It is/was to replace human processing (2)
- It is/was an upgrade of a previous semi-automated system (3)
- It is/was for an entirely new organisational function that humans were not previously doing (4)
- Other - *please outline in the text box* (5) [*free text box provided*].

Q4 What were the initial institutional objectives for deploying [NAME OF SYSTEM]? In the first column, please select all that apply; In the second column, please indicate what was the single most important objective.

	Please select all that apply (1)	Please select the single-most important objective (2)
Improving public access to government services (15)		
Enhancing direct customer experience/interface (10)		
Reducing administrative error (3)		
Improving consistency of decisions (4)		
Productivity gains (2)		
Cost reduction (1)		
Creating new institutional capabilities (5)		
Triaging resources, enquiries, applications etc (6)		
General data management (7)		

Augmenting human capabilities (8)		
Improving policy/service agility (9)		
Implement a new function (11)		
Fraud/unlawful conduct detection and action (12)		
Other - please outline in the text box (13)		
Unsure (14)		

Q5 Do you have any comments about the impact of the system (expected or unexpected) since its deployment? [e.g. on your organisation, your staff, the individuals affected by the system's decision, etc] *Please enter these comments in the text box* [*free text box provided*].

Q6 Who are the typical users of [NAME OF SYSTEM] i.e. those who interact with it and/or its inputs/outputs? Please select all that apply and rank on frequency of interaction.

	No interaction (1)	Occasional interaction (2)	Frequent interaction (3)
Members of the public (1)			
Government/Council administrators (2)			
Expert practitioners (e.g. social workers/psychologists; clinical staff; teachers; engineers; town planners) (3)			
Business, non-government organisations etc (4)			
Other - please outline in the text box (5)			

Q7 Which group or groups are directly impacted by the decisions or outputs of [NAME OF SYSTEM]

- Members of the public in general (1)

- The system relates to a specific group within the population that could be experiencing vulnerability (e.g. children; people with a disability; indigenous people; people in custody). *Please specify the group/s in the text box below.* (2)

- Workers/employees of your organisation (3)

- Businesses, non-government organisations etc (4)

- Government agencies/regulators (5)

- Other - *please outline in the text box* (6)

Governance, legal settings & review

This next section relates to the governance, legal settings and review of [NAME OF SYSTEM]. *To complete the next questions you may wish to have input from the legal team of your organisation.*

Q8 Is there a generalised public statement that [NAME OF SYSTEM] is in use?

- Yes, on an organisational website (1)
- Yes, in the geographical location in which it is used (e.g. speed cameras) (2)
- Yes, other – [*free text box provided*]. (3)
- No (4)
- Unsure (5)

Q9 What information about how [NAME OF SYSTEM] works and how it is used is publicly available? *Please select all that apply.*

- General information on website (1)
- General information on request (2)
- Detailed information on website (3)
- Detailed information on request (4)
- Some information not available because commercial in confidence (5)
- Information otherwise not available (6)
- Unsure (7)

Q10 What degree of input does [NAME OF SYSTEM] have into making a formal administrative decision (i.e. one made under administrative law, which has legal effect and is potentially appealable)?

- It is not used in an administrative decision-making process (1)
- It has minimal input (2)
- It is one input among many (3)
- It is one of the main inputs (4)
- It is the main input (5)
- In most cases it is the only material input (6)
- It solely makes the administrative decision (7)

If respondent has indicated system is not used in an administrative decision-making process, skip to end of block

Q10a In relation to administrative decision-making, what role does [NAME OF SYSTEM] play? *Please select all that apply.*

- Collects and presents information, but does not offer decision-making guidance (1)
- Filters information to provide a set of cases for decision-makers to consider (2)
- Suggests possibilities to a human involved in the decision-making (3)
- Provides guidance through the decision-making process (4)

- Recommends a course of action (5)

- Makes discretionary decisions (6)

- Makes non-discretionary decisions (7)

- Not applicable, as ADM system is not used in administrative decision-making processes (8)

- Don't know (9)

If respondent has indicated system is not used in an administrative decision-making processes, skip to end of block

Q10b In a few short sentences, please explain in plain language how [NAME OF SYSTEM] contributes to the administrative decision and what role, if any, humans have *(i.e. what does this look like in practice?)*

Q11 In cases where a person makes the final administrative decision, how are they instructed to use the tool in the final decision?

- Use of the tool is required (1)

- Use of the tool is required, but the tool's output can be overridden by the human involved in the decision-making (2)

- The person has the option to use or not use the tool or its outputs (3)

- Unsure (4)

- Not applicable (5)

Q12 Are those subject to the administrative decisions advised that automation is/may be involved in their case?

- Yes, a general notice or website information (1)

- Yes, individual notification with decision (2)

- Sometimes (3)

- No (4)

- Unsure (5)

- Not applicable (6)

Q13 Can an individual "opt out" of [NAME OF SYSTEM] being involved in decision-making, and choose to have their case/situation handled via a human-only process?

- Yes (1)

- Sometimes (2)

- No (3)

- Unsure (4)

- Not applicable for [NAME OF SYSTEM] (5)

Q14 Are reasons given for decisions made involving [NAME OF SYSTEM] to those impacted?

- Yes - always (1)
- Yes - at the discretion of the decision-maker (2)
- Only on request (3)
- No (4)
- Unsure (5)
- Not applicable (6)

Skip to Q14b if respondent indicates that reasons are not given for decisions involving [NAME OF SYSTEM]
Skip to Q15 if respondent chooses 'not applicable' or 'unsure'.

Q14a What form of explanation is given?

- Verbal, from a team member (1)
- Written, by a team member - general information only (2)
- Written, by a team member - explaining individual outcome (3)
- Auto-generated - general information (4)
- Auto-generated - specific information on individual outcome (5)
- Other - Please describe in the text box (6) [*free text box provided*]

If Q14a has been displayed, skip to Q15; do not display Q14b.

Q14b Briefly explain why reasons are not provided or are not necessary? [*free text box provided*]

Q15 Can a person impacted by an ADM decision using [NAME OF SYSTEM] request a review/appeal of that decision? Please tick all that apply*.*

- Yes, it is an organisational policy (1)
- Yes, it is a statutory right (2)
- Yes, it is possible (3)
- Sometimes (4)
- No (5)
- Not applicable/Unsure (6)

Q16 Does any of the following provide authorisation, rules or guidance for the development or use of [NAME OF SYSTEM] in administrative decision-making? *Please tick all that apply.*

- Legislation, regulations or other legislative authorisations (1)
- Organisational policy and procedures (2)
- Ministerial direction or guidelines (3)
- Other (4)
- No explicit authorisation/directive (5)

- Not applicable (6)

Q16a Should you have information immediately available to you, please briefly name (or provide links to) authorisations, rules or guidances in the text box below. [*free text box provided*]

Technology, procurement & operation

The following questions relate to the building, procurement and management of [NAME OF SYSTEM]. *You may wish to consult with the technology area of your organisation to answer these questions.*

Q17 What process for the development of [NAME OF SYSTEM] was adopted?

- Off-the-shelf (1)
- Adapted to purpose from a commercially available system (2)
- Purpose-built (3)

Q18 Was [NAME OF SYSTEM] designed and developed:

- In-house (1)
- By an external vendor - *Please provide the vendors name in the text box* (2) [*free text box provided*]
- In-house and with an external vendor - *Please provide the vendor's name in the text box* (3) [*free text box provided*]

Q19 In the organisational team designing [NAME OF SYSTEM] (or the specifications for it), what types of expertise did your team have? *Please select all that apply.*

- Technical (1)
- Legal (2)
- Policy (3)
- Practitioner/end user (4)
- Other - please describe in the text box (5) [*free text box provided*]
- Unsure (6)

Q20 Who is primarily responsible for software maintenance, updates and repairs of [NAME OF SYSTEM]?

- In-house ICT unit (1)
- External vendor (2)
- In-house ICT unit & external vendor (3)
- Other - *Please provide details in the text box* (4) [*free text box provided*]

Q21 Is [NAME OF SYSTEM] and its data externally operated and/or hosted?

- No (1)
- Yes - our organisation has partial access to that data. *Please name the external party who stores the data in the text box below.* (2)
- Yes - our organisation has full access to that data. *Please name the external party who stores the data in the text box below.* (3) [*free text box provided*]
- Unsure (4)

Display Q21 if system was not designed and developed in-house

Q22 Can your organisation access the algorithmic design of [NAME OF SYSTEM] to investigate how specific decisions are made?

- Yes (1)
- Yes, but subject to the provider's consent (2)
- No - due to contractual constraints (e.g. commercial intellectual property) (3)
- No - due to algorithmic complexity (4)
- No - due to lack of expertise (5)
- Unsure (6)
- Not applicable (7)

Q23 If you are aware that the ADM system is used in other organisations apart for yours, please indicate in which of the following sectors it is used in:

- Not used outside of this organisation (1)
- Premier & Cabinet portfolio (2)
- Regional NSW portfolio (3)
- Jobs & Tourism portfolio (4)
- Treasury portfolio (5)
- NSW Health portfolio (6)
- NSW Education portfolio (7)
- Stronger Communities portfolio (8)
- NSW Transport portfolio (9)
- NSW Customer Service portfolio (10)
- Environment & Planning portfolio (11)
- NSW Police Force (12)
- NSW Local Government (13)
- Other Australian State & Territory agencies (14)
- Australian Federal government agencies (15)
- Community Service organisations (16)
- Private Sector organisations (17)

- Other - Please outline in the text box (18) [*free text box provided*]
- Unsure (19)

Technical aspects of the ADM system

The next questions seek more detail about the technical aspects of [NAME OF SYSTEM]. To complete these questions, you may wish to have input form the chief information officer, computer professionals, or the systems division of your organisation.

Q24 Please indicate what kind of technology/technologies are used in [NAME OF SYSTEM]. *Please tick all that apply.*

- Fully automated, rule-based system (1)
- Structured decision-making tool (2)
- Predictor/risk prediction (3)
- Profiling (4)
- Classification (5)
- Automated data gathering (including sensors) (6)
- Natural language processing (including Chatbot) (7)
- Automated visual/image processing (8)
- Automated audio/voice processing (9)
- Geo-location (10)
- Modeling/simulation (11)
- Recommend-er system (12)
- Unsure (13)
- None of the above (14)
- Other - please describe in the text box (15) [*free text box provided*]

Q25 In light of your previous response, please briefly describe the technical design and operation of [NAME OF SYSTEM] further in the text box below.

Q26 Is machine learning used in the design and development of [NAME OF SYSTEM]?

- Yes - supervised machine learning (1)
- Yes - unsupervised machine learning with a discriminative model (2)
- Yes - unsupervised machine learning with a generative model (3)
- Yes - hybrid (4)
- No (5)
- Unsure (6)

Q27 Given [NAME OF SYSTEM] is based on machine learning, does it evolve over time?

- No evolution during operation, only during the training phase. The dataset is static and does not change over time. (1)

- Model periodically re-trained with new/updated data, but full validation of new model occurs before a (manual) re-deployment. (2)

- Model automatically retrained periodically and deployed without direct human intervention. (3)

- Model utilises online learning. Updates are essentially continuous and separate from validation. (4)

Q28 Indicate the source of data used as inputs into [NAME OF SYSTEM]. *Please select all that apply.*

- Automated sensors (e.g. cameras, microphones, thermometers, online log files, GPS watches & activity wrist bands) (1)

- Submitted externally by NSW residents and/or businesses, either digitally or via paper forms - specifically for the ADM system (2)

- From publicly available data in the form of online documents, social media etc. (3)

- Pre-existing administrative/organisational data held by your organisation (4)

- Another agency within the Premier & Cabinet portfolio (5)

- Another agency within the Regional NSW portfolio (6)

- Another agency within the Jobs & Tourism portfolio (7)

- Another agency within the Treasury portfolio (8)

- Another agency within the NSW Health portfolio (9)

- Another agency within the NSW Education portfolio (10)

- Another agency within the Stronger Communities portfolio (11)

- Another agency within the NSW Transport portfolio (12)

- Another agency within the NSW Customer Service portfolio (13)

- Another agency within the Environment & Planning portfolio (14)

- NSW Police Force (15)

- An agency or organisation from NSW Local Government (16)

- Other Australian State and Territory agencies (17)

- Australian Federal government agencies (18)

- Community Service organisations (19)

- Private sector organisations (e.g. banks, real estate agencies) (20)

- Other - Please outline in the text box (21) [*free text box provided*]

Q29 Indicate any of the following data types used as input into [NAME OF SYSTEM]. *Please select all those that apply.*

- Age (1)

- Disability/impairment status (2)

- Sex (3)

- Gender identity (4)

- Sexuality (5)

- Race, ethnicity or indigeneity (6)

- Religion or faith (7)

- Pregnancy status (8)

- Marital or domestic status (9)

- Carer status (10)

- Age (11)

- Health diagnosis (16)

- HIV/AIDS diagnosis (12)

- Other sensitive information (e.g. personal/household income and/or assets; mental health, domestic and family violence, criminal record, illegal drug use). *Please outline in the text box below.* (13) [*free text box provided*]

- None (14)

- Unsure (15)

Q30 What best describes the nature of the input data for [NAME OF SYSTEM]?

- Structured data (i.e. data that are stored in a pre-defined format and are straightforward to analyse) (1)

- Unstructured data (i.e. data that either do not have a pre-defined data model or are not organised and labeled in a predefined manner, such as text, image, audio, video, social media or website data) (2)

- Semi-structured data. (*In practice most data combine both structured and unstructured data. For example, a photo taken with a smartphone consists of the image itself (unstructured data), accompanied by structured metadata about the image). (3)

- Complex structured data (e.g. data produced in the form of a model, which is both the output of an AI algorithm and can be used as input to another system). (4)

Q31 For any data sourced from or stored by other government or third-party organisations, please briefly describe (drawing on information immediately available to you) the types of authorisations (legislation, MOUs etc) privacy protections and data sharing arrangements that are in operation in the text box below. [*free text box provided*]

Q32 In the matrix below, please indicate which forms of testing, auditing and assessment have occurred for [NAME OF SYSTEM], during which stages of development and operation (as applicable).

	Pre-deployment (e.g. development; design; procurement) (1)	During roll-out (2)	Since roll-out (3)
Testing for accuracy (1)			

Disability accessibility (2)			
Privacy impact assessment (3)			
Risk assessment (4)			
Internal advice about legal compliance (5)			
External legal advice (6)			
Assessment against *NSW AI Assurance Framework* (7)			
ISO technical standards (8)			
External auditing (9)			
Cyber Security compliance (10)			
Analysis of complaints and review request data (11)			

Pause & Review

Submit survey: Click on the button below if you are ready to submit your survey responses. Once you submit you can not return to the survey to add to or amend your responses. If you have not yet completed all questions in the survey, you can navigate backwards now. Alternatively you can close your browser and return to the survey via the original survey link provided to add to or amend your responses at a later time.

If you would like to receive an email with a copy of your survey responses, please enter an email address for this to be sent to below.

- Email address for copy of survey response (1)
- Additional email address (if required) (2)

End of Survey

Final comments: You have reached the end of the survey. If there is anything else that you would like to add, please feel free to capture this in the box below. If not, then please click on the arrow at the bottom of the page to progress to the final page where you can submit your response.

9.4. INTERVIEW INSTRUMENTS

Participant Information Sheet

Participant Information Sheet – Interview

Research Title: *Mapping automated decision-making tools in administrative decision-making*

Researcher(s)

Prof. Paul Henman; Dr Lyndal Sleep; Dr Jenny van der Arend (University of Queensland)
Prof. Kimberlee Weatherall; Jose-Miguel Bello y Villarino; E/Prof. Terry Carney; Dr Scarlet Wilcock (University of Sydney); Dr Rita Matulionyte (Macquarie University); A/Prof. Jeffrey Chan (RMIT)

Thank you for your interest in participating in this research project. Please read the following information about the project so that you can decide whether you would like to take part in this research. Please feel free to ask any questions you might have about our involvement in the project.

Participation is voluntary. If you do not wish to take part, you do not have to. If you decide to take part and later change your mind, you are free to stop at any time, and you would not need to give any explanation for your decision to stop participating.

Your decision whether to take part, not take part, or take part and then withdraw, will not affect your relationship with the University of Queensland, the University of Sydney or the NSW Ombudsman (the funder of this project).

What is this research about?

This project is seeking to undertake a comprehensive mapping of existing and proposed use (within the next 3 years) of automated decision-making (ADM) in administrative decision-making by NSW Government departments, agencies, and local governments, in order to understand ADMs' implications for administrative law and good administrative decision-making practice.

The project, being funded by the NSW Ombudsman, follows its 2021 special report to Parliament entitled, The new machinery of government: using machine technology in administrative decision-making that highlighted the need for this research to:

- increase visibility of when and how administrative decisions are automated,

- understand the impact of increasing digitisation in the public sector, and

- proactively support agencies to develop and deploy ADM in a way that complies with Administrative Law and good administrative conduct requirements.

What will I need to do?

Your organisation has already taken part in this study through responding to a survey about a particular ADM system. We are now seeking to get a more in-depth understanding of that ADM system. The interview will be a semi-structured and explore the following areas (as relevant to your expertise):
- the ADM system's establishment, technical design, ongoing implementation/development;
- the use of the ADM system in your organisation, with a focus on understanding how it operates and is experienced by users;
- arrangements to monitor and assess the performance of the ADM system; and
- governance arrangements to prevent and manage any identified risks associated with the ADM system's use.

If you agree to participate, we ask you to participate in an audio-recorded interview[1] (of approximately one hour) regarding your knowledge and expertise relating to that system.

What are the possible benefits of taking part?

Automated decision-making in government administration is a growing phenomenon. There are many benefits from automating decisions - including efficiency gains and consistency of decisions - but there have also been downsides - such as non-legally authorised decisions, lack of accountability and transparency.

This project is being conducted to identify the areas in which ADM and the types of ADM being used may create legal, ethical and other challenges. In doing so, the project may identify better policy, legal, organisational and operational approaches to assist the legal, fair and reasonable adoption of ADM in governments to enable the positive benefits of ADM to be utilised. It is anticipated that your contribution will directly assist in providing a snapshot of current and planned uses of ADM.

What are the possible risks and disadvantages of taking part?

As this study is not about individuals, there are no individual risks. As a result of the project, the NSW Ombudsman and (following publication of a report) members of the public may become aware of automated decision-making that they were previously not aware of. Organisations may wish to evaluate whether this exposes them to any particular risk or disadvantage.

What will happen to the information about me?

All information collected about you will remain confidential, though your organisation and your generic expertise (e.g. legal, policy, computer professional) will be identified in reporting. Given your position, it might not be possible to guarantee complete anonymity.

Can I hear about the results of this research?

Yes. A report of this research will be provided to the NSW Ombudsman during 2023, after which the NSW Ombudsman will prepare a report based on the finding to be tabled in the NSW Parliament (expected late 2023). As per usual practice, a draft copy of that report will be provided to all mentioned agencies prior to tabling.

Who can you contact if you have any concerns about the project?

This study adheres to the Guidelines of the ethical review process of The University of Queensland and the National Statement on Ethical Conduct in Human Research. Whilst you are free to discuss your participation in this study with the researcher contactable on p.henman@uq.edu.au or kimberlee.weatherall@sydney.edu.au if you would like to speak to an officer of the University not involved in the study, you may contact the Ethics Coordinator on +617 3365 3924 / +617 3443 1656 or email humanethics@research.uq.edu.au

Should you wish to contact the NSW Ombudsman that is funding this research, you may contact Christie Allan, Executive Strategy Officer, callan@ombo.nsw.gov.au.

This research Ethics ID number: 2023/HE000009

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[1] Some online platforms will require both video and audio recording at once. If this is the case, only the audio will be used to transcribe the interview and the video will then be destroyed. You are also welcome to turn off your camera.

Interview informed consent form

Consent form - Interview

Research Title: *Mapping automated decision-making tools in administrative decision-making*

Researcher(s)

*Prof. Paul Henman; Dr Lyndal Sleep; Dr Jenny van der Arend (University of Queensland)
Prof. Kimberlee Weatherall; Jose-Miguel Bello y Villarino; E/Prof. Terry Carney; Dr Scarlet Wilcock
(University of Sydney); Dr Rita Matulionyte (Macquarie University); A/Prof. Jeffrey Chan (RMIT)*

Name of the participant: _____

I consent to participate in this research project. It has been explained to me that the purpose of this research is to comprehensively map the use of automated decision-making (ADM) systems in administrative decision-making in NSW Government departments, agencies and local government agencies. I have also been provided with a written participant information sheet in a language that I can understand.

The possible risks of participating in this research have been explained to my satisfaction. I understand that in this research I will be required to participate in an interview to discuss my professional and organisational knowledge regarding a particular ADM system. I understand that my **interview will be audio recorded.**

I understand that my **participation is voluntary** and I am free to withdraw from this research anytime without needing to provide any explanation, and my relationship with the University of Queensland, the University of Sydney or the NSW Ombudsman (the funder of this project) will be unaffected as a result of my withdrawal. Should I decide to withdraw, I understand that my data will be destroyed and will not be used in the research.

I understand that data collected for this research will be stored on a dual authenticated SharePoint account and my interview transcript will be de-identified although my organisation will be identified (unless otherwise stated), and only university members of the research team will have access to the individual, unanalysed data. I understand that given the small number of participants, it is not possible to guarantee complete anonymity.

I understand that this research adheres to the Guidelines of the ethical review process of The University of Queensland and the National Statement on Ethical Conduct in Human Research. I have been provided with contact details of the researcher, as well as UQ Ethics Coordinator.

Participant signature_____ Date _____

I have organisational authorisation to participate in the interview   YES   NO

Date _____

Ethics ID number: 2023/HE000009

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Interview questions

Semi-structured interviews will be undertaken with senior government legal, policy, IT/systems and frontline management stakeholders, who have been involved in the development, governance, implementation and use of the ADM systems that will be explored via case studies.

Interview questions are shaped by the conceptual framework for the project. They will seek to achieve a more in-depth understanding of the ADM system, including its genesis, purpose, operation, legal and governance settings, and technical arrangements. There will also be a focus on exploring participant experiences, to understand the key risks and issues relating to good administrative conduct and administrative law that are associated with different kinds and contexts of ADM use.

Thank you for agreeing to participate in an interview regarding the ADM system. This interview will first ask some general questions about the system and its role in your organisation, from your perspective, and then ask more particular questions about your particular expertise and role in the organisation.

Your participation is voluntary, and you can stop the interview at any time.

General role of ADM in organisation

1. Can you provide us with some background of the ADM system in your organisation?
2. Can you tell me more about the scope and role that the ADM system plays (In your organisation? What organisational function does it contribute to and under which statute (if relevant)?
3. Can you please describe the operation of the ADM system, who uses it, for what purposes and its operation in relation to particular administrative decisions. (Prompt: please explain the different people involved, such as NSW service delivery agents, managers, NSW residents)

A. Systems development and technical operational aspects of the ADM

4. Who was involved in *developing* the ADM system in your organisation and what did the process look like?
5. What training was provided to your staff to understand how the tool works – and who did this target?
6. What is the technical operational design of your ADM tool?

B. Governance and legal context of ADM system

7. What approach was taken to understanding the risks associated with the use of the ADM system?
8. What kinds of concerns and risks were identified?
9. How were these concerns/risks addressed?
10. What are the legal statutes, regulations and authorisations under which the ADM system operates?

C. Operational aspects of ADM system and organisational learnings

11. Who has been involved in the *implementation and ongoing use* of the ADM system?

12. What has worked well?

13. What kinds of challenges have you faced in developing ADM in your organisation? How are these managed in your organisation?

14. How is your ADM tool monitored to make sure that it is working well and not having negative impacts on anyone (e.g. for accuracy; bias; due process issues etc) over time?

15. What practical things do you think would have helped/will help to support your organisation to ensure good governance and ethical/lawful use of ADM systems in your organisation going forward?

16. What is your message to other public agencies in thinking about using ADM in their organisation?

17. Do you have any resources you can make available to us, that can help with the case study on the ADM system?

18. Can you suggest anyone else in I could contact about the ADM system?

19. What is the technical operational design of your ADM tool?

D. Governance and legal context of ADM system

20. What approach was taken to understanding the risks associated with the use of the ADM system?

21. What kinds of concerns and risks were identified?

22. How were these concerns/risks addressed?

23. What are the legal statutes, regulations and authorisations under which the ADM system operates?

E. Operational aspects of ADM system and organisational learnings

24. Who has been involved in the *implementation and ongoing use* of the ADM system?

25. What has worked well?

26. What kinds of challenges have you faced in developing ADM in your organisation? How are these managed in your organisation?

27. How is your ADM tool monitored to make sure that it is working well and not having negative impacts on anyone (e.g. for accuracy; bias; due process issues etc) over time?

28. What practical things do you think would have helped/will help to support your organisation to ensure good governance and ethical/lawful use of ADM systems in your organisation going forward?

29. What is your message to other public agencies in thinking about using ADM in their organisation?

30. Do you have any resources you can make available to us, that can help with the case study on the ADM system?

31. Can you suggest anyone else in I could contact about the ADM system?

Thank you very much for your participation in the interview.

ACKNOWLEDGEMENTS

admscentre.org.au

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