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CSIRO Submission 20/740

Response to Issues Paper 2

Senate Select Committee on Financial Technology and Regulatory Technology

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Introduction

CSIRO welcomes the opportunity to provide input to the Senate Select Committee on Financial Technology and Regulatory Technology. We thank the Committee for inviting CSIRO to submit its perspective on the questions raised in the Committee's Issues Paper 2. CSIRO previously provided a submission to the Committee addressing questions in Issues Paper 1 and provided some additional information about our recent research and development in this area and our role in the Consumer Data Right. We also appeared before the Committee in February 2020.

In this submission we respond to questions in the issues paper that relate to areas of our research and expertise, especially Rules as Code, blockchain, digital identity, and data standards for the Consumer Data Right and for digital trade. As with all other research in CSIRO, our research in these areas is undertaken primarily for its potential impact on Australian industry, the Australian community, and Australia's national interests. We do not address the questions on tax and access to capital which are largely policy issues outside our scope. We also do not address the questions on know your customer or talent acquisition which are not currently areas of research.

CSIRO's research and project experience with industry and government give it an established capability both in the underlying technology areas and in the application of these areas of economic and social importance to Australia. Some of our technology focus areas include AI/ML including Ethical AI, Blockchain, Rules as Code, Privacy, and Cybersecurity. These are all highly relevant to FinTech and RegTech, and we expect that as FinTech and RegTech solutions grow they will integrate with a wide variety of new technologies in agriculture, manufacturing, robotics, smart cities, and enterprise software. CSIRO is a trusted provider of technology-neutral expertise to industry including banks, technology providers, and start-ups, and to government agencies including ASIC, APRA, AUSTRAC, RBA, Treasury and more broadly including to ACCC, DISER, DAWE, DSS, and DHA.

CSIRO sees FinTech and RegTech as areas of high potential impact for the Australian economy and society. Australia has a strong position in RegTech internationally, a strong financial services sector and an active FinTech sector. Fintech and Regtech could be new growth sectors for the Australian economy with global reach. The potential benefits of RegTech such as streamlining and improving regulatory compliance for businesses and individuals and reducing the cost to government of administering regulation are particularly relevant to supporting Australia's economic recovery over the long term.

CSIRO is available to discuss this submission further with the Committee. Please refer to the contact details on the cover page.

CSIRO response to Issues Paper 2

Consumer Data Right

The committee is interested in what kinds of measures may be required as the Consumer Data Right evolves in Australia to ensure that it increases competitive forces in Australia.

Trust is at the heart of the Consumer Data Right (CDR). Based upon our own consumer experience research, and other related research, CSIRO recommends that for relevant data standards the relative uniformity of consumer experience be maintained as much as possible across sectors, entities and use cases. This includes current, and future sectors, as well as 'big tech' companies. Relative consistency promotes understanding, trustworthiness, and comfort. This comprehension and assurance, drive consumer acceptance and their propensity to willingly share their data and engage in the CDR[1].

The committee is interested in hearing evidence on the progress of preparatory work for the rollout of the CDR into energy and telecommunications.

CSIRO was designated as the Data Standards Body (DSB) for the CDR in 2019. The DSB is in the process of being transitioned to the Department of the Treasury. CSIRO's Data61 is expected to continue to maintain a research relationship with the DSB into the future. In this role CSIRO has provided support and advice to the Data Standards Chair, including industry / eco-system engagement, and a work stream dedicated to consumer experience research that investigates issues including privacy and consent. Each sector presents different complexities for consumer experience issues, including privacy and consent. Preliminary work on the energy sector has discovered complex relationships between consumers and data.

The DSB has conducted research into how to describe the energy sector data in easily comprehensible ways. Through ecosystem workshops and the Data Standards development process, the DSB has explored mechanisms for authentication in a sector configured with an existing hierarchy for the flow of retail energy data. The DSB has also described the structure for the energy data to be transferred. This work continues to be undertaken in an open and transparent fashion through a public platform[2].

The committee also seeks feedback on the potential for Australia's CDR to interact with open banking data sharing schemes in other jurisdictions (e.g. California, the United Kingdom and Singapore), and how this potential can be realised.

International interoperability would also benefit from a relatively consistent and uniform consumer experience. This includes consent, authorisation, authentication, language usage, and expectations of sensitive data handling. Harmonisation across regimes should extend beyond the standardisation of user interfaces and API payloads, to the methods and processes for managing derived, or value-added data. The management of 'anonymised' data, for example, presents significant opportunities for innovative analytics, but requires an agreed understanding of the risks involved, and universal acceptance of their management. For example, as novel use cases and business models bring together more data sets in new ways, new data privacy risks are presented, which may erode and undermine attempts at anonymisation and de-identification. CSIRO's Data61 continues to provide research and insight into data privacy methods and platforms for Australian industry and regulators.

[1] Data Standards Body Consumer Experience Research
https://consumerdatastandards.gov.au/engagement/reports/reports-cx/
[2] https://github.com/ConsumerDataStandardsAustralia/standards/issues

Data Standards and Blockchain

The committee is interested in further exploring the issue of international data standards and facilitating data sharing with other jurisdictions. […]

Data standards are required for any kind of effective data sharing regime, including internationally and including blockchain-based approaches.

Blockchain is a general-purpose infrastructural technology, and data standards are still needed for any specific blockchain-based system. However, data standards for application domains such as in supply chains, construction materials, food, or trade are often technologically neutral, in being able to be used in a variety of different communications or database technologies. Such data standards will be equally applicable to blockchain technology too. Other standardisation activities relate to defining schemes to adapt existing data standards to blockchain, and to define standards for interoperability between blockchain platforms and between blockchain and conventional technologies. These are being addressed by existing international standardisation efforts.

The operations of regulators, and digital trade, both require industry and regulators to work together across organisational and jurisdictional boundaries. Blockchain technologies support this by allowing parties to retain administrative control over updates to their own data, while providing a common view of data and processes shared with other organisations. Blockchain infrastructure can be operated by a collective, to avoid capture by the interests of a single dominant central operator. So, blockchain technologies hold great promise for operationalising multi-lateral coordination across jurisdictions, departments, or companies, who may each not be willing nor allowed to cede administrative or operational control to another party.

The adoption of blockchain technology is possible now and in CSIRO's view does not need to wait on the "completion" of standards. While more standardisation can further increase uniformity, the standardisation process is never complete. The widespread uptake of Blockchain technology indicates that it is sufficiently mature for production systems to be implemented in Australia and internationally.

Rather than standardisation, in CSIRO's view the major new challenge for real systems is governance. Blockchain systems are operated by a collective, not by a single dominant entity. So, blockchain systems need to be governed by the collective. Bilateral pilot projects are an excellent start, but the broader adoption, oversight, and evolution of blockchain systems requires multi-lateral decentralised governance. Internationally, coordination for this may be a role that could be played by international organisations that Australia is a part of such as the UN, WTO, or others, as appropriate to the application domain.

The committee seeks feedback on what other [other than ISO and the two blockchain pilots] areas of digital international standards should be prioritised by the Australian Government to best enable FinTechs, RegTechs and other Australian stakeholders in the private and public sectors to benefit in the long term.

The next stage of adoption for digital transformation in the economy (including for blockchain-based systems) is to more broadly integrate existing data and processes using existing Application Programming Interfaces (APIs) and existing data standards. Blockchain-based systems are never stand-alone systems. They always integrate with data and processes from other systems. Whether for blockchain or other technologies, the key technical points of integration are APIs. FinTech and RegTech systems need access to APIs in order to deliver innovation and new services in the private and public sectors. One example of this is the Consumer Data Right regime, which is defining an API ecosystem initially limited to data access and to designated industry sectors. For FinTech and RegTech more broadly, the digital platforms operated by the Australian government are also critical for API access as the authoritative source of data and digital services

for many areas of industry, trade, and society. CSIRO encourages the Committee to continue to foster activities to increase access to APIs across industry and government.

The committee is interested in the deployment of blockchain-based systems that assist people and businesses to deal with government more easily and efficiently.

Governments internationally have been experimenting with and deploying production blockchain-based systems for various purposes. One example area is land title or property transfers, where the Republic of Georgia has a blockchain-based registry in production, and Sweden has carried out a series of test projects[3]. These systems target reduced transaction time and cost, and improved transparency or assurance of authenticity of deeds. Another example area is for social vouchers, the Municipality of Groningen (Netherlands) has a blockchain-based system in production, and the Netherlands and the UK have carried out test projects[4]. In Australia, CSIRO carried out a research project with the Commonwealth Bank on conditional payments on blockchain, motivated by the complexity of the National Disability Insurance Scheme[5]. These systems target more precision in spending against social security objectives, and reduced time and cost for participants. In the example area of trade certificates, the Australian Border Force is conducting a blockchain pilot jointly with Singapore, and CSIRO has conducted laboratory experiments on blockchains for biosecurity certificates. These systems target reduced time and cost to communicate and validate the authenticity of trade certificates.

Government data and services are an integral part of the workflow of many processes in industry and with other governments and other parts of government. The digital transformation of government as a platform for the economy is not just a blockchain problem. But blockchain technology can provide distinctive capabilities to enable a shared view of data coming from many jurisdictions or authorities. Blockchain technology also provides new capabilities to implement decentralised systems where multiple different authorities each need to maintain conditional controls over secondary authorities in an ecosystem. This can include delegated powers to inspect or certify, or secondary markets for saleable government-issued rights or assets. While in practice, data will often need to be retained behind secure government APIs, where data is required by policy to be public, blockchain also provides capabilities to increase transparency.

Digital Identity and MyGov

The committee is interested in exploring the long term possibilities of how a single digital channel to government could streamline the interactions of businesses and individuals with government, and how it could be used to support novel applications.

The long-term opportunities go beyond streamlined interactions with government, and will include streamlined interactions across the economy, using government as a trusted platform. The natural authority of government and the inevitable trust that the community places in it, creates the opportunity for government technologies to be critical digital infrastructure to enable a more productive and better regulated society. Trustworthy identity is vital across society, and many aspects of the digital identities of businesses and individuals arise from government authority and registers. Digital identity could be a critical element of government as a platform. One simple example of this to reduce fraud and risk, would be for business registers operated by government to be able to be used across society as a well-known

[3] The land registry in the blockchain – testbed: A development project with Lantmäteriet, Landshypotek Bank, SBAB, Telia company, ChromaWay and Kairos Future. March 2017.
[4] David Allessie, Maciej Sobolewski and Lorenzino Vaccari, "Blockchain for digital government: An assessment of pioneering implementations in public services", Report No. FRC115049, Joint Research Centre, 2019
[5] Making money smart: Empowering NDIS participants with Blockchain technologies. Daniel Royal, Paul Rimba, Mark Staples, Sophie Gilder, An Binh Tran, Ethan Williams, Alex Ponomarev, Ingo Weber, Chris Connor, Nicole Lim. October 2018

trustworthy source for businesses. They could confirm information about each other's bank accounts, internet domains, or digital signature keys. Businesses should be able to use this government digital infrastructure to build trustworthy services for the economy.

The committee is also interested in exploring the role of data in delivering seamless services to businesses and individuals and welcomes feedback on the innovative ways to achieve that.

Delivering seamless services requires careful consideration of user needs and design of data collection, methodology, and analytics approaches that are tailored to achieving those needs. Although more data provides more power for analysis, it is also important to consider ethics and data privacy in the application of these capabilities, to develop and maintain community trust in these systems. CSIRO's Data61 is leading research in trust, ethical AI, privacy and cybersecurity.

One innovative RegTech solution approach to enable less expensive regulatory compliance for businesses and individuals is to publish regulation as data: Rules as Code for areas of regulation that are complex, high-risk, change often, or involve frequent transactions. In principle, Rules as Code could also be published on a blockchain, to be able to be executed as smart contracts (or 'smart regulation'). If a government service is delivered using a blockchain-based system, then this smart regulation can also be checked automatically as part of the service delivery. This would allow the regulator to project regulation into the ecosystem for in-built high integrity compliance and would facilitate the rapid implementation of updated regulatory controls.

The committee [is] interested in approaches to cyber security in the FinTech and RegTech space, and seeks comments on whether current industry practices and requirements in relation to data security are adequate.

As domains continue to amass more data that represents commercial and private information, such as in the developing areas of RegTech and FinTech, so to do the risks of cybersecurity breaches. Therefore, assessment of the risks in these domains will become ever more important. New entrants to these domains may have low cyber security maturity levels and practices that are yet to be systemised or stress tested. Cybersecurity gaps can emerge when digital transformation outpaces cyber security skills development. These gaps introduce new types of cyber security risks not only for the domain but also for other inter-dependent domains, stakeholders and users. Australia must constantly assess and improve its cybersecurity capabilities as our FinTech and RegTech sectors mature.

Rules as Code

The committee seeks feedback on priority areas for implementing a 'Rules as Code' vision and how this can be accelerated.

Rules as Code models of legislation or regulation are both machine-interpretable and human-readable. CSIRO's Data61 has learned from previous pilot projects that it is technically feasible to use a Rules as Code approach to create and validate models of many kinds of law. The modelling approach requires effort but is scalable. Similar approaches have also been used to support a service in NSW[6] and form part of the *Strategy for a Digital Public Service* in New Zealand[7]. Nonetheless, further research and development could enable more efficient translation of existing legislation into machine readable material.

[6] https://www.fairtrading.nsw.gov.au/community-gaming/community-gaming-regulation-check
[7] https://www.digital.govt.nz/digital-government/strategy/strategy-summary/strategy-for-a-digital-public-service/#Foundations

Government as a central natural authority for legislation and regulation undertakes to publish Rules as Code models, they will tend to have greater legitimacy, and the central publication of the models should improve consistency and reduce duplicative work across government and industry. CSIRO expects that in future Rules as Code will become part of the core business of governments globally. The Australian government is well-positioned to take a leadership role in Rules as Code, supported by Australian RegTech research and industry.

CSIRO recommends that the government consider undertaking a program of work leading to the publication of Rules as Code models for important bodies of legislation or regulation. This will help create important Rules as Code digital infrastructure for future scalable innovation through pilot projects and use by RegTech businesses. Published models should be both machine-interpretable and human-readable, and the mechanism for computers to interpret these models should be described and be available for public use.

- Areas of regulation could be chosen because of their potential to support productivity improvements in industry and in government, or to improve the quality of regulatory compliance. This may be where government or industry needs to deal with regulatory compliance across many frequent transactions in a sector, where a high level of advice is currently required, where there are many exceptions and exclusions in the law, or where regulation changes frequently.
- The selection of areas of regulation should be cognizant of how solution concepts can depend on how the law is drafted. For example, while it is not necessarily more difficult to model the “black letter” parts of principles-based legislation than it is for prescriptive legislation, it can sometimes be more difficult to fully automate the assessment of facts about situations under principles-based legislation. Discretionary judgements are not made by Rules as Code technology, but those judgements can be made separately and incorporated into the calculations performed by Rules as Code.
- Projects should create Rules as Code solutions using multidisciplinary teams of policy analysts, legislative drafters, and software developers, to co-design models of legislation or regulation.
- Projects should report on costs and benefits from use of the Rules as Code models, to create learnings about adoption for government.
- We suggest that agencies responsible for the publication of Rules as Code should start planning for the likely expansion of these as an ongoing platform to support a range of government and industry applications.
- We recommend that initially, any machine-interpretable and human-readable model of legislation or regulation that is published by the government only be published as “guidance”, or an “example”, or a “tentative descriptive model”, rather than as a stronger kind of regulatory instrument.

Potential areas to target for Rules as Code, include import/export regulation, building & construction, planning approvals, environmental regulation, permits and licensing for businesses, food labelling or defence export controls. Further information on some of these priority areas include:

- Building and Construction: This sector represents about 9 per cent of Australia’s Gross Domestic Product and has a range of challenges including the need for more consistent assurance about construction, low levels of cross-industry digital processes and low levels of productivity growth. The conversion of the Building Code of Australia (BCA), contained within the National Construction Code (NCC) to a Rules as Code service, would be able to support the objectives and implementation of the Building Confidence Report. This could be done through fostering an ecosystem of new regulatory solutions developed by a combination of state and territory regulators as well as RegTech businesses. These solutions should be able to capture a range of relevant data through automated processes that will provide greater assurance about the products, processes and people involved in any construction project. This data could also help support a more effective and

affordable insurance market for the building and construction sector, creating a financial incentive for automated data capture and compliance assessment through Rules as Code systems.

- Export regulation: Australia exports around 70 per cent of the total value of agriculture, fisheries and forestry production. Regulation and compliance costs for Australian agrifood exporters are among the highest in the world, but these high standards of Australian export regulation are critical for maintaining our competitive advantage, which is international trust in our food. The challenges raised by future export aspirations to double exports can be mitigated by a digitisation effort, transforming the system of handling registrations, sign-offs and compliance approvals. This can significantly lower export barriers and reduce compliance costs, while at the same time facilitating expansion of exports by offering scalability. This can be achieved through digitisation of export regulations through Rules as Code and data collection throughout the supply chain, to automate demonstration of compliance. In addition, remotely augmenting export compliance audits through telepresence and sensor technologies could build trust, leading to reduction of existing on-site audits and associated costs. Rules as Code allow to fully utilise tracing data to support export compliance and provide the necessary agility to shift to different export markets, through automated identification of regulatory requirements.

Regulatory Culture

The committee seeks further input about how these initiatives [PMC measurement of regulators, PC report on RegTech, and budget RegTech commercialisation] can help spur the development of the RegTech sector in Australia.

These initiatives are worthy and support the development of the RegTech sector in Australia. There are also other government activities including ASIC's Innovation Hub RegTech Initiative. However, there is no overall network or coordination for RegTech in digital transformation across government. An earlier government inter-departmental Digital Legislation Working Group functioned as an effective knowledge and innovation network, but it is now in hiatus, and to restart would require a mandate, organisational owner, and leader.

In our experience, Australian regulators generally have a positive attitude to innovation, including in RegTech. An important issue might concern the priorities and resourcing for regulatory agencies, rather than their culture. Individual agencies can legitimately seek to improve their own internal efficiency and have a clear incentive to do so. But agencies do not necessarily have such a clear internal incentive and associated resourcing to work to reduce the cost of regulatory compliance in industry and in society. Regulators and business both have costs dealing with regulation, but sometimes these are duplicative or joint costs. This goes beyond the regulation itself, to the systems that regulators use to interact with businesses, citizens and other parts of government. The government should consider the directions and resourcing provided to agencies to prioritise RegTech adoption, in areas where any additional cost is likely to be significantly less than the potential national productivity benefit from reuse and automation across government and industry.

Trade and International Policy

The committee will also consider Australia's broader digital trade policy. […] The committee is interested in initiatives to deepen engagement on digital economy issues in the negotiation of future FTAs, and the scope for pursuing DEAs or FinTech Bridges with other partners.

In an international context, Rules as Code could significantly streamline trade as it facilitates digitised trade agreements, and automated export requirements and regulations. To allow for digitised international trade, a bilateral agreement on creation and adoption of standards for automation of regulations is

essential. The development and adoption of such standards for both data exchange and Rules as Code could be considered the first essential step towards full automation of import and export regulations. Changes in export requirements can be seamlessly adopted by both government and industry. As such, unnecessary costs and waste resulting from incognizant non-compliance can be eliminated. Furthermore, by streamlining compliance and auditing, it ultimately expedites trust between international trading partners.

CSIRO notes and supports the opportunities presented by the recently-signed Australia-Singapore Digital Economy Agreement (DEA) which present mechanisms to reduce trade barriers in international digital commerce and RegTech services. The Australia-Singapore DEA includes a number of Memorandum of Understandings (MoUs) covering harmonised digital rules to reduce trade barriers and to encourage data innovation, to make it easier to transfer data across borders with appropriate safeguards.

CSIRO notes and supports the pilot activities being undertaken by Australian Border Force with Singapore on the Intergovernmental Ledger for trade certificates on blockchain. CSIRO's Data61 has undertaken research aligned with that general vision, exploring the use of blockchain to augment existing biosecurity certificates in trade[8].

We hope that these insights will assist the Committee's investigations into the opportunities for government to promote effective and sustainable growth in Australia's economy and global competitiveness through FinTech and RegTech.

CSIRO is available to discuss this submission further with the Committee. Please refer to the contact details on the cover page.

[8] Qinghua Lu, Mark Staples, Hugo O'Connor, Shiping Chen, Adnene Guabtni, Software Architecture for Blockchain-based Trade Certificate Systems. In "Proceedings 2020 IEEE International Conference on Blockchain and Cryptocurrency (ICBC)", 2020.

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