Developing a Systemic Design Practice to Support A Regulatory Agency in Addressing Complex Problems

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Abstract

Regulatory agencies are an important stakeholder in addressing complex societal problems and are beginning to recognise that these kinds of problems cannot be managed using traditional regulatory tools. In this paper we examine existing regulatory problem-solving theories and identify their limitations in addressing complex problems that are dynamic, unordered and exist within social systems. We build on these findings by describing the outcomes of a case study examining the problem-solving practice of an Australian Government regulatory agency. We propose numerous opportunities for the development of a systemic design practice within a regulatory context. The development of a systemic design practice would support regulators to navigate disjointed governance systems and establish a shared frame of reference to problems, disrupt traditional thinking patterns, enable solutions to be co-designed and encourage practices to incorporate active reflection and iteration.

Introduction

Government regulatory agencies are almost always an existing stakeholder within the systems that complex societal problems emerge. Regulatory agencies can play a powerful role in addressing these problems because they are specifically funded and legally empowered to manage problematic conditions within specific business and community sectors (Organisation for Economic Co-operation and Development, 2012). For example, the financial regulator in Australia has the power to help stabilise financial markets by monitoring the conduct of company directors and prosecuting them if they fail to act in the best interests of the corporation or its shareholders.

We adopt the view of Jackson (2010) and Veale (2014) that regulatory agencies operate from within a positivist paradigm that relies upon a hard-systems methodology to address problems. This conventional approach aims to reduce complexity by defining and compartmentalising problems and controlling them through pre-defined rules and strategies. While the conventional approach has been effective to manage simple and well-framed problems, it becomes counter-productive when the complexity of a problem increases (Ryan, 2016).

Outside the regulatory context, new approaches have been proposed to address complex problems that acknowledge the interconnected and dynamic nature of these problems and the requirement to respond with experimental, iterative and reflective approaches (Dorst, 2015; Snowden & Boone, 2007). The field of systemic design is evolving to support organisations to deal with increasing complexity and shift their thinking to develop radically innovative approaches (Jones, 2014).

Regulatory agencies around the world are beginning to identify that there are systemic problems in the markets that they regulate and these cannot be managed using existing regulatory tools. This new focus on 'problem-based regulation' (Sparrow, 2008) and the search for new strategies provides a fruitful area for the development of a systemic design practice. The objective of this research is to explore the opportunities for systemic design to be adopted as an alternative approach for complex problem solving within a regulatory context.

In this paper we first describe the dominant problem-solving approaches within regulatory theory and their limitations in addressing complex problems. We then develop a deeper understanding of real life practice that results from applying these regulatory theories to a complex problem through an in-depth case study at an Australian Government regulatory agency. Based on the findings of the case study, we recommend opportunities for the development of a systemic design practice within this context. This research approach is in line with the accepted idea from design research methodology that it is important to understand the nature of the context and the existing practice to inform the development of a new practice (Blessing & Chakrabarti, 2009).

Dominant Regulatory Approaches and Their Relevance for Complexity

Three clear problem-solving approaches can be identified within regulatory theory – these are responding according to legislative mandates, responsive regulation and problem-based regulation. These approaches are also apparent in regulatory practice, including in documented strategies of the case study agency.

Responding according to legislative mandates

Regulators act under a set of legal rules (legislation) that prescribe what a business or individual can and cannot do, possible actions by the regulator such as audits and investigations and possible responses the regulator can enforce when rules are broken (for example to revoke a business licence, issue a fine or prosecute an individual). The term regulation literally means 'to control by rule'. These rules are based on an assumption that problems can be predicted and controlled by pre-determined responses, which is contradictory to new ideas about the non-predictable nature of complex problems, particularly when they involve human behaviour (Kurtz & Snowden, 2003).

When serious unforeseen issues occur in a market, the legislation is amended with more rules and stronger powers for the regulator to clamp down on these problems. Dorst (2015) comments that the authoritative knee-jerk reaction to create more rules to prevent incidents limits an organisation's ability to improvise and innovate; paradoxically setting an organisation's possible responses to be even more static while the world around us becomes more dynamic. Excessive legal definition of a problem and response may also limit the frame to which agencies are likely to envision the problem and possible solution.

Responsive regulation

A popular regulatory theory of responsive regulation encourages regulators to address problems based on a scale of escalating responses, including actions that may not be specifically outlined in regulation such as education or public shaming (Braithwaite, 2011). The basis of the theory includes useful principles in the context of complex problems, including considering the issue within its context, not imposing a preconceived theory, actively listening to stakeholders and responding to problems in a probing way with a series of escalating sanctions. However, in use the theory tends to be distilled down to a central concept of the responsive regulatory pyramid (often referred to as a cooperative compliance model), see figure 1. This provides a guide for certain tools or responses to be applied based on the level of risk of the problem and the attitude of the organisation or individual. For example, if a business was supplying natural medicines into Australia and not complying with the labelling rules, the relevant regulatory agency would respond based on the level of risk the non-compliance posed to the community. This could range from providing education material to the company to issuing a criminal penalty to its directors.

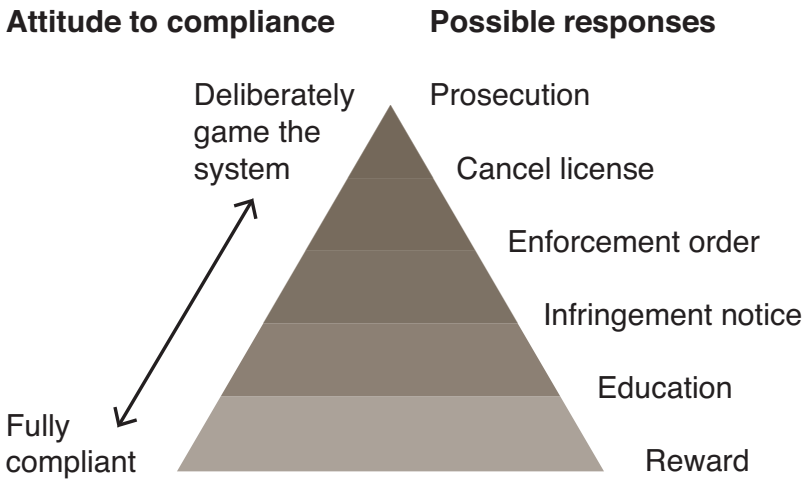

Figure 1: Responsive regulatory pyramid

The responsive regulatory pyramid is based on rational choice theory (Braithwaite, 2011), a fundamental economic theory that assumes that humans make efficient, self-interested decisions to achieve their desires and that their behaviour and choices can be modelled to determine outcomes (Jonge, 2012, Lakoff, 1999).

While it is easy to see how rules-based procedures may be necessary to support high volume decisions on simple matters, systemic designers and complexity theorists are clear that this is an inadequate approach for decisions on complex problems. Firstly, rational choice theory is inadequate to understand human decision making which relies more on emotional reasoning (Kahneman & Tversky, 2000) and contextual influences (Kurtz and Snowden, 2003). Secondly, categorising problematic behaviour and applying actions that are considered best practice based on a successful past response (such as providing education to businesses that demonstrate minor non-compliance), will only be effective if there is a clear cause and effect relationship and the right answer is undisputed (Snowden & Boone, 2007). Snowden and Boone (2007) describe the relevant situations for best practice as being simple, ordered contexts such as process issues.

Problem-based regulation

In the last ten years, a focus on problem-centric regulation has permeated regulatory practice following the popular work of Malcolm Sparrow (2008). Sparrow emphasises that the fundamental purpose of regulation is to solve societies more intractable problems. He proposes that regulators become more flexible in making choices in how to respond to issues by developing new strategies outside of the legislation as well as relying on existing tools. Sparrow recommends that regulators use risk assessment approaches to identify systemic problems, or specific patterns of risk that are revealed repeatedly in the sector, which might manifest as crime problems, environmental issues, drug smuggling etc. Once identified, Sparrow recommends that regulators act like saboteurs to find new ways to disrupt the problem, and that this should be done by leveraging different skills through cross functional teams.

In observing past practice that can be used as inspiration, Sparrow provides a case study of a US customs agency who were trying to address drug smuggling on the Mexico/US border. A probing

strategy was enacted, where the agency trialled different interventions such as sniffer dogs and tyre spikes in several sites. They adjusted their response based on the reaction of the various entities until they came up with a solution that worked in most cases. This type of response reflects the recommended action against complex problems by Kurtz and Snowden (2007) to create environments and experiments that allow patterns to emerge and to then reflect and adjust the approach.

However, in contradiction to the inspiring case study, Sparrow recommends that regulators attempt these systemic problems using a linear problem-solving protocol based on the policing SARA model (scan, analyse, respond and assess) (Sparrow, 2008).

Table 1: Problem-solving protocol, Sparrow 2008, pp 158

Problem-Solving Protocol
Stage 1: Nominate & select potential problem for attention
Stage 2: Define the problem precisely
Stage3: Determine how to measure impact
Stage 4: Develop solutions/interventions
Stage 5(a): Implement the plan
Stage 5 (b): Periodic monitoring/review/adjustment
Stage 6: Project closure, and long term monitoring/maintenance

This hard-systems approach to problem solving was established during operations research in the Second World War, where industrial and technology problems were able to be controlled and manipulated to achieve a pre-determined goal. This way of thinking was adopted within management science, establishing the notion of the organisations as rational, goal seeking entity able to control problems through compartmentalising them, selecting an appropriate tool and evaluating the results (Checkland, 1994).

This goal-orientated approach to problem solving has come under much criticism from authors in systemic design and complexity who claim that it is being incorrectly applied to complex problems within social systems. Social systems are fundamentally different to the ordered realms of industry and technology due to the nature of human intellect and the diversity of our experience and responses (Nelson & Stolterman, 2012). The increased complexity in an interconnected and globalised world also means that it is almost impossible to predict the impact that actions will have within a complex social system (Dorst, 2015; Kurtz & Snowden, 2003).

Systemic design to support innovation within regulatory practice

We believe that Sparrow has captured the imagination of the regulatory community and focused their attention on the critical issue of addressing society's most difficult problems. However the tools and strategies that Sparrow recommends are inadequate to prepare regulators to innovate against the complexity of such problems. This is especially difficult within an organisational paradigm that relies primarily on hard-systems methodologies from the fields of law, economics and management.

Systemic design and complexity theories arise from more diverse and transdisciplinary paradigms and help us to consider the broader systems that problems operate in. They accept that organisations are continually changing social constructs and that problems can have many different interpretations based on the mindset and vested interests of the person perceiving the problem (Checkland, 1994; Nelson and Stolterman, 2012). Systemic design encourages practitioners to take a broader view of a situation to appreciate these multiple perspectives and shift thinking away from the assumption that problems can be objectively defined and controlled.

We believe that practices from systemic design can be adapted to support regulatory agencies to address complex problems. This is supported by previous successful case studies in the application of systemic design within government (Ryan & Leung, 2014; Veale, 2014) and the application of design to public policy and services (Bason, 2014; ThinkPlace, 2016).

The above analysis of regulatory theory indicates that there is limited guidance to support regulatory agencies to deal with complex problems. To understand how these theories are applied and what other factors influence problem-solving practice, we conducted a case study within an Australian Government regulatory agency. These insights provide a foundation for the development of systemic design interventions in a regulatory context.

Case Study Overview: Problem-solving Practice in a Regulatory Agency

Case study subject and context

The unit of analysis in the case study was a project undertaken by an Australian Government regulatory agency to address a systemic risk or problem that they had identified using methods recommended by Sparrow (2008).

This project was undertaken within an Australian Government regulator responsible for ensuring quality of goods and services provided by a specific business sector. The organisation is reasonably small, and employs a majority of staff with an extensive history of regulation within the sector, as well as some newer staff from other industries and sectors.

The business sector being regulated is large and very diverse, ranging from family operated businesses to large multi-national enterprises. The customer base is also extremely diverse. There is a complex governance arrangement around this sector. This includes separate federal government departments responsible for setting policies, developing legislation and providing assistance programs, state government departments providing funding, and regulators responsible for related segments of the market covering consumers, fair trading and company and tax law.

Objective

The objective of the study was to understand how the regulatory agency addressed a complex problem and the potential for systemic design interventions in this context. This drove the following research questions:

- Q1: What is the level of complexity of the problem that the case study project aimed to address?
- Q2: What practices were used in the case study project to address the problem?
- Q3: What other contextual factors impacted the problem-solving practice within this case study?

- Q4: Which elements of practice in the case study project might benefit from a systemic design approach?

Research method

We conducted an in-depth case study involving:

- Policy and project document analysis
- Observation of project steering committee meetings
- Semi-structured interviews with six project managers and officers which were transcribed and iteratively coded to research questions and emerging themes

Case Study Findings

Q1: Complex nature of the problem

The organisation had recently adopted the recommendations of Malcolm Sparrow to implement more sophisticated risk assessment that took into account a range of external perspectives through environmental scanning. Through this work, a new systemic risk emerged which related to the potential misuse of a government assistance program. This appeared to be linked to poor business practices which negatively impacted a high number of consumers. The regulatory organisation took this as a first opportunity to experiment with Sparrow's problem-based regulatory approach. This required an experimental stance since there were no business rules or past practice to rely on.

The nature of the problem itself could be described as complex (Snowden and Boone 2007) since it involved:

- large numbers of interacting elements, including businesses, agents and consumers
- a complex governance arrangement with policy and funding settings that changed over time without necessarily interacting with other agencies in the governance system
- unclear cause and effect, with many aspects of the problem unknown and hidden through collusion or lack of information
- a dynamic broader system since the issue impacted many industries and aspects of business (and hence drew interest and influence from other governance bodies and public entities).

In addition, staff recognised the problem as complex and one that they weren't sure how to tackle:

> *[Interviewee 4] "…I think that's probably been the biggest part that it is very much a multi-dimensional problem and it's not just one particular thing we are looking at. There are a lot of factors we have to keep up in the air at all times".*

Q2: Current problem-solving practices

The problem quickly gained the attention of the media around the time that it was being identified as a systemic issue by the regulatory agency. Due to the external public pressure, the agency acted quickly with limited time or resources invested in understanding the nature of the problem and developing the approach.

There was initial engagement with other government agencies to discuss the nature of the problem and determine which agency should take responsibility to act against specific concerns. This included the case study agency mapping specific concerns against regulatory agency responsibility for the various government entities in the sector. However, this work gained limited buy-in from other agencies so the case study agency commenced a project to address the problem from within their own regulatory jurisdiction.

A project manager was assigned and worked with another staff member to determine how to proceed. Internal complaints data was used as the main problem indicator and there was limited access to broader information including from other government agencies. A strategy was developed to gain more insight into the problem through a variation to the standard regulatory audit approach. This included conducting stakeholder interviews, varying the standard scoping rules for audits and including control audits with businesses not seen to be engaging in the problematic behaviour. The strategy was written into a project plan which included expected outcomes, KPIs and a project timeline. The strategy was given to another team to implement.

The team that gained responsibility for implementing the project aimed to utilise a cross-functional team by drawing on staff from different areas of the business. However, various challenges arose at this stage due to a hesitation by staff to adjust the original plan, a lack of understanding and reluctance of staff to implement audits that went against their normal business practices, and pressure to act quickly in order to report back through a parliamentary inquiry process which limited the depth and usefulness of some of the activities.

The initial regulatory activity to uncover the nature of the problem took a significant period of time and eventually led to responses enabled under the legislation such as imposing conditions on business registration, cancelling business registration, enhancing monitoring by the regulator, 'public shaming' by publishing concerns about particular businesses and increasing public education on compliance expectations. In the meantime, the scale of the problem was being recognised as more significant and growing.

The case study agency found some success in sharing data with other government agencies involved in the problem area and undertaking collaborative action. However, there remained a gap in understanding between many of the agencies of what the true problem was and how to best address it. This became apparent through the central government department adjusting policy settings and regulatory mandates without communication or agreement from other agencies, something that the case study agency believed would add to their workload but not increase their effectiveness against the problem.

The problem has continued to be monitored and addressed through a small team of staff who come together to discuss findings and issues in a steering committee with broader organisational leaders once a week.

Case Study Discussion

Q2 Current problem-solving practices – limitations of responding according to legislative mandates and the responsive regulatory pyramid

The dominance of relying on approaches established through legislation is clear in the scope of responses that were considered in the early stage of the project. These were limited to a variation on existing practices to understand the problem and categorising findings to apply established actions such as imposing conditions on registration, cancelling registration and education. This study did not extend to assessing the overall effectiveness of these actions on managing the systemic problem. While there is certainly strength in a regulator being able to impose legal conditions on the operation of a business, from a systemic design perspective there are likely to be many more leverage points to disrupt the problem beyond this scope of actions. This could include broadening the regulators influence by working on collaborative actions with external stakeholders interested in the problem, such as consumer groups, not for profit organisations and other business entities.

Q2: Current problem-solving practices – trialling problem-based regulation

This case study was the first opportunity for the regulatory agency to trial a problem-based regulatory approach following the recommendations of Sparrow (2008). It was clearly the right approach for the agency to identify this systemic problem and treat it with dedicated project resources since it proved to be a particularly systemic and harmful public issue throughout the project. This is opposed to treating instances of the problem on a case-by-case basis which would occur through a standard audit process. The project was viewed as an opportunity to trial a new approach without any previous business processes to follow and led to rich learning for the organisation. As the initial project manager commented:

> *[Interviewee 2] "I grabbed it as an opportunity. It took the life out of me. But that was about shifting our risk model at that time into this new way. Because the only way I know in this organisation to get things moving is to show them how it can be done. And this was the biggest win. So crisis was our friend".*

It is not unexpected that the agency's initial approach against the problem was limited to a variation on existing regulatory practice while following the linear problem-solving protocol as recommended by Sparrow (2008). The linear problem-solving protocol was evident in project planning documentation (define problem, determine how to measure impact, develop solution, implement) and the initial lack of reflective practice and iteration to frequently re-evaluate the understanding of the problem and redesign responses. Sparrow's emphasis on 'defining the problem precisely' at the beginning of the project was also followed with the agency forming a hypothesis without extensive input from external stakeholder perspectives. As stated by other authors including Veale (2014), the perception of an objective and knowable problem leads people to converge on a solution, usually relying on past practice to inform a solution. This is in contrast to a divergent design approach which broadens the perspective and considers and develops many possible responses before selecting one or many to trial.

Implementation of a linear problem-solving approach was also compounded by staff feeling pressured to act quickly:

> *[Interviewee 4] "The [case study agency] is exceptionally fast paced in comparison to other agencies. So one of the biggest problems that we had in working was that we were - let's get this done, let's go do it you know, let's work this out… That also does have a negative though, from a toolbox and a project perspective because we need to just get in and get it done. You don't really have that time to reflect and to think of new ways of doing it".*

Interestingly, the agency did adopt a much stronger reflective practice towards the end of the project when they realised the ineffectiveness of using rules-based approaches to investigate a complex issue. This led to more dynamic group discussions at a steering committee level, trialling of more experimental analytics and investigations methods and the redesign of existing audit models to encourage staff to make more unique judgements in response to each situation.

While learning through challenging experience is necessary, we propose that regulators can be better supported to deal with complex problems through the introduction of new approaches from systemic design.

Q2: Current problem-solving practices – separation of planning and implementation

The teams involved in the project adopted a common practice in management and policy of having one team plan the project and a separate team implement it. While this was partly done to navigate resource constraints, it was clear that many of the staff involved in the implementation phase did not properly understand the problem or the rationale for the adopted strategy and did not feel empowered to make adjustments. This was evident from some staff ignoring instructions to vary their audit approach and reverting to standard practice. Other staff were aware of issues in the original project plan including unrealistic timeframes but did not feel empowered to make adjustments. In contrast, a systemic design approach aims to build a core design team including staff with diverse skills and expertise to drive a project throughout planning and implementation phases. This allows a common frame of reference to be developed and for the strategy to be frequently adjusted based on project learning (Thinkplace, 2016).

Q3: Contextual factors influencing problem solving – networked problems and separated government entities

One of the most interesting findings from a systems perspective were the challenges the regulatory agency had in acting against a problem which exists in a much broader context than its own organisational focus. As Dorst has identified "The passing of structures and systems of the industrial age and the rise of the networked society have resulted in open, complex, dynamic and networked challenges that can only be successfully met by organisations that are ready to become open, complex and networked themselves" (2016, p. 7). While the case study agency acted as a leader in an attempt to bring other government stakeholders together, these efforts were hampered by other agencies not viewing the problem as a priority, not accepting responsibility to help address the problem and having different perceptions of the problem.

We believe that a major contributor to the difficulty in government agencies collaborating on a problem that exists broadly in the sector, is the strong structural separation of these agencies and the emphasis on accountability through demonstrating control and effectiveness. Each government agency has objectives within a specific area that they are held accountable for. Although guiding policy documents usually always encourage a 'whole-of-government' or 'joined up government' approach, when an agency's budget assurance (i.e. job security) and public reputation (i.e. pride and personal wellbeing) are tied to demonstrating effectiveness against stated objectives, it is easy

to see how collaborative efforts may slide. Stacey (in Stacey and Griffin 2007) writes extensively about this issue and the "cult of performance that replaces purpose" (pp.15-42) within public sector organisations when private sector accountability models are imposed. As one of the case study agency managers expressed:

> *[Interviewee 2] "Everyone's got their own priorities and that was part of the clash in [case study problem], you know, everyone tries to focus on their own priorities and each other's may not be shared".*

Seen from a systems perspective, establishing government agencies to manage issues within very specific segments of a market is akin to compartmentalising problems in order to improve the whole (Dorst, 2015; Veale, 2014). Soft-systems and complexity theorists claim that while this approach may be adequate to manage very ordered systems, it is not effective to manage whole systems which are dynamic and in constant flux (Checkland, 1994; Snowden and Boone, 2007). This is the realm of complexity, which practices like systemic design are evolving to address.

Q4: Which elements from practice might benefit from a systemic design approach?

A range of initial case study findings and opportunities for systemic design were presented to the case study agency as below.

Case study findings	**Systemic Design Approaches**
Difficulty developing common understanding, acceptance of responsibility and response to the problem amongst other organisations within the system	Jones (2013) states that participatory methods are an important foundation for design within complex social systems. Facilitated workshops offer the opportunity for stakeholders to come together around a problem and develop a shared frame of reference, consider various perspectives and to develop a pathway for action (Dorst, 2016).
Reliance on internal skills and data to address the problem	Design methods focus on understanding a range of perspectives through research, collaboration or simply mapping and considering the needs of broader stakeholders (Jones, 2014).
Early focus on solutions without a broader understanding of the problem and its context	Design methods focus on gaining a broad understanding of the problem context so that a problem can be reframed before solutions are developed. This encourages a divergent approach – where new information leads to new responses, rather than a convergent approach where solutions are determined based solely on the information at hand, limiting perspectives, solutions and effectiveness (Dorst, 2015).
Separation of planning and implementation with a view by some staff that plans cannot be adjusted	Design approaches encourage a core design team to be developed around a problem to support consistency and cohesive understanding throughout various stages of a project (ThinkPlace, 2016), as well as methods that co-evolve the understanding of a problem with the development of solutions (Dorst and Cross, 2001). Reflective practice is encouraged to adjust project plans throughout implementation (Schon, 1995).
Incremental innovation until much	The introduction of design innovation methods early in the project disrupts traditional thinking and explores many ideas and opportunities

Case study findings	Systemic Design Approaches
later in the project	quickly and cheaply. Ideas have an opportunity to be raised and tested in a more dynamic group environment (Dorst, 2015).
Difficulty of staff accepting and implementing new approaches	It is recommended that some staff involved in the implementation phase are involved in design workshops to ensure they understand the issue and contribute to a solution. Representation from various skill levels within an organisation also ensures diversity of perspective. Frontline staff in particular can provide valuable information about stakeholder needs (ThinkPlace, 2016).
Working aesthetic limited to written documentation, data analytics and formal steering committee meetings	While the dominant government working aesthetic is connected to making serious and accountable decisions (Bailey & Lloyd, 2016), creative practices introduce visual and playful learning which have the ability to disrupt traditional patterns of thinking (Dorst 2015). Systemic design includes deeper methods to understand the complexity of a system and fast, generative methods to stimulate new ideas.

Based on these recommendations, a series of systemic design workshops were designed and implemented to support the agency address a new systemic risk that emerged. The workshops prioritised building a partnership approach with other government agencies, understanding the problem from multiple perspectives, and considering new ways to address the problem outside of only standard regulatory practice and legislated activity. Future research will include an analysis of these systemic design interventions and whether they need to be adjusted for adoption within the regulatory context.

Conclusion

In this paper we consider how regulatory agencies address complex problems, firstly from a theoretical perspective and secondly from the findings of a practice-based case study. It is clear from this study that regulatory agencies are beginning to recognise complex or systemic problems in the markets that they regulate and consider how they can be better addressed. Systemic design methods provide an opportunity for regulators to develop interventions which better address the complexity of social problems and help to navigate the challenges of disjointed governance systems through framing and co-design.

Introduction of new methods such as systemic design would need to be supported by a strong understanding of organisational learning and change. This is particularly important within an environment that maintains long-held rational assumptions about the ability to predict and control problems through pre-determined strategies. However, the case study agency has already demonstrated a willing openness to experiment with new approaches. Developing a systemic design practice may just require further opportunities to trial new methods, documentation of outcomes, and iteration within this specific context.

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