Government Services Architecture

Research in Progress

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Abstract

To enable 'future state' service strategies new architectures are required to enable government and regulatory operations to be more open to disruption and innovation. Through a service science perspective, this paper outlines a government services architecture (GSA) to enable social welfare delivery to be driven by, and responsive to, changing social and economic forces. Using Service Dominant Logic as a kernel theory, we developed an initial set of requirements from which three models were derived: 1. GSA Theoretical Framework (research and theories); 2. GSA Meta-Model (objects and relationships) and; 3. GSA Functional Model (functions and interactions). The research provides a practical application of SD-Logic by responding to limitations of government service business models and supporting approaches to architecture. The implications for government and further research is identified.

Keywords: e-Government, Ecosystem, Service, Enterprise Architecture, Social Welfare.

1 INTRODUCTION

Throughout the start of the 21st century we have seen major disruption and transformation occur across many industry sectors such as media, transport and finance. While it is evident that transformation in these industries has been driven by the 'market' to produce dynamic service offerings – the delivery and innovation of government and social services have remained challenged and constrained by enterprise boundaries, layers of regulation, and internally driven innovation cycles.

Public agencies have been seeking to transform the delivery of services through strategies that enable them to be more contestable, transparent, and accessible to both citizens and non-government parties (United Nations 2018; OECD 2019). For instance, across the European Union there is an emerging focus on service interoperability to drive regulatory capabilities and allow information systems to be to open, transparent, and standardised enabling greater digital service integration (OECD 2017; 2019). Similarly, across the Australian Government, service agencies and policy departments are introducing strategies aimed at providing both vertical and horizontal integration and re-use of service instances and capabilities (Thodey 2018; United Nations 2018; Digital Transformation Agency 2019).

Within this context of transformation where 'joined up government' (cross agency coordination and delivery) is enabled with new technical capabilities, public agencies are looking to pivot from a focus on being a 'service provider' or 'policy delivery' to one of 'ecosystem steward' or 'service integrator' (Smith and Crainfield 2019). In this emerging role, where delivery is 'horizontally and vertically co-ordinated through inter-agency stewardship and governance (Smith and Crainfield 2019), the focus becomes the establishment of capabilities and frameworks that provide ecosystems and platforms. Which then enables participants to collaborate, generate, bundle, and access 'service' and 'value' outcomes across agencies and sectors. In addition, if we consider the research on next generation systems to support collaboration and co-creation the focus of design moves from monolithic approaches to ecosystems, platforms, and service (Desouza and Bhagwatwar 2014; Vargas et al 2016).

To support this transformation, adequate business models and architectures that translate conceptual theories are required to support notions of 'service', 'market', and 'ecosystem' (Vargo 2016) . From the research on 'service' and 'public administration' two related challenges have been identified in meeting this requirement. Firstly, business models in the government sector have historically been shaped from 'product dominant' approaches or philosophies focusing on internal processes and performance measurement to deliver service (Vargo and Lusch 2018; Osborne 2018; Hodgkinson et al 2017; Blaschke et al 2017). From this research, it is then proposed that the 'dominant logic' of an architectural or modelling approach is a success factor in achieving service strategy or value outcomes.

Secondly, classical approaches to 'architecture' have evolved as a response to the historical scaling and development of information and enterprise resource planning systems (Jacobs and Weston 2006; Gannon 2013; Kotusev 2016; Gampfer et al 2018). While these architectures and solutions have evolved and enabled the management of highly complex transactions and data, they none-the-less have remained constrained in their ability to open, innovate, and enable strategic and value realisation (Donaldson et al 2015; Janssen 2011). To which, if we apply a 'dominant logic' lens (Vargo and Lusch 2004; 2008; 2016; 2017) it can be proposed that the philosophy and practise of information systems and architecture will have a consequential logic that defines and constrains the development of systems.

This research applies Service Dominant Logic (SD-Logic) as a kernel theory to re-imagine architecture for public agencies. In applying the SD-Logic axioms and principles it is proposed that the resultant frameworks would provide a focus on innovation and development that is driven by dynamic social and economic needs through emergent service, value co-creation, markets and ecosystems. Using the 'social welfare sector' as the primary use case it is expected that the future empirical research will illustrate the dynamics of 'service' through the management of complex information systems/data, citizen/agency interactions, policy development and the adaption of emerging and advanced technology.

2 RESEARCH PURPOSE, LOGIC AND QUESTION

The aim of the research is to provide public agencies with a foundational framework that guides the design and development of architectures and capabilities that can enable socially and economically driven social welfare policy. The logic of this initial research is that by using SD-Logic as a kernel theory, the resultant architecture will based on a construct that supports the provisioning of services to leverage ecosystems, markets, and platforms to enable participants to generate, bundle, and access 'service' and 'value' outcomes. The research question is synthesised to: What architecture is required to support the design of Government to act in the role of 'service integrator' and 'ecosystem steward' in the delivery of social welfare policies and services?

3 SERVICE AND MARKET PERSPECTIVE

Contemporary approaches to transformation and management of government services have remained challenging and can be traced back to the 1990s (Coursey and Norris, 2008; Pederson, 2018). Government design and delivery has evolved through constructs such as eGovernment, one-stop shops, maturity frameworks, service-orientated architectures, and enterprise architecture (Coursey and Norris, 2008). Through these constructs, agencies have been seeking to transform from monolithic definitions of enterprise into complex and diverse 'digital information systems'.

Typically, 'enterprise architecture' has provided the baseline for the integration of technical, information, service, and business domains. The common practice for governments (e.g. USA, Australia, New Zealand, UK, and Estonia) has been to use enterprise and technical architectures such as TOGAF (Magoulas et al 2012; Gampfer et al 2018) and Service Orientated Architectures (Alwadain, Fielt, Korthaus and Rosemann 2016) as the primary basis for planning, aligning, and designing services and solutions. These methods, while enabling technical capabilities, neglect the strategic, value co-creation/production and systemically constrain (Westrup 2018; Alter 2016; Donaldson et al 2015; Janssen 2011).

From a SD-Logic perspective (Vargo and Lusch 2016, Wilden and Gudergan 2017; Glassburner et al 2018; Fujita et al 2019; Akaka et al 2019) three issues are identified that provide insight into the constraints of government service design and architecture. Firstly, it is proposed that one underlying constraint is that enabling frameworks, architectures, and strategies have been derived by 'product dominant' logics (PDL) (Vargo and Akaka 2018). Due to the linear doctrines of PDL, the required frames of reference or architecture for agile service and value driven offerings have not been enabled. Secondly, the evolution of approaches to public service administration has revolved around 'linear Fordist models' of production (Osborne 2018) that have resulted in public management viewed as a 'production' or 'performance' methodology rather than a service or value offering that engages the citizen in 'co-production' (rather than 'consumption') (Osborne et al 2013; Westrup, 2018; Hodgkinson et al 2017). Finally, it has been a struggle to translate solutions from theory to drive and scale service and enterprise design, eGovernment, and social welfare sectors. Researchers have noted that this has partly been a result of a failure to translate research and mid-level theories into practical methodologies (Osborne et al 2013; Vargo and Lusch 2008; Alter 2018).

3.1 Framework Development

A literature review and analysis covering social welfare, e-Government, enterprise architecture, service science, and service dominant logic was conducted from which an initial set of core requirements were formed. The synthesis of requirements was aggregated to five key themes: ecosystems, service, innovation, emergence, and stewardship (see Table 1). The themes have been kept intentionally broad as a scoping device to establish a conceptual baseline for the ongoing research.

Theme	Government Service Requirement
Ecosystems	Ability to support, develop, and contribute to regulated or autonomous ecosystems comprising of platforms, data, resources, , and interactions to create value. This includes the enabling agencies to break enterprise encapsulation/containment for contextualised or idiosyncratic value creation (Westrup 2018; Alter, 2016).
Service	Ability to integrate resources, roles, and institutional practice to facilitate service and value. (Vargo and Lusch 2017)
Innovation	Ability to support continuous innovation driven by social and economic dynamics - innovation as an emergent property of ecosystems (Akaka, Koskela-Huotari and Vargo 2019)
Emergence and Agility	Ability to capture or respond to emergent demand, resource capability and service offerings (Osborne et al 2013; Raman and Bhraradwaj 2017; Akaka, Koskela-Huotari and Vargo 2019).
Role (Stewardship)	Ability to support, participate, develop or steward self-regulating ecosystems (Vargo and Lusch 2017; United Nations 2018; Blaschke et al 2017; Digital Transformation Agency 2019; Smith and Crainfield 2019)

Table 1: Government Service Requirements

Following the literature review, three formative models were used to synthesise the findings. The current research extends and is supplemented by the research by Vargo and Lusch (2017) and the architecture frameworks established by Blaschke et al (2017; 2018). The current paper extends the set of frameworks to include: 1. theoretical framework, 2. meta-model, and 3. functional model.

The theoretical model (see figure 1) has been developed to succinctly juxtapose the service science theories and their relationship and relevance to social welfare delivery. The core theories are drawn from service science (Alter, 2016; 2018), SD-Logic (Vargo and Lusch 2016, Wilden and Gudergan 2017; Glassburner et al 2018; Fujita et al 2019; Akaka et al 2019), dynamic capability theory (Raman and Bharadwaj 2017); Westrup 2018; Alter, 2016; Vargas et al 2016), enterprise architecture (Open Group, 2011), and public service dominant logic (PSDL) (Osborne et al 2013; Hodgkinson et al 2017).

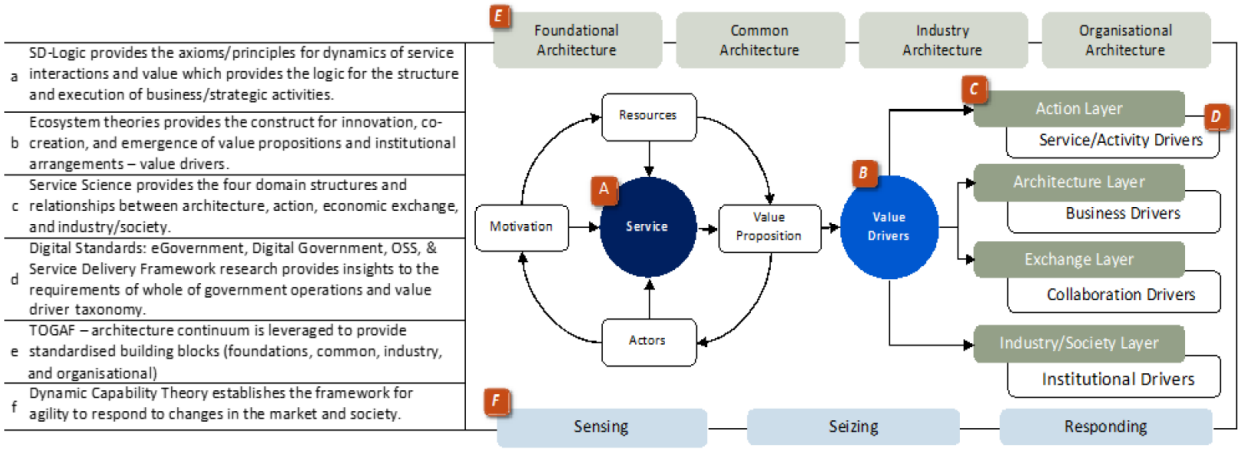

Figure 1: Government Services Architecture - Theoretical Framework

While the model presents a functional facade, it is not intended to provide anything more than a logic positioning of the theories to demonstrate coverage and scope. Object definition, functionality, and operating logics will be established incrementally in the following sections and through further research.

The model illustrates that service interactions (a) are composed of resources, motivation, actors interactions to create value propositions. The collection of value propositions are then catalogued as 'value drivers'. These are a series a strategic settings or conditions that are established through 'service interactions' to generate strategic, economic, or value outcomes. The catalogue is stratified across four levels from the action layer (micro) through to the industry/sector layer (layer). The 'value drivers' within each layer are derived according to industry value streams.

The two architectural framing devices are drawn from TOGAF (e) which provide the four architectural domains covering foundational, common, industry, and organisational architectures. The system is then driven by dynamic capabilities (f) which provides the source of innovation for 'value drivers' to be configured relative to economic and social need. Through the dynamic capabilities, actors (citizens and agencies) have the ability to 'sense' changes in economic or social settings. From which opportunity can then be 'seized' through the provisioning of new resources or strategy - allowing the actor or system to 'respond' to the original economic or social need.

3.2 GSA Meta-Model

The GSA meta-model identifies the core elements and their relationship to one another for the delivery of social welfare services (see figure 2). The meta-model is an extension of Blaschke et al (2017) ontological model and draws in further elements as outlined in the theoretical model. These include the constructs of DCT, economic definitions of value, and emergence/entropy that provides the dynamics of competition, institutional complexity, and harmonisation. In addition, the model introduces the lifecycle for policy development which leverages off the dynamic capabilities to 'sense', 'seize' and 'respond' to economic and social settings.

Finally, the model introduces the agency role of 'service innovator' as a resource creator. The 'service innovator' responds to economic or social need through the provisioning of new resources or capabilities. Those resources are then made available through 'service ecosystems' for other actors to access and integrate to produce value. At this level, the ecosystem architecture is boxed – the referential interaction between service activities and ecosystem is introduced in the GSA Functional Model.

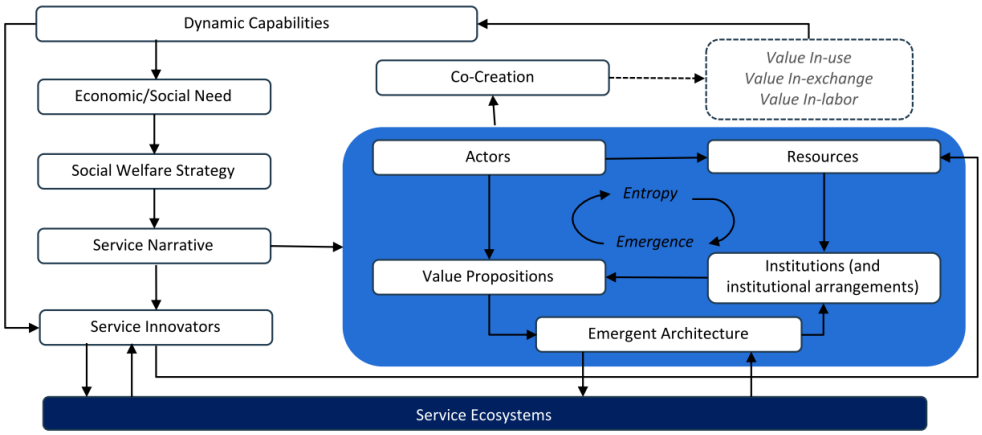

Figure 2: Government Services Architecture - Meta-model

3.3 GSA Functional Model

The functional model (see figure 3), extends on the theoretical framework and meta-model to explain and ground the dynamics of emergence, service, and value – this creates the functional relationship between policy creation, service interaction (value creation), and ecosystem construction. The model is structured into three areas to form a value cycle from 1. 'policy creation', 2. which drives 'service interactions' (responding to policy settings), and 3. from service interactions we have the emergence of patterns, frameworks, and resources to form the 'service ecosystem'.

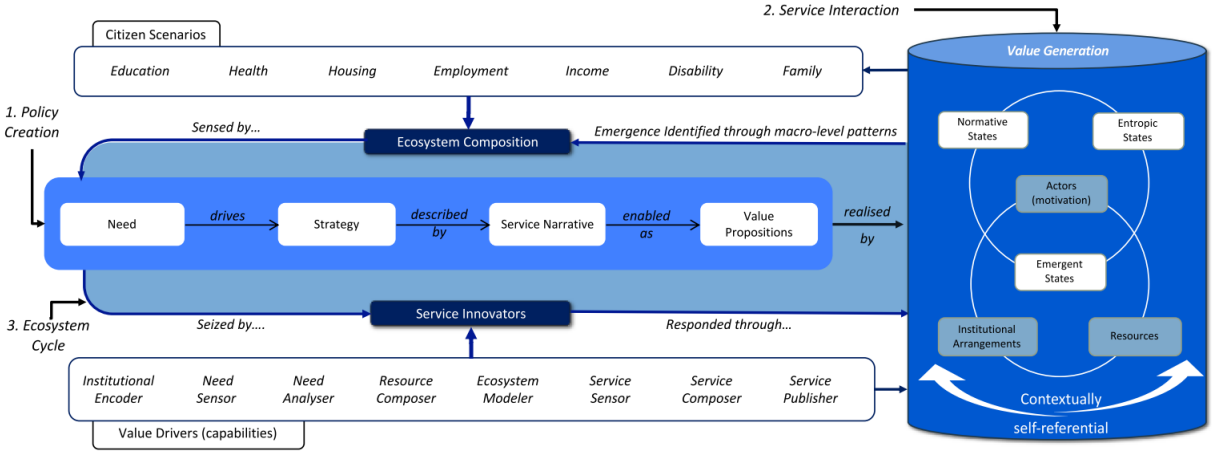

Figure 3: Government Service Architecture - Functional Model

1. **Policy Creation:** using Public Service Dominant Logic (PSDL) and Dynamic Capability Theory (DCT) to motivate 'policy creation' that senses social and economic 'need' which is seized and developed into 'strategy', 'service narrative', and 'value propositions'. The 'policy' provides the motivation for design and functions to set the conditions to realise value propositions ecosystem.
2. **Service:** The service interaction realises the 'value propositions'. The catalyst for 'service' are the actors (agencies and citizens) that act in the role of 'resource integrator' to interact and leverage resources to produce value and new institutional arrangements. Interactions are contextualised by interaction states - e.g. normative states are disrupted creating entropy giving rise to emergent states and become normative as competing institutional arrangements are harmonised.
3. **Ecosystem:** Ecosystem creation and aggregation is driven by emergence and innovation supported by dynamic capabilities. Emergence of service and value within ecosystems evolves from micro-level transactions which are then patterned at a meso or macro-level (Akaka et al 2019; Fujita, Vaughan, and Vargo 2019). Innovation or disruption that responds to social, political, or economic occurs at a micro or transactional-level – as those patterns or interactions become intuitions or resources that compose the ecosystem.

The GSA Functional Model implies eight core capabilities that government and public agencies should consider when developing strategies to innovate through social and economic dynamics. Empirical research is required to validate and develop the core capabilities - table 2 describes the capabilities.

	Capability	Description
1	Institutional Encoder	Ability to encode legislation, policy, regulation, institutional practice.
2	Need Sensor	Ability to detect social and economic needs of actors within an ecosystem.
3	Need Analyser	Ability to analyse the effectiveness of policy and service outcomes.
4	Resource Composer	Ability to identify, describe, and enable resources.
5	Ecosystem Modeller	Ability to model and digitally represent the value propositions, actors, institutions, resources, and interactions within an ecosystem.
6	Service Sensor	Ability to detect service interactions and their components within an ecosystem.
7	Service Composer	Ability to detect interaction patterns that realise service.
8	Service Publisher	Ability to publish services and components of an ecosystem.

Table 2: GSA Capabilities

4 CONCLUSIONS

It was hypothesised that issues identified with classical approaches to both, enterprise architecture and public administration are underpinned by constraints imposed by 'product/goods dominant' logics and traditions. The modelling indicates that while SD-Logic, supplemented by other service science theories, is a candidate for providing a kernel theory on which to base a Government Service Architecture further empirical research needs to be undertaken to validate, iterate, and develop the framework.

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