The Roles of Citizens in Electronic Government: Rules to Guide the Design of Electronic Government Services using a Novel Market Segmentation View

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Abstract

This thesis adopts a design science approach to formulate a framework of rules from a novel market segmentation view of the constituents of electronic government within which principles of electronic government service design can be structured. The intent of the framework is to guide the design of electronic government services to better meet the expectations of constituents as they interact with government in various roles. The alignment of service design with constituent expectations is proposed to increase the rate of adoption of electronic government services.

Electronic government has been established in Australian government operations since the early 1990s. At the same time, Australians have demonstrated a propensity to adopt new media for communications having very high penetration of internet connection and mobile telephone use. Yet the adoption of electronic government services lags behind the use of the Internet for equivalent commercial activities. Consequently, the benefits to both constituents and government of electronic government are not being fully realised. The contention of this thesis is that electronic government services do not make sufficient account of the expectations of constituents when the services are designed and deployed.

A design science approach is adopted to create a framework that will guide electronic service design. Design science is adopted because the thesis proposes to create guidance on how 'things should be' rather than exploring 'how things are'. The framework proposed is developed from a suggestion by Henry Mintzberg about key roles of constituents in government. That suggestion is operationalised with reference to the marketing literature on segmentation and through investigation of the nature of government interactions with constituents. Rules are developed to guide the identification of which market segmentation any government service addresses through consideration of its salient characteristics. The segmentation rules are tested and refined using financial transaction data from actual electronic government services. The framework is then demonstrated through application on some example government services and through its power to augment existing models of electronic government adoption drivers. Throughout the thesis, specific design principles are nominated. The limitations of the framework are noted and future research, particularly suggestions for further empirical verification, are nominated.

Acknowledgements

Primary thanks are due to Dr Ed Lewis and Professor Shirley Gregor, my supervisors, who applied the correct amount of encouragement, cajoling, and yet left me with sufficient room to actually create this thesis for myself. Their insight, guidance, and example are a constant standard against which my research in information systems is tested.

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From my practitioner history there is a large group of people who have had influence on me. I particularly note the support, guidance, and opportunities provided by Mr Andrew McWilliam and Mr Rick Molony. These two gentlemen are paragons of the earnest application of information technology to better the circumstances of government and through that of society in general. It has always been an honour and a privilege to work with and for these men.

And, of course, I must thank my family and friends, mostly for not laughing in my presence while this dragged on.

Dedication

I dedicate this thesis to the three most influential people in my life: my mother, Kathleen Vallantyne Turner, my late father, Leonard George Turner, and my aunt, Catherine Elizabeth Turner. Their constant faith and support have made me the man I am and can never be properly repaid.

Preface

Rather than being an end, this thesis really only establishes the beginning of the ideas expressed within it; the end of a gestation period, perhaps. The initial idea that constituents play particular roles when interacting with government, and that those roles heavily influence their expectations of government and their interaction with it (Mintzberg, 1996), was an epiphany moment for me as a public servant working in one of the Australia Government's leading exploiters of information technology; the (then) Department of Immigration and Ethnic Affairs. The prospect that the government could improve its interactions with constituents by recognising the role played by each party in the interaction was exciting. That the roles were identified by the relative power of each party in the interaction was genuinely novel at the time and remains an unusual, and under-exploited, view. The revelation established a broad agenda for my professional career from that time on, and became the focus of my academic research career when I moved to academia in 2001.

My move to academia was broadly coincident with the Australian Government completing the task set for it in 1997 of providing "all appropriate services online" (Department of Industry Science and Technology, 1997). I was beyond sceptical of the Prime Minister's announcement of its achievement (Howard, 2002) having worked for so long as an e-government practitioner, both within government and as a consultant to government. Consequently, I have watched with disappointment as the e-government agenda has been side-lined by the Australian Government before it was every really started. Adoption rates of e-government services have grown over the ensuing years, largely, in my view, because familiarity with the Internet as a service delivery mechanism has increased over the same time. The Australian Government neither advertises its e-government offerings, nor announces new services as they are developed and deployed. And this lack of marketing is evident in State Governments to Local Governments too (albeit with some exceptions at different times). For a first-world country with a relatively well-off population notorious for its rapid adoption of electronic communication technologies, the missed opportunity of realising government (and societal) efficiencies through the appropriate exploitation of electronic government is a tragedy.

So, I have spent the last nine years (off and on) trying to establish a formal approach to designing electronic government services so that they are more readily adoptable by constituents based on the roles that seemed so insightful to me as long as fifteen years ago. It is a long time, but I've had many distractions, both personal and professional, and through my interest in teaching as well as other research interests. However, the ideas have developed over that whole time and, as I said at the outset, have now come to some 'final' starting position.

This thesis was not born, full-blown, from my forehead as Athena was from Zeus. It has developed during my time in academia. My (related) publication history attests to that development and is described below to illustrate that historical development.

Turner, T. L. (2002). *Market Segmentation for e-Government*. Paper presented at the CollECTeR 2002, Melbourne.

Turner, T. L. (2002). *What are the Implications of being a Public Organisation on Designing Online Services?* Paper presented at the Innovations and Impacts Day, IPAA National Conference, Adelaide.

The first paper, *Market Segmentation for e-Government,* set a mark in the ground for my research. The paper articulated the basic form of the segmentation view and illustrated its use in some typical service design decisions. This paper (and my later, related, journal paper) forms the basic platform of Chapter 4 and the central idea of the thesis. The second paper, *What are the Implications of being a Public Organisation on Designing Online Services?,* was the other key factor in my mind at the time. The propositions within it are incorporated in Chapter 6; specifically, Section 6.4.6 and Ruleset PS 7.

Turner, T. L. (2004). Accountability in Cross-Tier e-Government Integration. In J. Halligan & T. Moore (Eds.), *Future Challenges for e-Government* (Vol. 1, pp. 128 - 138). Canberra: Australian Government.

This book chapter developed some of my thinking around integrated service delivery and pointed to ideas of different expectations of accountability. These ideas are included in Chapter 4, particularly Section 4.5.4 and Ruleset PS 1.

Turner, T. L., Schwager, A., & Imran, A. (2005). *A Preliminary Analysis of an e-Government Market Segmentation*. Paper presented at the European Conference on e-Government (ECEG) 2005, Antwerp, Belgium.

Turner, T. L., & Schwager, A. (2005). *Analysing e-Government Market Segment Behaviour*. Paper presented at the World Congress of Computing, Las Vegas, USA.

Turner, T. L., Schwager, A., & Guo, Z. (2005). Verifying e-Government Market Segments. Paper presented at the International Conference on e-Government, Ottawa, Canada.

These three papers were the first attempt to validate the utility and usability of the proposed segmentation framework by investigating transactional data made available to me by the Australian Capital Territory (ACT) Government. These results were encouraging, indicating that genuine differences emerge when transactions are segmented according to the framework rules. The data for these papers forms the basis of Chapter 5 and many of the same ideas are applied. The data analysis was re-conducted for the thesis (described in Annex A) and weaknesses in the earlier analyses mean that the findings are not exactly the same as reported in these three conference papers.

Turner, T. L. (2006). Introducing a Novel Marketing Segmentation for e-Government Services. *Journal of e-Government*, 3(4), 5-38.

By this time, my ideas were becoming quite robust and my earliest attempts to create a formal thesis were underway. The journal article crystallised the central argument and forms the primary basis for Chapter 4.

Turner, T. L. (2006). *Defining e-Government as Rules for Social Action*. Paper presented at the 6th European Conference on e-Government, Marburg, Germany.

Another area I struggled with initially was how to express the framework of advice that I was formulating. The conference paper, *Defining e-Government as Rules for Social Action*, crystallised my views here. That thinking is repeated in Chapter 3 and particularly Section 3.4.

Turner, T. L. (2009). *A Review of e-Government Reviews: What are we not doing?* Paper presented at the 9th European Conference on e-Government, London.

The development of a formal thesis for this research has also generated one conference paper (to date). The paper cited here was an early version of the literature review for this thesis and underpins Chapter 2.

And then it only took three Christmas holiday periods of constant work to make a real thesis emerge from these jottings!

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Chapter 1 WHY SHOULD WE STUDY E-GOVERNMENT?

1.1 The Kernel of a Research Agenda

Electronic government (e-government) has been burgeoning in Australia since the early 1990s. Much progress has been made and Australia is consistently ranked highly in various 'league tables' of international e-government. Yet e-government adoption continues to fail to meet expectations (AGIMO, 2008; Webber, 2006) and not just in Australia (Cullen & Hernon, 2006a; Dovey & Helfrich, 2008). As substantial benefits are tied to people using e-government services (AGIMO, 2006c; Bellamy & Taylor, 1998; Dovey & Helfrich, 2008; Hernon & Cullen, 2006a), encouraging greater adoption is an important objective.

This thesis presents research aimed at offering practical tools to design e-government services in a way that will make them more readily adoptable. These tools will aid e-government practitioners by offering a way of anticipating the expectations of service users and by classifying service design principles to align services with user expectations. Services that are designed to meet user expectations are expected to be more readily adoptable.

This chapter sets the scene for the research presented in this thesis. The author's personal experience as a practitioner in Australian e-government is followed by a brief overview of the academic view of e-government. These two perspectives set the ground on which to present an overview of e-government adoption today. The slow rate of adoption of e-government is highlighted as a problem and the outline of how to address that problem is presented. A reader's guide to the remainder of the thesis concludes the chapter.

1.2 A Brief (Personal) History of e-Government in Australia

In 1995, the Commonwealth of Australia released *Clients First*, a report that summarised the findings of the Information Technology Reference Group,

established to "consider major trends in the development of computer technology and assess their applicability to and likely impact on Commonwealth information technology" (ITRG, 1995). The report made a series of recommendations, but its central thrust was encapsulated in its title: the opportunities that information technology (IT) presented to government were primarily in being able to better, and more efficiently, serve the constituents[1] of government.

Clients First was a clarion call to the Australian Government[2] to change its perspective from one of only serving the government of the day to the perspective of serving the Australian public in implementing policy and delivering services called for by the government. Although perhaps not solely responsible, *Clients First* was a prominent precursor to a range of initiatives in the government that restructured the administration to a more constituent-centred approach, probably the most notable example of which is the Commonwealth Service Delivery Agency, Centrelink, brought into existence on 1 July 1997 ("Commonwealth Services Delivery Agency Act," 1997; MAC, 2004).

As the work done that culminated in *Clients First* was conducted in 1994, the Internet, and particularly the common use of the Internet through the World-Wide Web, was a virtually unknown concept outside of academia. Yet, *Clients First* pointed to what is now commonly referred to as e-government:

> "Transactions between government and its citizens are changing in three important respects as the use of information technology in delivering services becomes more prevalent:
>
> - **Content** of the transaction can be enriched by information technology moving the scope of the interaction from that of a single event to an episode, or a series of connected events…

[1] Constituent is used in this research to mean an individual member of the public. Common synonyms such as citizen, customer, and client have special meaning in this research and (when not directly quoting the use of these terms in other work) are used in the context of their special meaning. Constituent represents a person who is not being considered as part of one of the market segments detailed here.

[2] The Australian Government refers to the national-level government of the Commonwealth of Australia. The name "Australian Government" was brought into common practice in the late 1990s. Prior to that time it was commonly referred to as the Commonwealth Government. All references to the national-level government, except in direct quotes, are to Australian Government for consistency of presentation and to reduce confusion.

- **Context** of transaction can move from face-to-face service delivery to electronic, screen-based processes…
- **Infrastructure** that enables transactions today consists of bricks and mortar and desks and people. Elements of that infrastructure could be displaced by computers and communications" (ITRG, 1995, pp. Chapter 3–original emphsais).

The author can attest from personal experience that *Clients First* was a serious motivator in the Australian Government of the day. A whole range of initiatives were established on the basis of implementing *Clients First*-style services. At the time, the talk was all about one-stop shop(front)s, possibly operated by third parties, and kiosks for self-service delivery. But *Clients First* is equally prophetic of Internet-based service integration and web-based service delivery.

Probably the most important aspect of *Clients First* was its title. It reflected the 'constituent-centric' government focus of the day. Although processes and services were still expected to be efficient and cost-effective, there was a whole new perspective for the design and implementation of government services: what did the constituent want or, perhaps, what would serve the constituent best?

At the same time, the *Reinventing Government* movement started in the United States by David Osborne and Ted Gaebler (Osborne & Gaebler, 1992) was gaining momentum in Australia. *Clients First* gave further impetus to the ideas of *Reinventing Government*, which also had a constituent-centric thrust. In parallel, what is now described as the New Public Management school of thought was developing some serious momentum in Australia (Lane, 2000; Pollit & Bouckaert, 2004; Quiggin, 1999), particularly because of what appeared at the time to be its substantial success in the United Kingdom under Margaret Thatcher's reign (Pollit & Bouckaert, 2004). Indeed, a crucial element of the Information Technology Reference Group's Terms of Reference was to consider and report on the efficacy of outsourcing Australian Government IT operations (Information Technology Reference Group, 1995). The idea of commercial sector partners delivering reformed services directly to the constituent using the latest technologies at minimum expense on the government purse was a siren song!

1n 1997, the Prime Minister, Mr John Howard, issued a statement *Investing for Growth*, that established an agenda for his new government over a range of matters. For the government's information technology specialists, one line came to be a rallying call:

> "The Government, as a leading-edge user as it enters the new millennium, is committed to the following undertakings.
>
> - Delivering all appropriate Commonwealth services electronically on the Internet by 2001…" (DIST, 1997, p. 69).

This objective was reinforced in the *Strategic Framework for the Information Economy* (DCITA, 1998), released by the Australian Government the following year:

> "Government will have a major impact on the growth of the information economy by getting itself online, and offering all appropriate services to citizens electronically. The national vision for government is to be responsive to the needs of citizens by providing as many affordable, equitable and accessible government information services as practical online" (DCITA, 1998, p. 29)

As the new millennium began and the 'Year 2000 bug' efforts were completed, this single government objective from *Investing for Growth* came to be the dominant IT issue. Its connection to the objectives established in *Clients First* is clear, even if only in hindsight (there was a change of government in 1996). By this time, the agenda was firmly set. The Australian Government was adopting e-government for the benefits to itself, its constituents, and the Australian economy more broadly (DCITA, 1998).

The Australian Government was an early and vigorous adopter of IT, which actually constrained much of its early e-government impetus. The legacy systems created during the 1970s and 1980s were not designed, or built, or operated upon technology, to allow constituents to interact directly with the government. (Indeed, many early government systems in the author's experience were barely usable by trained government officials!) Consequently, launching new, constituent-centred initiatives where the constituent played a direct part in (self-)service involved either wholly replacing existing systems, or focusing on wholly new initiatives for which there

were no previous computing systems. Both these alternatives proved to be more expensive, more time-consuming, and ultimately less rewarding than the early hype on e-government suggested (e.g. Deloitte Research, 2001; Di Maio, 2000; OECD, 2001; Simsion Bowles and Associates, 1998).

Nevertheless, some exciting, world-leading e-government initiatives were implemented in Australia in the 1990s. The following list identifies the major 'e-government' initiatives of the time, many of which the author worked on in one form or another:

- The Australian Taxation Office provided direct connection support for tax agents to lodge citizens' tax returns electronically, making Australia the leading nation in electronic lodgement of tax returns (Rimmer, 2001).
- The Australian Customs Service implemented COMPILE, a closed network customs document clearing exchange that radically reduced the time taken to export from Australia (Rimmer, 2001).
- The (then) Department of Immigration and Ethnic Affairs established the Advanced Passenger Clearance (APC) system in 1991. The APC allowed Australians, New Zealanders, and later other visitors, travelling to Australia from New Zealand, and later certain United States airports, to be pre-cleared on immigration computing and alert systems so that they could be expedited through immigration formalities on arrival (JSCM, 1999).
- The APC was then extended by the development of the Electronic Travel Authority (ETA) system (commonly called the 'electronic visa'). The ETA system, implemented in 1996, allowed a formal legal document to be issued by accredited travel agents on behalf of the Australian Government to Australian visitors travelling from certain countries without the need for the old sticky-label visa in visitor passports. The electronic visa system involved the interconnection of travel agent systems, airline reservation systems, several immigration department computer systems and computer systems operated by the Customs Service at the border (JSCM, 1999).
- The Australian Government launched the Business Entry Point (www.business.gov.au) in 1998, one of the very first government service delivery

> websites that integrated services across jurisdictions as well as across agencies within one level of government (JCPAA, 1998).

With these early successes, it is not surprising that Australia was consistently ranked very highly in e-government league charts in the late 1990s and early in the new century (Accenture, 2001; 2002; 2003; 2004; Dexter & Parr, 2003; e-Envoy, 2001; Hernon & Cullen, 2006a; PEPA, 2002; UNPAN, 2005). These were exciting, heady times for information technology specialists in government!

However, reality is never as simple or glossy as it appears in a consultant's brochure. In spite of almost evangelical suggestions of personalised government delivered over the web that started to appear in 1996 (e.g. Tapscott, 1996; Vallerand, 1996), the majority of early Australian Government initiatives that were 'constituent-centric' tended to treat all constituents the same, and to the extent that different groups of constituents were identified (e.g. youth, the aged, or benefit recipients) each group was targeted by a separate program (sometimes a whole separate agency) who then saw no difference within their target group for the interactions that might take place. In short, early constituent-centric initiatives, while paying attention to the constituent, did little to fundamentally shift the way government interacted with them. The low uptake of government services delivered online at the time reflected this consistency of approach (see section 1.5.1).

Then, in February 2002, Prime Minister John Howard announced:

> "And one of the things I promised was that we would put all Commonwealth Government services online. And I'm pleased to announce today that that goal has been achieved in full over the last four years. We now have 1,665 individual Commonwealth services and agencies which are fully online" (Howard, 2002).

This announcement effectively ended the interest in e-government at a policy level in the Australian Government; clearly, the job was done. An indicator of the movement of attention from e-government is the e-government strategy released in November 2002, *Better Services, Better Government* (NOIE, 2002a), which noted the success and pointed (weakly, in this author's view) to refining the existing achievements from within existing agency budgets so as to not lose Australia's status as a leading e-government country.

However, the Prime Minister, briefed by the then National Office for the Information Economy, over-stated just how successful the initiative had been. The 1,665 services were largely information services; few agencies were offering any kind of real transactions, particularly not of the kind where constituents, or other stakeholders, could complete the transaction online (NOIE, 2002b). The real potential of e-government for the Australian Government remained untapped or, at least, significantly under-exploited (Accenture, 2004; ANAO, 2005; Bushell, 2005).

At the same time, State and Local governments in Australia were venturing onto the World-Wide Web, with varying degrees of sophistication. State governments were online and offering a range of services, mostly information-related, although there were some more complex transactions. The State of Victoria, for example, had some sophisticated early services aimed at stakeholders in their kiosk-based Maxi application and the online Business Channel (MV, 1998a; 1998b). Local governments were generally more reticent, with many of them not having a web site until the mid-2000s. There were important trend-setters at the local government level though, most notably Brisbane City Council with its eBrisbane program (Bell, 2000; Kerr, 2000). In Australia, the State and Local government levels are where more regular, more transactional interaction occurs between constituents and their government (Davis *et al.*, 1993; Webber, 2006), so the (generally) slow and cautious approach at these levels did not elevate constituent enthusiasm for e-government interaction.

1.3 The Academic Perspective of e-Government

The preceding is the personal perspective of a practitioner of e-government developed as it happened. At the same time, academic interest in the phenomenon was developing (Brown, 2005). In this section, the broad academic research area is presented based on the literature explored in more detail in the next chapter. This section excerpts what the literature describes as being the subject of e-government research.

A definition of e-government is an important first step. The e-government literature offers many and they are largely aligned, although reaching similar positions from slightly different perspectives. Struggling over a definition of e-government is

important, not only to offer a flag around which researchers and practitioners can rally, but, as Grönlund and Horan point out, “different definitions lead to different performance measures [and consequently], also a matter of values. … clearly e-Gov can be studied with several kinds of values in mind, including economic, social, and political” (Grönlund & Horan, 2004, p. 722). Yildiz (2007) agrees, seeing the lack of a definition as the most significant limitation of the e-government field. These authors note that narrower, more technology-oriented definitions and performance measures may actually lead to sub-optimal consideration of solutions; a trap Grönlund and Horan warn that Information System (IS) researchers in particular should be careful of, acknowledging the IS tradition of taking a system perspective to research.

In summary, the literature takes the view that e-government is about more than just the application of Information and Communication Technologies (ICTs) in government or the way the activity within government is or should be changed by those ICTs. The field should include consideration of the role of government in a society that is being changed by the increasing presence and use of ICTs—a broad ambit; perhaps too broad to be useful here. Let us turn to what the literature reveals about what researchers are actually considering.

Yildiz points out that the e-government concept really awaited the widespread availability and adoption of the Internet: “Before this, IT use in government was primarily internal and managerial” (Yildiz, 2007, p. 648). Kraemer and King are even stronger: “one might argue that the experience of the pre-Internet period is irrelevant to e-government, because without the Internet there would be no e-government” (Kraemer & King, 2006, p. 11). Yildiz goes on to note that “The tragic events of September 11, 2001, caused a major shift in the perception of e-government from a tool for increasing the convenience of government service provision, facilitating administrative reform and furthering democratic participation to a tool of defense against terrorist threats” (Yildiz, 2007, p. 649). He notes a range of new foci, largely to do with information sharing, information protection, and attendant processes and facilitating concepts.

Yildiz feels that e-government should be an enabler for new approaches to achieving government ends: “the main issue is to make government work better, faster, more

convenient to use for its stakeholders and provide administrative and democratic channels that were not possible to open with the old technological tools" (Yildiz, 2007, p. 655).

Brown (2005) recounts three major developments that have influenced the complexity and evolution of e-government: the evolution of ICTs and their use within public administration; evolving ideas about appropriate management approaches within government, starting at the ideas of New Public Management and drawing heavily on private sector concepts of efficiency and output orientation; and evolving ideas about the role that government plays, particularly in answering new demands within society brought about by increasingly technology-savvy public and government members. These three developments accord well with the potted history provided earlier.

Brown describes four key areas where e-government has made "clear and lasting impacts" (2005, p. 247) on public administration that are discussed in more detail in Chapter 2:

- Constituent-centred service;
- Information as a public resource;
- The skills and knowledge needed by public servants to deliver e-government; and
- Accountability and management models.

Andersen and Henriksen (2005) classify e-government research into two dimensions: contextual research domains, and domains of impact. The contextual research domains are: "conceptualization of e-government, the government role in technology diffusion, a governmental administrative e-service focus, and democracy and involvement of citizens, including separation of power" (Andersen & Henriksen, 2005, p. 30). Domains of impact are: capabilities, interactions, orientations, and values. Again, these ideas are discussed in more detail in Chapter 2.

1.4 The Definition of e-Government

In summary, the academic literature appears to have a grand vision for e-government: a vision that places the consideration of some of the most important questions about government itself under the microscope filtered by the introduction

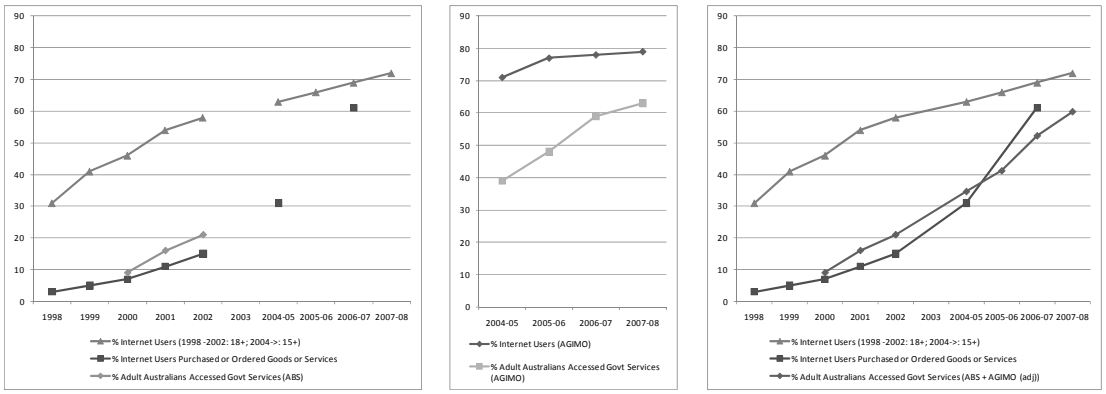
of essentially pervasive information and communication technologies. However, authors who have reviewed the published (academic) literature to date must be disappointed. Their findings can only be summarised as representing a "nascent" (Norris & Lloyd, 2006) field, one where not only are the issues considered generally narrow and technology-oriented, but where research methods and approaches are immature and unlikely to promote repeatable guidance for future work. Only Reece (2006) seems satisfied with progress to date in e-government research. His interests, though, focus on the e-democracy area of the field and he is tacitly accepting that research in e-government is still developing a maturity.

In Chapters 2 and 3, I develop ideas of e-government in more detail to resolve a specific definition of e-government. At this stage, e-government involves the application of information and communication technology to government. More specifically, my practitioner origins lead me to frame the concept as the conduct of government through the Internet. That conduct can involve at least three elements: internal government operations (often referred to as 'back office'), interactions between government organisations and their constituents (often referred to as 'front office'), and the conduct of civic activities (usually referred to as e-democracy, but more correctly termed e-participation—not all governments are democracies).

1.5 E-Government in Australia Today

1.5.1 It is Built, Have They Come?

E-Government service adoption by government constituents in Australia has improved in the years since "all government services" became available online, but it is no longer matching the adoption of e-commerce in commercial activity. Figure 1 presents statistics of e-commerce and e-government adoption from two Australian sources: the Australian Bureau of Statistics (ABS) from its 8146.0 statistical series (Figure 1a); and the Australian Government Information Management Office (AGIMO) research series on the use of and satisfaction with e-government services in Australia (Figure 1b).



(a) ABS 8146.0 Series Data (ABS, 1999; 2000; 2001; 2003; 2004; 2005; 2006; 2007; 2008c)

(b) AGIMO Use of and Satisfaction With Data (AGIMO, 2005; 2006a; 2007; 2008)

(c) Both data series on common axes; AGIMO data has been scaled; ABS data series have been interpolated

Figure 1: Statistical Data on Adoption of e-Commerce and e-Government in Australia 1998-2008 (various sources)

The sampling and measurement techniques employed by the ABS and AGIMO differ; consequently, the results across common years have different quanta. To represent a common view, Figure 1c blends the graphs of Figure 1a and Figure 1b using the ABS's count of the Number of Internet Users (top line) as the common baseline and scaling AGIMO's Number of Users of e-Government Services by the factor that is required to have AGIMO's Number of Internet Users match the ABS value for each year. That is:

Equation 1: Formula used to Make AGIMO Statistics Comparable to ABS Statistics

$$\frac{AGIMO\ Number\ of\ Internet\ Users}{ABS\ Number\ of\ Internet\ Users} * (AGIMO\ Number\ of\ Users\ of\ eGovernment\ Services)$$

Moderating the available statistics in this way shows a steady, roughly linear, adoption of e-government services by Australian Internet users (Figure 1c) and a roughly exponential growth of e-commerce users (Figure 1c). The difference in growth rates/curve is important because the benefit of e-government comes more from interacting/transacting online (AGIMO, 2006c; Bellamy & Taylor, 1998; Dovey & Helfrich, 2008; Hernon & Cullen, 2006a). The benefits of easier, more accessible information delivery have probably already been captured. The indication that increasing numbers of people are confident to order/purchase online should reflect a parallel increase in interacting online with government, but at this very high level, the statistics evince no such indicator (Webber, 2006).

These statistics are, at best, indicative of different rates of adoption for e-commerce and e-government activities by Australians. More useful information such as preference for online versus other channels, which services are used online, the number of repeat visits, and the time spent at each visit would offer greater insights into the level of constituent adoption of e-government services; however, these data are unavailable. AGIMO did consider selection of channels in its surveys, but the question asked only which channel was last used, not a test of preference for a channel.

1.5.2 What is Holding Back e-Government Adoption?

AGIMO has reported on Australians' use and satisfaction with e-government services on four consecutive occasions using a consistent measurement methodology and a sufficiently large sample to provide credible indications of the population's views (AGIMO, 2005; 2006a; 2007; 2008). This research consistently indicates two key failings of Australian e-government: constituents have a lack of knowledge about the services that are available online, and they find that the usability and navigability of the services provided are inadequate. Most recently, they have also voiced frustration at the time it takes for government to respond online, both in the context of e-mail responses and in load times for websites (AGIMO, 2008). So, in spite of "all" (Australian) government services being online for over seven years (as at AGIMO's last research investigation), uptake is only moderate (at best), and constituents feel that the services provided are inadequate.

This state of affairs is not unique to Australia (Accenture, 2003; 2004; Bushell, 2005; Hernon & Cullen, 2006b; Webber, 2006). E-government implementations worldwide are variously seen to not be reaping the benefits claimed of them because of a lack of adoption (Accenture, 2003; 2004; Dovey & Helfrich, 2008; Olphert & Damodaran, 2007; Warkentin *et al.*, 2002; Webber, 2006). When asking citizens what was delaying their adoption, a range of barriers were identified.

Key issues impeding the development of e-government at present include (AGIMO, 2005; 2006a; 2006c; 2007; 2008; Chamberlain & Castleman, 2001; CITU, 2000b; Deakins *et al.*, 2001; Di Maio, 2001a; e-Envoy, 2001; Kunstelj & Vintar, 2004; MAC, 2004; Titah & Barki, 2006; Welch *et al.*, 2005):

- Identification and authentication of individuals;
- Security and privacy concerns;
- Determining which services to integrate; and
- Deciding whether to use complex multi-jurisdictional service arrangements to achieve 'seamless' government.

The first two issues here are often included in the broad issue of trust in using e-government (Fountain, 2001b; Hernon, 2006; West, 2004). Trust is a central issue in adoption of e-government services (Bélanger & Carter, 2008; Hung *et al.*, 2006; Teo *et al.*, 2008; Tolbert & Mossberger, 2006) and is explored in some detail in Chapter 6.

Dominantly, delays in adoption are because e-government services are not meeting citizen expectations (AGIMO, 2005; 2006a; 2007; 2008; Bushell, 2008; Cullen & Hernon, 2006a; 2006b; Huang *et al.*, 2002; Kunstelj & Vintar, 2004; Webber, 2006). There is little guidance to assist implementers of e-Government services to address these issues (Bertot & Jaeger, 2006; e-Envoy, 2001; Kunstelj & Vintar, 2004; Reece, 2006; Singh *et al.*, 2001; Titah & Barki, 2006). To understand and better meet constituent expectations, researchers advocate consulting with citizens (ANAO, 2005; Bertot & Jaeger, 2006; Cullen & Hernon, 2006a; 2006b; Dovey & Helfrich, 2008; Kunstelj & Vintar, 2004; Thomas & Strieb, 2003). Significantly, researchers in this area were strongly of the view that segmenting the citizenry was the fundamental way to better address their needs (Accenture, 2007; Bonde, 2006; Cullen & Hernon, 2006b; Hernon & Cullen, 2006a; Huang, *et al.*, 2002) and that this segmentation must go beyond simple demographics (Accenture, 2007; Cullen & Hernon, 2006b; Hernon & Cullen, 2006a).

To an "e-vangelist" who is deeply committed to the possibilities of improving government efficiency and effectiveness through the appropriate application of IT, the lack of progress in having online service delivery drive those benefits is frustrating. This frustration is amplified by the sense that the issue lies in the presentation (design) of the online services more than which ones are offered, or to whom. Academic research also makes this point(Akesson *et al.*, 2008; Bertot & Jaeger, 2006; Bonde, 2006; Cullen & Hernon, 2006a; Dovey & Helfrich, 2008; Huang, *et al.*, 2002). That frustration, and exposure to particular projects that called

for online service delivery, led to the research that is described here. The goal is to find an effective way of designing and delivering online services that actively encourage constituents to engage with their governments through the Internet and world-wide web.

1.6 The Problem and an Outline Solution

1.6.1 The Problem

There is an initial step in converting an ardent practitioner interest into academic research. One must first identify in formal terms the problem that exists and postulate how that problem might be addressed. This section takes that initial step.

If e-government is to be a success, its adoption by the users—in this case, government constituents—must be high to return the benefits that are so frequently extolled. Just because e-government delivery is cheaper does not necessarily return benefits to citizens, or government (Deloitte Research, 2001). Indeed, Fountain (2001b) and Fitchett and McDonagh (2001) note that e-government can actually be actively bad for some constituents. Government costs are only reduced if the other, more expensive channels can be reduced significantly—they will never be removed altogether (AGIMO, 2008; Deloitte Research, 2001). At least in the Australian context, constituents will benefit most if relevant services are delivered in ways that allow them to complete transactions without reverting to other channels and, arguably, in ways that are 'natural' and convenient to them; that is, not requiring complicated or difficult undertakings to achieve the desired end-result (AGIMO, 2005; 2006a; 2007; 2008).

Some time ago, Henry Mintzberg (1996) pointed out that Al Gore's view of the "citizen as customer" was flawed. Mintzberg went further and identified different roles that constituents play in their interactions with government (not specifically related to the online environment). Implied in Mintzberg's idea was that people behave differently, and have different expectations of government behaviour, in the different roles that they adopt. Without having made the connection directly, Mintzberg was drawing on ideas that are strongly supported by The Theory of Reasoned Action (Fishbein & Ajzen, 1975). This research is based on the idea that it

is the disconnect between the constituent's expectations in their role and the way the government views them, and consequently designs and presents its online services, that is inhibiting adoption of online government services. The consistent findings that AGIMO has produced over four consecutive investigations support this contention.

In this context, the *Harvard Business Review* article by Mintzberg (1996) provided the author with the important insight into what it meant to be 'citizen-centric' (in the Australian jargon of the time) and to treat the "citizen as customer" (Mintzberg, 1996) (in the American jargon of the time). Mintzberg was definite that he (and other 'citizens') was not as easily classified as 'customer'; indeed, he resented the simplification of the complex relationship that people have with their government(s) to some mere commercial transaction (Mintzberg, 1996). The significant aspect of Mintzberg's view that differentiates it from traditional market segmentation and e-government targeting approaches is using the role that the constituent plays in the interaction with government. Considering the role emphasises the expectations in the mind of the constituent while interacting. This resonated with the author's view at the time of reading the article and now, and is harmonious with recent calls for different approaches to match constituent expectations (e.g. Cullen & Hernon, 2006a; 2006b; Hernon & Cullen, 2006a; Huang, *et al.*, 2002)

The problem can then be stated along the lines: how do we increase the adoption of complex government transactions online by constituents? If the public is increasingly comfortable purchasing and ordering online (Figure 1), why are they not adopting e-government more vigorously? Noting AGIMO's findings, what guidance can agencies be given so that online services are more appealing, more 'adoptable'?

1.6.2 An Outline Solution

Experience and some serendipitous insights lead this author to believe that the question might be productively addressed along the following lines:

- Constituents will tend to adopt, and find more usable and useful, online services that meet their expectations about their interaction with government.
- The expectations of constituents about their interactions with government arise from the roles that they and the government play when interacting and that these roles can be classified in a manageably small number of categories.

- Online services should, then, be designed to meet the expectations of constituents given the nature of the service being delivered and its implications for the roles of government and the constituent.
- Consequently, guidance on online service design can be compiled that will assist practitioners to design services that meet the expectations of constituents without compromising other government objectives (e.g. cost efficiencies, equity of access, etc).

If Mintzberg's classification of 'citizen-government' interactions was to be as helpful as it intuitively appeared, how might one exploit the classification? Mintzberg (1996) gave some clues to the different expectations that his different roles might develop. I felt that these expectations could be formalised to reflect a set of design rules that government could apply to online services (at a minimum) to make them more aligned with constituent expectations and therefore more 'adoptable' (Featherman *et al.*, 2006; Tan & Thoen, 2001). Applying a useful idea in a novel way to create a solution to a perceived problem has been described as a 'design and development centred' initiation to research (Peffers *et al.*, 2008). A formal means to guide the creation of a solution in research is discussed in more detail in Chapter 3.

1.7 A Reader's Guide

The formalisation of Mintzberg's proposed segmentation into a framework for collating design principles to guide the design of more adoptable e-government services proceeds as follows. Chapter 2 reviews the e-government literature more extensively to properly locate this research, highlight where in the field this work sits, and to note that this type of work is not being undertaken in spite of increasing calls for it. Chapter 3 then presents some important tools with which to create the solution to the problem. A formal methodology for designing solutions is identified and adopted. The supporting theory of Market Segmentation from the Marketing discipline is introduced. Finally, the adoption of rule and principle statements to articulate the research output is firmly located in philosophy.

Chapter 4 introduces Mintzberg's proposed segmentation in detail and proceeds to operationalise it. Structural characteristics of the segments are developed and

formalised in rulesets. An initial illustration of the usefulness of the segments also produces some initial design principles, categorised by the segments.

Chapter 5 seeks to validate the formalisms of Chapter 4 in the absence of being able to experiment on it or observe it in practice. Much of the detail of this validation is reserved for Annex A. Chapter 6 further demonstrates the efficacy of the segmentation by applying it in three ways: (1) most directly by segmenting some example e-government services; (2) refining existing theory on the adoption of e-government services through a structural characteristic embedded within the segmentation; and (3) refining existing design principles through a second structural characteristic of the segmentation.

Chapter 7 concludes the thesis by recapitulating the solution to the problem in a formal structure required by the selected research method. Section 7.2.8 consolidates all the rules and principles developed throughout the thesis into a single collection; the starting point for a manual of advice for practitioners and the first version of the solution to the problem of adoption of e-government services by constituents.

In an effort to directly signpost the structure of this work, Table 1 presents a structure for the selected method and its concordance with the thesis structure. The context and details of the method and this structure are discussed in Chapter 3. The same table is repeated at the beginning of each chapter as an exhibit to remind the reader of the progress of the argument within this thesis and its correlation to the selected method.

Table 1: Concordance of Thesis Structure with Design Theory Structure (after Peffers, *et al.*, 2008)

Design Process Element	**Brief description**	**Thesis Chapter**
Problem identification and motivation	Define the specific research problem and justify the value of a solution.	Chapter 1 Why Should We Study E-Government?
Objectives of a solution	Infer the objectives of a solution from the problem definition and knowledge of what is possible and feasible. The objectives can be quantitative or qualitative.	Chapter 2 What Do We Know About e-Government? Chapter 3 How Can We Formulate Advice on E-Government

Design Process Element	Brief description	Thesis Chapter
Design and development	Create the artefact, which can be any designed object in which a research contribution is embedded in the design.	Chapter 4 A Novel Market Segmentation
Demonstration	Demonstrate the use of the artefact to solve one or more instances of the problem. This could involve its use in experimentation, simulation, case study, proof, or other appropriate activity.	Chapter 5 Validating and Verifying the Segmentation
Evaluation	Observe and measure how well the artefact supports a solution to the problem; comparing the objectives of a solution to actual observed results from the use of the artefact.	Chapter 6 Applying the Segmentation
Communication	Communicate the problem and its importance, the artefact, its utility and novelty, the rigor of its design, and its effectiveness to research and other relevant audiences.	Chapter 7 Conclusion

Chapter 2 WHAT DO WE KNOW ABOUT E-GOVERNMENT?

2.1 Introduction

If one is to provide a theory to increase the adoption and success of e-government services, one must define the scope of the theory and establish the connection of this theory to other theory in the relevant field(s) (Gregor & Jones, 2007; Hevner *et al.*, 2004; Peffers, *et al.*, 2008). This chapter establishes the field in which the research takes place, looking at common research approaches, and then identifies the scope of the field in terms of its high-level variables and the issues of concern as expressed by central research questions. Finally, this chapter situates the scope of this design theory within the e-government field so defined. Exhibit 1 locates the contribution of this chapter in the overall thesis and the development of the artefact.

Exhibit 1: Design Research Elements with Highlighted Current Element (based on \Peffers, *et al.*, 2008, pp. 52-56)

Design Process Element	**Brief description**
Problem identification and motivation	Define the specific research problem and justify the value of a solution.
Objectives of a solution	***Infer the objectives of a solution from the problem definition and knowledge of what is possible and feasible. The objectives can be quantitative or qualitative.***
Design and development	Create the artefact, which can be any designed object in which a research contribution is embedded in the design. Arguably, there is a theory embedded in the design parameters.
Demonstration	Demonstrate the use of the artefact to solve one or more instances of the problem. This could involve its use in experimentation, simulation, case study, proof, or other appropriate activity.
Evaluation	Observe and measure how well the artefact supports a solution to the problem; comparing the objectives of a solution to actual observed results from the use of the artefact.
Communication	Communicate the problem and its importance, the artefact, its utility and novelty, the rigor of its design, and its effectiveness to research and other relevant audiences.

2.2 A Review of e-Government Research

An important starting point when attempting to contribute to a field of research is to understand where the field is: its core topics and issues, relevant research methods, whether directions are apparent in the field, and most importantly, where the gaps in understanding are that might offer a place for a contribution to be made. In established fields of knowledge, reviews of the field are regularly published, usually by leading thinkers in the field, to consolidate understanding across the field. In those fields of knowledge that are still being established, the arrival of reviews of the field is a first indicator of reflection; perhaps, an initial sign of maturity. E-government is a field of research that is still young, immature, emerging; or so say the reviews that have arrived in recent years (Al-Sebie & Irani, 2003; Andersen & Henriksen, 2005; Brown, 2005; Grönlund, 2004; 2005; Grönlund & Horan, 2004; Heeks & Bailur, 2006; Helbig *et al.*, 2008; Norris & Lloyd, 2006; Reece, 2006; Scholl, 2006; Yildiz, 2007). This section uses recent reviews to create an initial picture of the e-government field to then refine with more recent thinking and to set the ground for this research.

2.2.1 Locating Reviews

To counter the claims that insufficient effort is placed in recounting research method in some reviews, let me first describe how I came to select these reviews; the literature review method, as it were. Initially, Grönlund and Horan (2004) and Brown (2005) were discovered in the course of collating e-government literature by searching individual journal indexes in information systems and public administration. From their bibliographies other reviews were identified (Andersen & Henriksen, 2005; Grönlund, 2004; 2005). Reviewing articles for the *Journal of e-Government* (now the *Journal of Information Technology and Politics*) identified a further review (Reece, 2006) and that bibliography informed the search. Finally, a meta-search engine was used to search the online citation indexes shown in Exhibit 2. The search term “e-government literature review” was used across all of these databases; 491 articles were identified. Most of these articles use the words within the phrase but not as a phrase. Many papers identified conducted a literature review in e-government but were limited to a specific issue of interest in the field, not of the whole field. By reviewing the abstracts of the various non-duplicate citations

identified, further reviews were discovered (Helbig, *et al.*, 2008; Norris & Lloyd, 2006; Yildiz, 2007).

Exhibit 2: Citation Indexes Searched for e-Government Literature Reviews

Academic Research Library
Annual Reviews
APAFT: Australian Public Affairs Full Text
Arts & Humanities Citation Index
Business Source Premier
Expanded Academic ASAP
OmniFile Full Text Mega
Social Sciences Citation Index
Social Sciences Index
Web of Science
JSTOR
Scopus
ScienceDirect

Finally, one review (Heeks & Bailur, 2006) was mailed to me by the lead author, unsolicited, and one other was identified by serendipity while pursuing citations for a third paper (Scholl, 2006). Two other small-scale, early (2003) reviews cited by Heeks and Bailur (2006) were also read (Al-Sebie & Irani, 2003; Tian & Tianfield, 2003). Al-Sebie and Irani (2003) present a weak review that does not describe how the "normative literature" reviewed was identified and makes only superficial findings with no analysis of the findings. Tian and Tianfield (2003) describe their view of perspectives of e-government with no formal literature review. These two reviews are not considered further here.

2.2.2 Reviews of e-Government

The majority of reviews of the e-government field that are considered were written from 2003 – 2005 (although published slightly later), with the latest in 2007 (Helbig, *et al.*, 2008). Six articles represent surveys of information systems (IS) literature using different sources for data. Professor Åke Grönlund, a long-standing authority on e-government, is the primary author of two of the reviews (Grönlund, 2004; Grönlund & Horan, 2004) both of which are based on a survey of conference publications that he undertook in 2003. (Grönlund published a third review article

(Grönlund, 2005) but it was a blend of the two considered here and offers no additional insights for this work.) Two other surveys (Andersen & Henriksen, 2005; Norris & Lloyd, 2006) are collaborative work using academic journals as sources for research papers to review. The sources for these two reviews are drawn from different parts of the literature. Professor Richard Heeks, another e-government luminary, and his student Savita Bailur (Heeks & Bailur, 2006) conducted a relatively constrained survey of journal and conference papers, deliberately avoiding reference discipline sources. The sixth review is a 'reconnaissance survey' of the field of "international digital government" research (Helbig, *et al.*, 2008) that looks at digital government research from a multi-jurisdictional point of view. The survey drew on 29 journals, nine conferences, and the websites of ten research organisations but did not analyse the content or quality of the papers identified (Helbig, *et al.*, 2008). The other reviews (Brown, 2005; Reece, 2006; Scholl, 2006; Yildiz, 2007), from public administration researchers, did not specifically analyse sources nor provide any insights into how the body of literature was approached. Nevertheless, they present useful reviews of e-government and offer perspectives from a different (non-IS) discipline.

The variety of approaches to reviewing the field indicate there is little consensus in what is important and whether the way it is being researched is adequate. The range of topics that are considered and published within the field of e-government seems to be wide. Even the keywords used to select articles are influential. For example, Norris and Lloyd (2006) acknowledge including articles that were not found by their keyword grouping but identified by colleagues. Limiting the range to just "e-government", "electronic government" and "digital government" (as Norris and Lloyd did) leaves out common variants, particularly in the early years of such research, of: "online government" or "government online", "i-government" (for internet government), and the term "web" being used interchangeably for "internet".

2.2.3 The Field of e-Government Research

I felt that to summarise what e-government research is investigating, I needed a 'mud map' of the field of research (refer to). My initial view of a domain of knowledge such as e-government was that it would have a number of dimensions. The first arises from the very practical insight born of experience that academic approaches

and views on e-government are quite different from practitioner views and approaches. The reviewers are supportive of this distinction too. Another dimension is epistemological: a dimension of knowledge. For this 'mud map' the dimension's 'scale' is somewhat arbitrary but suffices for this use. Furthermore, I then divide that dimension in half (still arbitrarily) and speak of a broad area where research is conducted and another broad area where practice is conducted. Finally, I add a layer to the initial dimension by characterising the most common medium for communication. This gives me arbitrarily and only a little coincidentally a 'field' of knowledge.

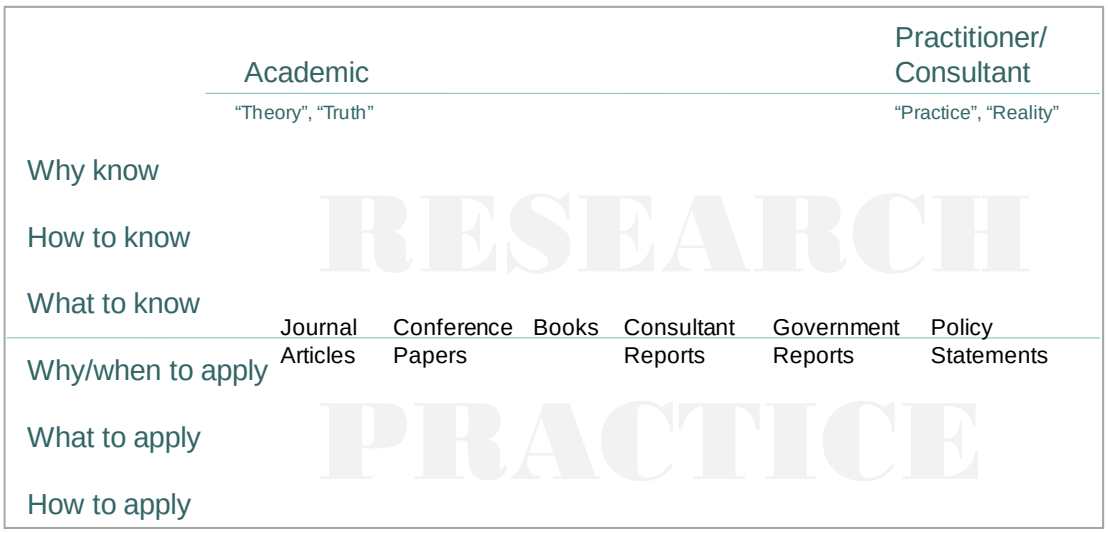


Figure 2: 'Mud map' of a Research Field (created by author)

With this guide, I first considered the IS discipline reviewers for their perspective. Grönlund (2004) notes that e-government started as a practitioner concept and that only a few conferences and journals were (at the time) dedicated to e-government. After introducing the range of possibilities, Grönlund selects three major academic conferences to use as a source of e-government research papers for his assessment. Two are European and one 'International' (actually American but commonly well-patronised by the international research community). From this source, he selected 170 papers and codified them on dimensions of rigor and relevance. His coding was internally validated by five independent reviewers coding 25 of the papers. This is a limited selection of publications at the time too, in spite of his criticism of the other reviews for just this failing.

Andersen and Henriksen's (2005) approach was to solicit a list of published academic research from two major citation databases (Social Science Citation Index

and ProQuest Direct) using a few synonymous search terms and filtering results for those published in peer-reviewed scholarly journals. (It should be noted that these databases do not index most IS journals (Clarke, 2008).) They excluded articles with a primarily technology focus, book reviews, editorials to special issues, and contributions to conference proceedings. Of 167 articles identified in this way, the list was randomly limited to 110 articles, which were then read by at least one of the authors. The authors correctly note that this survey sample was limited in scope and depth and biased by English-language only sources. They also note that they made no attempt to assess the quality of the papers (accepting the journal publication process as sufficient) and that their classification scheme may be imperfect.

Norris and Lloyd (2006) used online article databases and keyword searching to identify over 100 articles published in peer-reviewed scholarly journals—"the 'gold standard' that defines the scholarship in a field" (Norris & Lloyd, 2006, p. 41). They then eliminated articles that "merely represented authors' ruminations or speculations (no matter how well considered) about e-government" (Norris & Lloyd, 2006, p. 41) leaving only articles that contained empirical data (e.g. survey-based research) and analysis of that data. Norris and Lloyd did not investigate papers published after 2004 because of the arrival of four journals on the subject of e-government during 2005; they wanted to establish an initial baseline (Norris & Lloyd, 2006).

Heeks and Bailur (2006) specifically limit the range of their literature review to 'pure' e-government research sources on two counts: "to focus on e-government research *au naturel*, looking at the watering holes" around which e-government researchers gather, rather than "the far-off lakes of reference domains from which those watering holes are fed" (Heeks & Bailur, 2006, p. 244), and then by using the number of articles in one journal (*Government Information Quarterly*) that met their criteria ('e-government', 'e-governance' or 'digital government' in the title) as the limiting number of papers to draw from two other sources: 28 papers from *Information Polity*—the first nine or ten papers from three consecutive volumes—and 28 papers from the *European Conference on e-Government*—the first six or seven papers from four of the first five proceedings of that conference.

Helbig and her colleagues reviewed research in "relevant journals and conferences published in English in print and online from 1994 through 2006" (Helbig, *et al.*,

2008, p. 26). They drew on two published libraries of citations, one compiled by the North American Digital Government Society from a systematic scanning of "traditional journals in information systems, public administration, and public policy, as well as references from special issues on e-government in other journals" (Helbig, *et al.*, 2008, p. 27). These references were supplemented by publications in e-government conferences or conference tracks. All research had to be peer- or editor-reviewed. The other library was from the Special Interest Group on e-government of the Association of Information System, maintained by the Copenhagen Business School. The combination of the libraries, with the removal of duplicates, identified over 2,000 unique citations. By further research, particularly through the citations index EBSCO, the team added a further 40 references. Intuitively, this probably represents a close approximation of the total English-language academic field at the time.

Grönlund and Horan (2004) look at academic avenues and note that there are several conferences that focus solely on e-government and several conferences where e-government is a specific theme. They also identify dedicated journals for e-government, specifically *e-Government Quarterly* (eGQ), the *International Journal of Electronic Government Research* (IJEGR) and the (then) *Journal of e-Government* (JEG – now the *Journal of IT and Politics*, JITP). Norris and Lloyd (2006) identified four journals dedicated to e-government that had commenced by 2005: *Electronic Government: an International Journal* (EG), the *Electronic Journal of e-Government* (EJEG), the IJEGR and the (then) JEG. Importantly, Norris and Lloyd (2006) found the majority of their articles in *Government Information Quarterly* (GIQ), followed by a small range of journals, one or two of which are considered top-ranked, notably: *Public Administration Review*, *Journal of Public Administration Research and Theory*, and *Administration and Society*. The top-ranked journals that saw e-government as important enough to publish prior to 2004 were all in the social sciences/public administration literature. None of the top-ranked IS journals were present in the sample investigated (Norris & Lloyd, 2006), probably because of a citation bias in the source indexes (Clarke, 2008). Helbig et al (2008) classify GIQ as a dedicated digital government journal. They also present a range of journals from other disciplines that publish international digital government research.

In short, all surveys of published e-government research are drawn from different, largely non-overlapping sources. Some of the papers considered by Heeks and Bailur (2006) may overlap with papers considered by Grönlund and Horan (2004) or Andersen and Henriksen (2005) but it seems unlikely that they would do so to a significant extent. The reconnaissance study possibly touched the whole academic field, but then deliberately reduced its field of interest to a unique view in this set of reviews (Helbig, *et al.*, 2008). This suggests that, combined, the reviews represent a comprehensive survey of the literature; however, the various constraints and restrictions that the authors note limit just what perspective is being considered. Also, the lack of an overlap means that the consistency of analysis between reviews is difficult to judge. The difference in the parameters of journal papers versus conference papers and the variety of keywords used for identifying papers may be sufficient to warrant the difference in the findings of these surveys. There is a real possibility that together the reviews are equivalent to the apocryphal story of blind men describing an elephant to each other, each touching a different part of the animal and extrapolating from that alone. Figure 3 illustrates the range of sources and range of epistemology covered by the IS discipline reviews.

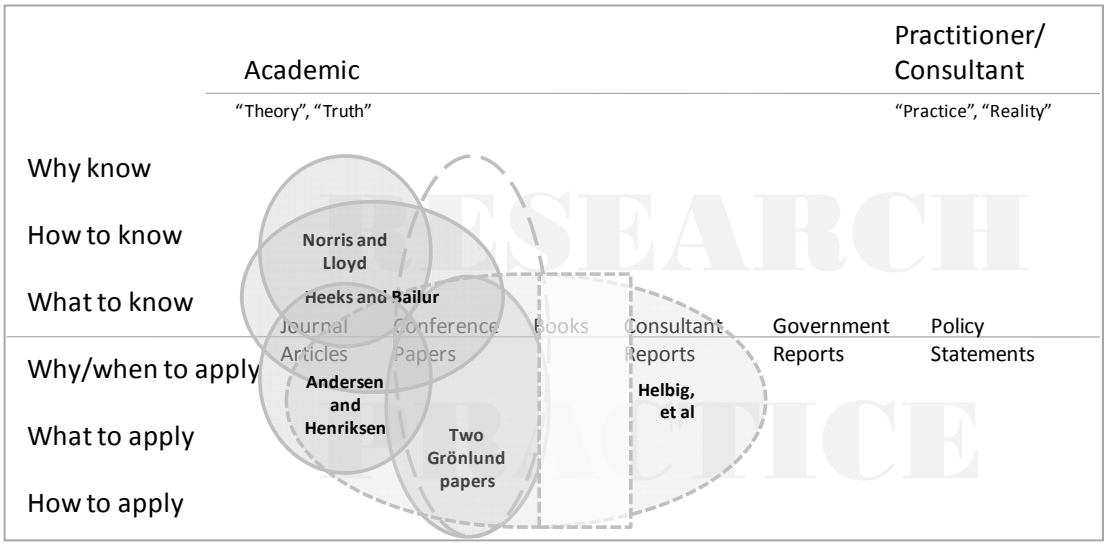


Figure 3: A Sketch of IS Discipline Research on a 'Mud map' of e-Government Research

Norris and Lloyd (2006) specifically excluded papers such as those by Brown, Reece, Scholl and Yildiz because they were seen as insufficiently rigorous. The public administration literature does not appear to place the same emphasis on empirical approaches as is apparent in the IS discipline (Gregor, 2005). The different

perspective from a reference discipline to e-government is important here, so the reviews are included.

The papers from the public administration researchers (Brown, 2005; Reece, 2006; Scholl, 2006; Yildiz, 2007) do not specifically review earlier publications on e-government. They all review the field drawing on various sources for examples and to support their arguments. Heeks and Bailur are specifically critical of such approaches describing them as "'hunt and peck': a review of some relevant sources but without the rigor that might allow the approach to be called a proper literature review" (Heeks & Bailur, 2006, p. 256).

Given the silence by the authors on their respective approaches to the field, an inspection of their respective bibliographies provides some insight into the background for their ideas. Brown (2005) uses a relatively small 'literature' that seems to be balanced evenly between web sites of major research institutions, conference proceedings of administrative science conferences, and books. Reece (2006) draws largely on books and reports, with a sprinkling of journal articles drawn from the public administration/social science literature. With the exception of a couple of workshop papers, there are no conference papers in the bibliography, and with the exception of a few articles from *Government Information Quarterly*, no journal articles from IS-related journals. Inspection of Yildiz's (2007) bibliography indicates a substantial reliance on journal papers (mostly from *Government Information Quarterly*, in which the article appears) and published books. There are some conference papers, workshop papers, and web page references. To the extent that the inspection can determine, the preference appears to be for the public administration/social science literature. Scholl (2006) references papers from top-level IS and public administration journals, books, and conference papers from e-government conferences. This is a relatively broad ambit; however, Heeks and Bailur (2006) identified at least six reference disciplines drawn on by articles in their survey and Scholl himself describes 13 reference disciplines; so, although of a high standard, his reference list seems narrowly composed, just as for the other public administration researchers. Figure 4 illustrates the range of sources and range of epistemology covered by the public administration reviews.

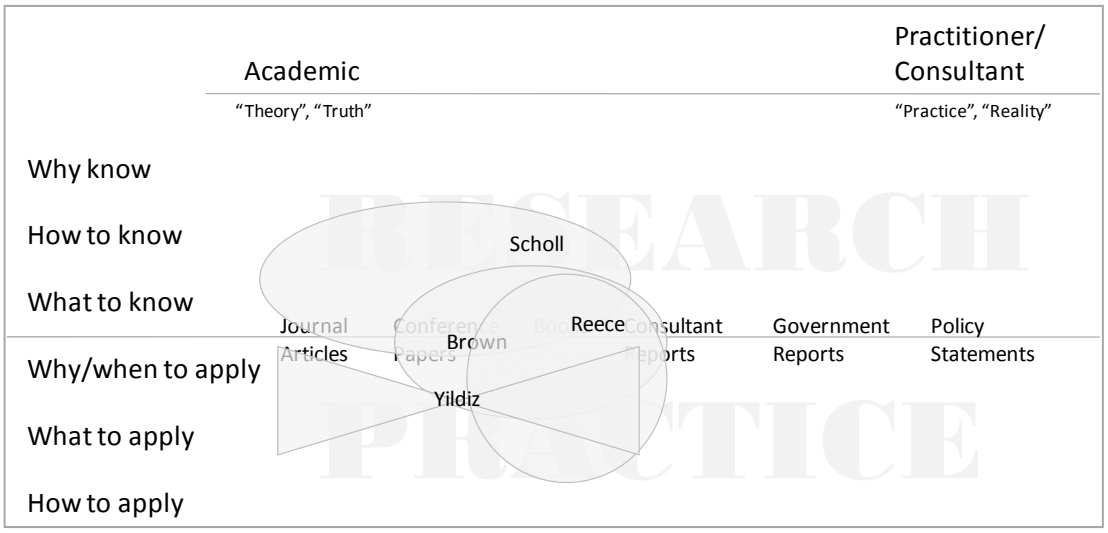


Figure 4: A Sketch of Public Administration Discipline Research on a 'Mud map' of e-Government Research

Figures 3 and 4 demonstrate at least one similar characteristic: an apparent reluctance to consider the output of practitioners working in e-government unless it is published through academic channels. Helbig et al (2008), Brown (2005), and Reece (2006) acknowledge non-academic sources specifically but reference none of their output and there are no other reviews that look at anything to the right of 'Books' on my arbitrary dimension of channels. Figure 5 emphasises this point by overlaying the two previous sketches on a common field.

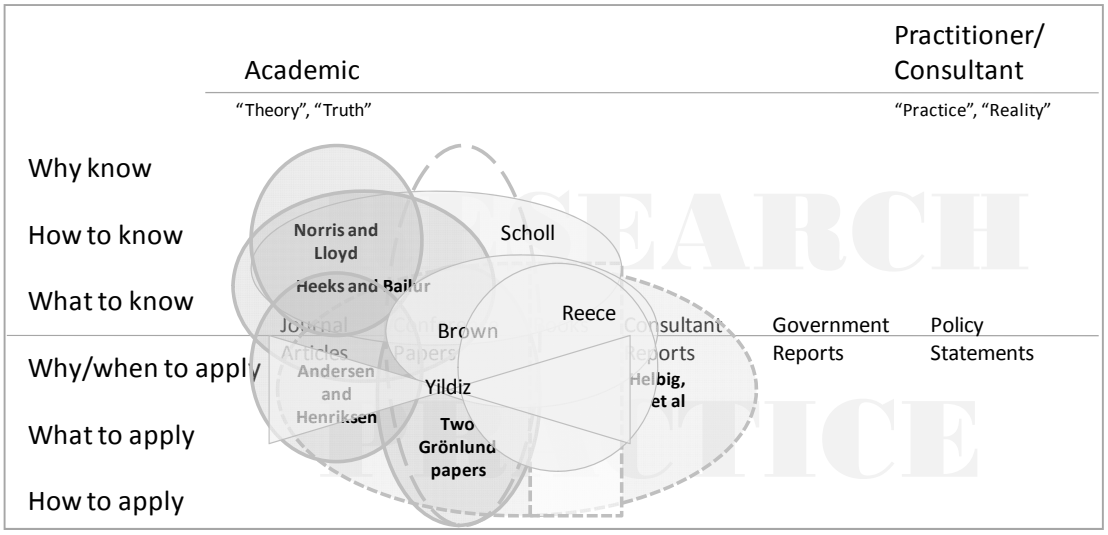


Figure 5: A Sketch of Research Interests on a 'Mud Map' of e-Government Research

The reviews agree that e-government as a concept and as a field of interest arose in the mid-1990s, driven predominantly by practitioners. Andersen and Henriksen (2005), Grönlund and Horan (2004), and Norris and Lloyd (2006) all acknowledge the deeper history of information technology in government stretching back to at

least the 1970s. Others suggest that history goes back to the 1950s (Kraemer & King, 2006).

Notwithstanding the absence of critical review of their output, the reviews do point to non-academic avenues for considering e-government. Brown notes that there are several international organisations promoting and/or facilitating e-government:

> "Several UN agencies are actively engaged in developing an international framework for e-government. Supported by General Assembly resolutions, the International Telecommunications Union (ITU) has sponsored the ongoing World Summit on the Information Society (WSIS). The World Intellectual Property Organization (WIPO) has developed internet treaties to support the knowledge economy and the United Nations Secretariat's Division for Economic and Social Affairs (UNDESA), through its UN On-line Network in Public Administration and Finance (UNPAN), has actively promoted the use of ICTs in public administration world-wide. The World Bank has an active e-government site and the OECD has also actively engaged its membership in experience sharing on e-government, knowledge management and the use of IT" (Brown, 2005, p. 246)

Grönlund and Horan (2004) acknowledge these international forums mentioning particularly the UN's WSIS and UNESCO's World Forum on the Information Society (WITFOR – World IT FORum) that serve to promote e-government issues at a global level. Helbig et al (2008) specifically identify five international research organisations, and include Accenture as a multi-national, pursuing international digital government research.

An important point raised by Grönlund and Horan (2004), Brown (2005) and Reece (2006) is the prevalence of international benchmarks of progress in e-government. Brown sees this as a product of "the considerable role played by consultants in shaping e-government, introducing both formula approaches and a global marketing of ideas" (2005, p. 247). Reece concurs noting: "Many of these early reports were written by industry consultants hired by government agencies to help assess practices in the field, while others were written directly by government personnel. Very few of these originated from academia" (Reece, 2006, p. 74). He explains that these reports

were either baseline studies or best practice reports, created to provide governments with some idea of where they were and where to go next (but references none of them).

Brown (2005) offers five examples (in alphabetical order) of survey sources: Accenture, the Bertelsmann Foundation, Brown University, the Economist and IBM, and UNPAN. Grönlund and Horan also note the "more or less recurrent" (2004, p. 716) benchmarking studies, nominating Accenture, UNDESA (UNPAN), Brown University, and IBM and the Economist. The research conducted by these organisations as part of their benchmarking activity as well as reports on e-government projects are also pointed to across the reviews. Reece (2006) mentions the important collection of data available for analysis collected by Pew and Public Technology, Inc. which can underpin more causal studies. Helbig et al (2008) agree that benchmarks studies are well-established and note the UN, the World Bank, and the International Telecommunications Union (ITU) with consecutive series, as well as Accenture and Brown University. They note that benchmarks of e-government are notoriously difficult, citing several studies that criticise the approaches and comparability of such studies.

Reece (2006) is more thorough in recognising the various practitioner efforts in the early part of e-government's history. He nominates organisations like the Civic Resources Group, Gartner Group, IBM's Institute for Electronic Government, Accenture, the Rand Corporation and the International City/County Management Association as significant sources of guidance for governments in e-government's early phases. He also acknowledges that there were prolific government agencies too, mentioning several US, British, and Canadian agencies. Reece does note that several of the UK government reports were written by academics, mentioning London School of Economics, University of Oxford, and University of Salford. He points to Brown University's Darrell West as "most notable academic in the descriptive government area" (Reece, 2006, p. 75) in the US.

E-Government's practitioner-origin appears to be a crucial blind-spot for the reviews. Despite acknowledging that the definition of e-government is frequently enshrined in the legacy strategies of governments (Grönlund & Horan, 2004), no review attempts to consider what contribution to the understanding of the field is made in this body of

practitioner work; the strategic documents of all those governments acting in the e-government field remain unopened by these reviewers. The bibliographies of the reviews draw only on academic publications. (Figure 3, page 26, indicates that Helbig and her colleagues considered consultant reports. The survey conducted in this research identified such work but specifically did not analyse the content or assess the quality of the material identified (Helbig, *et al.*, 2008).) The treatises on e-government by major consulting firms (e.g. Accenture), that have evolved over time just as e-government has evolved, are not considered even though, as Brown (2005) implies, the international benchmarking of progress is an extraordinary circumstance in a field of research. None of the work done by governments or their consultants is considered by these academic reviewers, as illustrated in Figure 5, page 28.

Clearly, there is a significant gap in the literature that this source of e-government insight has not been reviewed. Academics may feel that such work warrants little attention as its academic rigor is notoriously questionable in terms of not exposing its self-interest or the detail of underlying methodological approaches, or in connecting itself to existing literature and theory. However, the reviewers are equally harsh on the academic e-government field (discussed in more detail below) not the least of which are Heeks and Bailur who bluntly state:

> "most of the research on e-government falls between the stools of theory and of practice. It does not add to the body of theory. Nor does it significantly help to improve practice. For most work, then, there was no link between theory and practice because there was neither theory nor any particular practical value." (Heeks & Bailur, 2006, p. 258)

If that is the standard of the competition, formally published government strategies and policies and the detailed guidance reports from various substantial consulting firms and international organisations can hardly be worse! And, in this author's experience, it is precisely these non-academic sources that practitioners use for determining what to do and how to do it. A quotation attributed to Chuck Reid sums it up: "In theory, there is no difference between theory and practice; in practice, there is."

Reviews that seek to expose the insights embedded within these documents and to connect those insights to the theories, frameworks, and research questions of the field

are needed. It is not inconceivable that the academy is researching in areas that practitioners feel are already settled because of published policy. The search of the literature for this research has not turned up any reviews of government strategies or policies, or consultant reports seeking to tie their findings and conclusions to any theoretical body of knowledge. The research presented here, being the work of a practitioner come late to the academy does draw on such material where relevant.

2.2.4 The Common View of e-Government

Most of the reviews offer a definition of e-government, and they are largely aligned, although reaching similar positions from slightly different perspectives. Yildiz is an exception here as he notes "many definitions of e-government are rather loose and gloss over the multiple meanings e-government might have depending on the specific context, regulatory environment, dominance of a group of actors in a given situation, different priorities in government strategies, etc" (Yildiz, 2007, p. 654). He sees this lack of an agreed definition of the concept of e-government as a significant limitation in the field.

Grönlund and Horan locate various definitions within a classical model of society involving politics, administration and civil society, noting that "even though different in scope, the definitions are unanimously socio-technical: organizational change, skills, and technology together are the key to success" (Grönlund & Horan, 2004, p. 721). In spite of his concerns about a lack of a definition, Yildiz (2007) announces his own definition that matches Grönlund and Horan's categorisation exactly. Andersen and Henriksen limit the definition they use to identify e-government research: "Although the democracy issue clearly is part of e-government, we have focused our review of literature on the administrative and executive domain of government" (Andersen & Henriksen, 2005, p. 35). Reece (2006) agrees with the duality but is diametrically opposed: he sees the administrative element as much less interesting and focuses the major part of his consideration on the e-democracy and engagement issues of e-government. Norris and Lloyd (2006) do not specifically define e-government, although they imply that it has connections with the Internet drawing historical timelines for the field on the basis of the presence of web sites. Notwithstanding that implied definition, they analyse each of the surveyed papers for a review of the literature on IT and government, as well as other fields that might be

relevant to the particular issue under study. Helbig et al (2008) do not focus on the use of IT to support public policy and government operations. They frame "'digital government'—a term coined by the US National Science Foundation (NSF)—[as] the intersection of computer and information sciences, social and behavioural sciences, and government challenges and needs" (Helbig, *et al.*, 2008, pp. 6-7). Scholl (2007) acknowledges the NSF definition as a commonly-accepted position; however, I feel he is limiting his view of the field to US-based 'Digital Government' researchers in making that assertion.

Yildiz (2007) seeks to include consideration of the political environment in which e-government projects are selected and conducted. Brown speaks of "the entire range of government roles and activities, shaped by and making use of … ICTs" (2005, p. 242). He observes that e-government brings together two primary elements: the environment of ICT that tends to promote new management models "such as client/citizen centricity and single-window convergence" (Brown, 2005, p. 242). The other element is the linking of democracy, governance and public management with the public administration sphere. Grönlund and Horan draw a similar distinction naming the differences e-government and e-governance: "e-Govern*ment* refers to what is happening within government organizations … E-Gover*nance*, on the other hand, refers to the whole system involved in managing a society" (Grönlund & Horan, 2004, p. 719, original emphasis). They suggest that e-governance is the more important area of study.

In summary, the literature takes the view that e-government is about more than just the application of ICTs in government or the way the activity within government is or should be changed by those ICTs. The field should include consideration of the role of government in a society that is being changed by the increasing presence and use of ICTs. I will return to the definition of e-government in section 2.2.9.

2.2.5 The Research focus of e-Government Research

Brown (2005) claims that e-government has given rise to unique features:

- virtual communities—networks of individuals that would otherwise not exist and that are both more accessible (unlimited by geography, time, etc) and more closed (relying on affinity between members); and

- a specific organisational culture—changes to ministry structures to match changed roles brought on by citizen-centric services and new agencies developed specifically to guide government on matters related to the information economy.

It was noted in Chapter 1 that Brown describes four key areas where e-government has made "clear and lasting impacts" (2005, p. 247) on public administration:

- Constituent-centred service;
- Information as a public resource;
- The skills and knowledge needed by public servants to deliver e-government; and
- Accountability and management models.

Let us now look at these areas in more detail as they represent some of the central matters of e-government.

Constituent-centred service. "Perhaps the single most powerful concept inherent in e-government is client-centred service delivery" (Brown, 2005, p. 247). I think Brown mistakes cause and effect here. Constituent-centricity arose before e-government (e.g. in Australia, this concept was predicted by *Clients First* (Information Technology Reference Group, 1995)) from New Public Management ideas. Constituent-centricity is more likely to have been a significant driver as e-government is seen to facilitate delivering constituent-centric services. Brown reiterates that in this mode government services should be designed "from the outside looking in" (2005, p. 248) starting at meeting constituents' needs or helping them meet their civic obligations. "The formal organization of government assumes secondary importance" (Brown, 2005, p. 247). Brown (2005) notes that constituent empowerment offers costs savings (cost shifting to the constituent for administrative tasks) but also requires accommodation of the fact that not everyone can or will use technology tools and so integration of service across channels is critical.

Brown notes that the constituent-centred service approach works best "in the context of service transactions involving an exchange of information or money for a tangible return, such as a certificate or a reservation. This model, based on electronic commerce, is well suited to local government and areas of national government that have significant interaction with the public" (2005, p. 248), but that it works less well

in areas of research or policy development where knowledge management techniques are more appropriate.

Andersen and Henriksen note that: “whereas most of the studies address citizen/public sector interaction, there is limited emphasis on interactions between private businesses and the public sector” (2005, p. 31). They also observe that this constituent e-service research outweighs research considering e-democracy-type interactions. Reece (2006) suggests a more even distribution of research questions between what he calls ‘demand-side’—which focuses on addressing the needs of the end-user—and ‘supply-side’—which focuses on the providers of e-government services, government. It does appear, though, that the rhetoric of constituent-centred government has pervaded e-government research.

Information as a public resource. Although records and document management have long been important in government, e-government elevates that importance to be equivalent to human and financial resources. Brown (2005) notes that government’s ability to compel accurate information about virtually every aspect of a constituent’s or business’s life makes its information collections particularly valuable. “Privacy and the protection of personal and commercially-sensitive information have, therefore, become major e-government public policy issues, together with their companions, security and intellectual property” (Brown, 2005, p. 249). Yildiz (2007) shares this view, particularly in the context of the post-9/11 world.

The skills and knowledge needed by public servants to deliver e-government. Not only has the pace of adoption of ICTs in government been staggering but new working models based on networking and collaboration are cutting across traditional hierarchies and silos. The scale and complexity of much ICT use in government has also created difficulties in decision making and led to a greater emphasis on risk management. Brown (2005) also comments on the changed relationship between government and the private sector starting at the level of receiving advice from consultants in fast-moving areas of technology through to relying on private sector ‘partners’ to implement technology solutions, including the wholesale outsourcing of service delivery. Reece (2006) noted how this interaction significantly influenced the early (non-academic) literature of the field.

Accountability and management models. "The client-service orientation of e-government changes the relationships between the public, the civil service and elected representatives in practice and raises issues in principle. At the very least, the emphasis on providing service—preferably good service—to the public broadens the focus of civil servants from their traditional concern with supporting their political masters. This risks being extended into a perception that their real accountability is to the public and not to ministers" (Brown, 2005, p. 251). Brown (2005) also notes that the adoption of ICTs such as e-mail and databases is both a centralising and de-centralising force: de-centralising by allowing hierarchically-lower officers to make autonomous decisions; centralising in that singular data holdings are valued more and more for consistency and coherence.

Although Brown (2005) does not directly cite research to support his claims, they are intuitively appropriate, and in various parts are supported by the views of other reviewers. His lack of citation does not mean that there is no research supporting these claims. The other reviews point to all of these areas of interest being considered in research and the emphasis given by Brown (2005) in the ordering of the points (preserved above) is in line with the attention paid by researchers in the field.

Andersen and Henriksen (2005) look into their sample of the literature to discover what is being considered, what aspects of e-government are being explored. Their findings, discussed further below, indicate that a very socio-technical view is being taken of e-government; something that Grönlund and Horan (2004) assert is inherent in the definitions of e-government. Heeks and Bailur agree with Andersen and Henriksen on this point cautioning further that nearly half of the papers that they reviewed adopted an optimistic and technologically deterministic view, "which simply seem to regard IT as a 'good thing' for government" (Heeks & Bailur, 2006, p. 248).

Andersen and Henriksen (2005) classify their sample of research into two dimensions: contextual research domains, and domains of impact. Capabilities are seen to be things such as: "information quality (data access, data quality), efficiency (productivity gain, staff reduction/substitution, improved managerial control, time-saving measures), and effectiveness (improved decision processes, improved

products and services, improved planning)" (Andersen & Henriksen, 2005, pp. 30-31). Interaction includes:

> "areas such as coordination/cooperation, citizen/public sector interaction, private sector/public sector interaction, citizen/citizen interaction, and organizational control and power. … Orientation encompasses studies that address IT use in the structuring of problems and discretion of government. … Studies on values include IS implementation and impact on protection and improvement of the private sphere, job satisfaction and enrichment, job enlargement, protection of legal rights, improved standard of health, safety, and well-being" (Andersen & Henriksen, 2005, p. 31).

Andersen and Henriksen (2005) find that about 70% of papers fall within the domains of capabilities and interactions, which indicates that e-government research is primarily focused on the capabilities of IT applications and IT-enabled interactions between government and citizens or business. Furthermore, "sixty percent of the articles either concentrate on e-service provision or mere conceptualization of e-government rather than indicating outcomes and benefits of e-government adoption" (Andersen & Henriksen, 2005, p. 34). Although Andersen and Henriksen dispute Grönlund's claim that the field is immature, they do imply that the predominant socio-technical view of e-government is a sign of immaturity.

According to the literature reviews, the e-government research field has been dominated by considerations of government interaction with stakeholders (constituents, businesses, and suppliers) and interactions between different elements of government. This research has been primarily socio-technical in character: how to make these interactions and their supporting processes more efficient. There has been consideration of civic participation issues (Reece, 2006) but this is seen as an under-developed field, although broadly stated as more important than the area to date receiving focus.

2.2.6 The State of e-Government Research

Andersen and Henriksen specifically refute the idea that research into e-government is still in its infancy: "there is evidence of a persistent myth that not much has been

published on e-government and that e-government still appears to be in its infancy" (Andersen & Henriksen, 2005, p. 27). They cite Grönlund (2004) as the source of the claim, but have looked elsewhere to make their determination. Norris and Lloyd support Grönlund's view that e-government research is 'young' (as do many others (e.g.Al-Sebie & Irani, 2003; Coursey & Norris, 2008; Cushing & Pardo, 2005; Delcambre & Giuliano, 2005; Flak *et al.*, 2007; Scherlis & Eisenberg, 2003; Scholl, 2007)). Grönlund defined maturity as "a critical amount of methodologically sound examination of relevant issues, be they related to technical quality, user understanding, extent and qualities of use, or other" (Grönlund, 2004, p. 7). While this definition does not provide a scale of maturity against which to measure, the implication in an assessment of immaturity (youth) would be in a lack of critical mass and/or methodologically-sound research; Grönlund (2004) focuses on the methodologically-sound element. Heeks and Bailur (2006) and Scholl (2006) are sympathetic to this view without taking Grönlund's specific approach.

The reviews that explicitly conducted research paper surveys drew conclusions about the 'quality' of the e-government field (across two different perspectives—conferences and journals—as previously noted). Grönlund (2004) finds that the bulk (90%) of papers presented at the three conferences in 2003 were descriptive ("Describes a phenomenon in its appearance without any use of theory" (Grönlund, 2004, p. 181)) representing a still largely immature field. Grönlund concludes that:

> "the field is indeed immature, because theory generation and theory testing are not frequent, case stories (no theory, no data) and product descriptions (no analysis or test) are frequent, dubious claims (beyond what is reasonable given the method used) are frequent, appear in 29% of the papers, and only a few of the cases where theories are either tested or generated concern the role and nature of government" (Grönlund, 2004, p. 185).

Grönlund may be dismissing the usefulness of work that could be classified as 'theory for analysing and describing' which is valuable when little is known in a field offering the potential to identify basic concepts, variables, and defining terms (Gregor, 2002). However, from this author's personal experience of the work that Grönlund reviews, his critique of it as of poor quality is appropriate. Much of this

early work did little to define a new field or collection of phenomena, simply re-stating well-understood concepts from information systems and public administration under the new title of ‘e-government’, and often less-well than it was already expressed in the reference disciplines.

Norris and Lloyd (2006) save their most critical comments for the adequacy of the literature reviews provided by the articles rating only seven of the 57 articles (12%) as having a ‘strong’ e-government literature review. They forgive some of the earlier articles because of the dearth of relevant articles to review, but do not see an improvement in this element. Furthermore, they note that reviews of literature that support fields from which other ideas arise were better. They do not provide any insight into whether this corresponds with the discipline of the authors. Norris and Lloyd (2006) conclude that the field is indeed still new, still ‘finding its legs’, and they point to the predominance of publications in lesser-ranked journals as an explanation of the weakness of the scholarship in the articles that they reviewed.

Heeks and Bailur (2006) assess the quality of e-government research too. Their analysis of the papers they reviewed covered a range of areas including: underlying research philosophy, rigor of research approach, and recommendations for research and practice. They were singly unimpressed identifying a range of weaknesses:

- “A strong theme of over-optimism, even hype, and a consequent lack of balance in considering the impact of e-government.
- Dominance of positivist research approaches that, simultaneously, often fail to provide any significant practical recommendations.
- Little use of frameworks of knowledge from governance, and little use from within e-government in order to encourage an accumulation of knowledge.
- Dominance of research methods that require no face-to-face engagement with the realities of e-government, no statistical analysis, and no longitudinal engagement with e-government practices. …
- Little recognition of underlying perspectives, with weak, confused or even contradictory positions about e-government or about the underlying philosophy being espoused.

- Lack of clarity about underlying assumptions, about methodologies, and about how data were gathered for the reported research.
- Lack of rigor in the collection and analysis of data, and in generalization from that data.
- Unsubtle promotion of a writer's own products or services." (Heeks & Bailur, 2006, p. 260)

It seems that the assertion of immaturity in the field is warranted, although not solely on the basis that Grönlund (2004) uses. The youth of the field (accepting the coining of the term as no earlier than 1993) is less problematic than the apparent immaturity of the research conducted in the field. This issue is explored further below and taken up again in 2.5.

2.2.7 How e-Government Research is being Conducted

The reviews diverge somewhat in their approach to assessing what e-government research is taking place. Grönlund (2004), seeking to assess the field's maturity, considers the research in the selected conference proceedings for rigor and relevance. He stipulates the need in a scientific field for a common object of study and a set of theories used to understand the general conditions of the field. He says that the object of study, government, is made up of disparate organizations and processes. Similarly, the scope of work of government agencies varies widely "from road construction to social welfare to schools to railroads to defence" (Grönlund, 2004, p. 178). As a consequence, his view of the field focuses on *how* research is being conducted, or at least, how it is being *described*. His conclusions, discussed below, are not complimentary. Norris and Lloyd (2006) adopt a similar approach, reviewing papers for their rigor in particular. They categorised the articles they reviewed on twelve dimensions, ten of which were equivalent to 'demographics' for the paper (e.g. year of publication, type of article, discipline of lead author, etc). They included two "more qualitative (and frankly more subjective)" (Norris & Lloyd, 2006, p. 43) dimensions: the adequacy of the literature review, and the support for the paper's conclusion available within the data and analysis. Heeks and Bailur (2006) describe the development of 25 coding scales, some deriving from existing frameworks and some grounded in content analysis of the papers themselves. After initial trials, they

reduced the number to 24. Then all papers were coded against each scale and the analysis proceeded on those results. The detail of the scales is not presented in the paper—not even a naming of all 24 scales—but their analysis covers areas of research philosophy, research approach, and the use of theory.

Norris and Lloyd (2006) find that the most common study method is case study. They are critical of the collection of case data and similarly critical of some of the data analysis within the papers that they investigate. They also find a tendency for the articles to lack other indicators of academic rigor such as formulation of hypotheses or research questions and testing of such hypotheses or research questions. Their view may demonstrate a 'natural sciences' bias in a field where 'design science' is likely more applicable, even if practiced unconsciously. However, their implied criticism of the case study approach warrants specific comment. Norris and Lloyd, along with Grönlund and Horan, criticise what they describe as 'case stories' because of their lack of empirical research method and for poor analysis and shaky or unsupportable conclusions. These legitimate criticisms, however, make no account of the need for this powerful research method in circumstances where things cannot simply be counted and empirically manipulated. As e-government is set at the interface between (at least) information technology and public administration there is a substantial need to draw on reference disciplines in the social sciences that do not immediately lend themselves to empirical (e.g. statistical analysis) approaches. Interpretivist research methods (e.g. strongly-conducted case studies) offer insights from complex arrays of inter-dependent qualitative variables.

Andersen and Henriksen (2005) take a different approach. In spite of disagreeing with Grönlund (2004) specifically, they do not investigate the research process or the defensibility of claims made in research saying only that the articles they reviewed were not the anecdotal case stories absent of theory building or testing that Grönlund criticised. The different source of research articles may be a defining reason for an apparent difference in the rigor of the research reviewed. Norris and Lloyd (2006), however, specifically lend their support to Grönlund's (2004) characterisation of many case studies as case *stories*; i.e. not methodologically-rigorous investigations or reporting of the cases. Heeks and Bailur support the poor research view too noting that "the authors found no reference – not even a passing one – to concepts of

research philosophy such as ontology, positivism, epistemology, paradigms, etc., in any of the eighty-four publications" (Heeks & Bailur, 2006, p. 250). The last two reviews drew their samples from sources that crossed those used by Andersen and Henriksen (2005), which compromises the source-bias argument. That Grönlund (2004), Norris and Lloyd (2006) and Heeks and Bailur (2006) looked at the research approach and its rigor, where Andersen and Henriksen (2005) only looked at subject matter may explain the basis for their disagreement.

The only other review to describe endogenous characteristics of the e-government field (unless 'case stories' is one) was Reece (2006) who described three research techniques that he felt had developed through e-government research: mapping Internet characteristics to democratic processes, content analysis of web sites with fairly consistent agreement on coding schemes, and the development of databases of practices and achievements from benchmarking studies.

The public administration perspective is orthogonal to the discussion above. Reece (2006) structures his whole review along the lines that a field of research starts as descriptive, moves through prescriptive, and that e-government, having followed that route, is showing signs (in the early 2000s) of developing a causal focus. This progression has an implicit expectation of growing maturity and with it a growing rigor. In some ways, Reece simply accepts that the early work will be little more than 'case stories.' When describing the field's progress in the late 1990s to "more quantitative and generally more rigorous studies" (Reece, 2006, p. 74), he points out that most of these studies were primarily descriptive, lacking analysis, and "not, for the most part, attempt[ing] to develop theory, identify variables, or pose hypotheses" (Reece, 2006, p. 74). He categorises this literature as "baseline studies and best practices reports, where baseline studies assess the range of development and activities present in e-government initiatives and best practices reports assess the 'best' developments and activities present in e-government initiatives" (Reece, 2006, p. 75). With the lack of analysis and other academic rigour noted by Reece, such reports, if considered by Grönlund and Horan or Norris and Lloyd, may appear to be 'case stories'. Regardless, the author can attest from personal experience such reports were powerfully influential in developmental e-government thinking by governments, not least because the governments paid for them.

Scholl takes a slightly different approach testing e-government research against six criteria in an assessment of whether it constitutes a discipline in itself. He selects the criteria from a range of sources settling on: "(1) a formal definition of the discipline/field, (2) a common base of knowledge, (3) a unique cluster of research problems, (4) unifying theories, (5) an accepted set of procedures and methods of inquiry, and (6) a shared vision of the discipline/field's impact" (Scholl, 2006, p. 14). He concludes that e-government is not a discipline in its own right as although it complies with the first three criteria, it fails to meet the second three. He expands this analysis in a later paper (Scholl, 2007) where he identifies 17 criteria; the result remains the same.

Other review authors would not concede passing on Scholl's first three criteria either. Where Scholl feels that there is a single accepted definition of e-government research (quoting the US National Science Foundation's Digital Government Research agenda definition) other reviews (Grönlund & Horan, 2004; Heeks & Bailur, 2006; Yildiz, 2007) noted a range of e-government definitions and no single accepted view. Scholl suggests that there is an accumulated knowledge base across "49 monographs, over 200 articles in established journals, over 60 articles in new journals, and over 500 articles at conferences" (Scholl, 2006, p. 14), yet Heeks and Bailur conclude that e-government research "has not even reached the level of accumulating knowledge about its own models. The image is of random rocks being thrown into a pool rather than building cairns of knowledge" (Heeks & Bailur, 2006, p. 256). Scholl feels that there is a unique cluster of research problems, yet Andersen and Henriksen (2005) conclude that e-government is a research area without a clear research paradigm. Although their classification segmented research into four classes across two dimensions, they claim: "there are more issues that diversify e-government research other [sic] than unifying aspects" (Andersen & Henriksen, 2005, p. 35).

Importantly, though, Scholl (2006) crystallises a role for e-government research given its substantial legacy in 13 reference disciplines. He maintains that e-government research is essential to address problems that arise uniquely from the intersection of these reference disciplines and cannot be properly solved from a single disciplinary perspective. Grönlund and Horan (2004) and Heeks and Bailur (2006) are in agreement with this conclusion.

The reviews indicate that there is no specific or preferred e-government research method, unless it is the case study about the conduct of which the reviewers are pretty scathing. (As noted above, Reece suggests some common techniques but no preferred research method.) The assessments of the work already published appear to reflect a 'natural sciences' biased expectation and a positivist view; i.e. research attempting to determine what 'is' in concrete, quantifiable terms. Yet my practitioner experience and the dominance of socio-technical focus in e-government research to date suggests that the research focus might more usefully be on 'what and how to do' (practice, the lower part of my 'mud map'). I will take that point up more in Chapter 3. Nonetheless, the warnings of the reviews are salient; particularly that the research must demonstrate rigor, be relevant, and not make claims beyond what can be substantiated by the research.

2.2.8 What Should be Researched

The reviews and other work offer guidance on what ought to be the subject of e-government research. This section summarises that guidance as a prelude to summarising the field and setting a scope for the research presented here.

Grönlund and Horan (2004) suggest that e-government as a field of research may be distinguished by the topics: frameworks and guidance for e-government and e-governance; e-government policies, strategies and implementation; and participation, e-democracy and e-voting. They identify three characteristics of research that ought to be considered "e-gov":

- "exclusive"—issues that relate only to e-government, possibly because of unique combinations of otherwise not exclusive concepts;
- "government-focused"—the concerns must be about the combination of IT and government; and
- "e-Gov analytical—the role and methods of government need to be discussed in the light of the "e". What are the implications of IT design and use? Government in its current implementation cannot be taken as a given – because then IT would not matter" (Grönlund & Horan, 2004, p. 723).

Scholl (2006) does not specifically set an agenda for research in his review article (he moves to that in a later paper, discussed below). He does, however, point to an

important element that Grönlund and Horan (2004) have hinted at. Scholl feels that e-government research will be most successful and earn a sense of uniqueness as a discipline if it focuses on interdisciplinary or transdisciplinary research. He feels it is important to develop solutions to e-government problems, which are inherently cross-disciplinary, by synthesising the research insights and theories of reference disciplines in unique ways that are beyond the realm of any one reference discipline.

Andersen and Henriksen (2005) go to some length to describe what they feel should be contained within e-government, most importantly that it should focus on government. They then describe the domain of government as comprising six areas, summarised in Table 2 below:

Table 2: Proposed key dimensions of the e-government domain (Source: Andersen & Henriksen, 2005, p. 37)

Dimension	**Government Characteristics**
1. Labor intensity in the work processes	• Few physical products • Lack of robot and product technologies • Case work technologies
2. Regulation and service provision	• Positive and negative regulation • Service provision (general information services, specific services) • Citizens, government, politicians, and other governmental units the key users
3. Political, administrative-rational and anarchic motives	• Structures, processes, actors, and policies that determine or implement the allocation of public values • Many and often fragmented and conflicting political actors • Back-tracking (logs) of activities to ensure that employees act fairly, responsively, accountably, and honestly
4. Limited market exposure	• Limited market exposure and substitution options (products/actors) • Limited/no competition on the services • Indirect processes for budget allocation rather than directly from users
5. Demand paradox	• IT a potential cost driver rather than a strategic tool • Budget-driven IT applications • Higher concern on direct cost effectiveness than in the private sector
6. Strict rules and regulations	• Main roles and tasks defined at policy level • Investment and changes in IT use requiring consultation on formal procedures/law changes • Less strategic decision-making autonomy

The definition of the e-government domain by Andersen and Henriksen (2005) highlights a fundamental issue when investigating e-government: 'government' is different in each instantiation around the world (Helbig, *et al.*, 2008) and over time (Quiggin, 1999). For example, the claim that government has "few physical products" in Table 2 may apply in, say, (northern) European governments with which Andersen and Henriksen are familiar, but denies the activities of various governments around the world to produce anything from cigarettes (e.g. China) to submarines (e.g. Australia). Similarly, the view of "IT [as] a potential cost driver rather than a strategic tool" (Table 2) belies much of the international 'ICT for development' agenda (Imran *et al.*, 2008). Consequently, while categorisations like those in Table 2 are useful, they are not definitive. E-Government research must accommodate a wide variety of government activity (including different political modes) or focus on particular local issues to claim relevance.

Brown (2005) situates e-government in four domains across which governance and public administration can be divided:

- **Jurisdiction of the state and its role in society**—here there are matters of promoting economic prosperity and social cohesion in the disruptive environment of new technologies; allowing business to prosper through economies and reach that ICTs provide while ensuring that individuals have the skills to participate and are not excluded through newly created social divisions.
- **Legitimacy of the state and relationship with public**—here are matters to do with e-democracy and e-governance (e.g. e-voting and public consultations). Similarly, the constituent is more directly connected with the government for information and service provision, which can fundamentally alter the role of politicians as intermediaries. The dual obligation of constituents to provide necessary personal information and for the government to treat that information accountably leads to matter of privacy law, etc. Similarly, electronic commerce requires new laws about contracts, liability, electronic transactions and court access to same, even intellectual property law.
- **Operation of the state**—how does the administration operate using electronic technologies? This starts with the administration's relationship with its employees and the tools they are provided and moves out to the relationships

between administration and constituent and the use of private sector players in service delivery, particularly as increasing constituent-centricity leads to convergence across government and between public and private sectors.

- **Relationships with the international environment**—the new accessibility of international institutions (government and non-government) and their increased access to the public. “National sovereignty remains a cornerstone of the international system but the context in which it operates and the tools with which it is expressed are altered” (Brown, 2005, p. 244).

Yildiz (2007), too, offers guidance on where e-government literature ought to focus. He promotes a better understanding of the implementation of e-government projects. His suggestions directly address what he sees as limitations in the field. He suggests studying “the processes of, and participation patterns in, e-government projects [seeking] ... a finer understanding of the processes inside the black box of e-government policy making” (Yildiz, 2007, p. 656). He feels that e-government is nominally being adopted for rationalization purposes but suggests that investigating the real drivers might reveal other reasons: “For example, it is possible for a project to be initiated partly because other organizations are preparing similar projects or because some vendor firm persuades top-level managers of government agencies that they ‘need’ to implement such a project immediately” (Yildiz, 2007, p. 656). Other areas where attention is required include the problem of a lack of useful detail in the e-government literature. Third, he suggests investigating “the policy-making process in e-government projects in a complex political environment. ... Only by understanding these processes can one verify the presence or lack of the technology-enactment framework in e-government [described by (Fountain, 2001a)] and use this framework to optimize government decision-making and planning processes regarding ICT issues” (Yildiz, 2007, p. 657). Finally, he supports Reece’s suggestion to tie the subject of e-government strongly to mainstream public administration research.

Two of the reviews offer guidance on the ‘mechanics’ of e-government research rather than the topic. Reece stipulates “at least three fundamental areas that need further attention: (1) methods development; (2) theory building; and (3) more specific engagement research” (Reece, 2006, p. 98):

- **Methods**—He feels that the e-democracy literature must pay more attention to resolving the causal arrow direction debate. He also feels that resolving e-government variables needs attention and mentions, in particular, that the Internet can no longer be a single variable.
- **Theory Development**—He notes that although some elements of the (social science based) e-government literature has been tied back to proper bodies of theory, there are several areas where more research would fruitfully tie e-government back to established (social science) literature, particularly: civic engagement, healthy communities, deliberative democracy, advocacy planning, and the political networking literatures.
- **Engagement research**—He feels that there are important drivers leading to more research here: consistent positive results being found (especially for group-level engagement), good background and contextual literature to lean on, a strong normative desire to see e-democracy succeed (which will drive funding), and that engagement fits neatly into the democracy theories, regardless of which particular 'flavour' of democracy is considered.

Reece's interest in e-democracy and citizen engagement focuses his suggestions primarily within the ambit of Brown's 'Legitimacy of the state and relationship with the public' and the second and third of Andersen and Henriksen's domain areas (Table 2).

Heeks and Bailur are characteristically direct focusing on how to improve the quality of research:

> "It is easy to be prescriptive and tell those working in the e-government research domain what they should be doing:
>
> - Provide clear statements on research methodology and method, and on personal interests in any research artifacts.
> - Use research methods in a manner that strengthens the qualities (such as validity, reliability and generalizability) of the research.
> - Avoid inconsistent or weak use of perspectives and approaches, and invalid generalization of findings." (Heeks & Bailur, 2006, p. 262)

A strong common theme among the suggestions is to broaden what is being researched from 'just' the application of technology in government operations to meet the scope of the reviewers' common preference for researching how the role of government is changing in society. A secondary strong theme is to increase the rigor and relevance of the research, particularly by connecting it back to relevant bodies of knowledge. The majority of the reviewers advocate stepping beyond the description and analysis of specific e-government activities or systems (Gregor's (2002) Type I and Type II theories) into the broader consideration of whether these activities and systems do or might give rise to a new or different focus for government (Gregor's (2002) Type IV and Type V theories). Furthermore, they point to a need to consider the extent to which e-government activity is already changing the way government operates, both administratively and politically. E-government research should be trying to determine, according to the reviews considered here, whether government has or should fundamentally shift(ed) either because of the opportunities that ICTs present in the way that government is conducted, or because of the need to address emerging needs within the society of which government is an intrinsic part. On the basis of the material considered in the reviews, this is a 'stretch goal' for the field!

2.2.9 A Summary of e-Government Research

So, having considered the reviews, I can now synthesise a view of the e-government field. I then draw on more recent literature that has attempted the same feat to bring the conclusions of the field into sharp(er) relief.

An initial observation is that there are no really strong reviews of the field. Scholl (2007) offers a consolidation of key issues (discussed in more detail below) but the literature reviews identified in this research focus more on testing the field through narrowly-defined samples or are polemics with only the necessary support and not a comprehensive review. Furthermore, from this analysis and personal experience, there are clearly two groups of researchers: academics and practitioners; and they are not really talking to each other.

E-government is broadly accepted as involving (at least) information systems in a government context with an obvious interest in improving government operations (efficiency) but also improving the impact of government (effectiveness). This latter focus goes so far as to reach almost evangelical calls for transforming government

and questioning the role of government in a society that is pervasively-connected and technology-mediated.

In spite of this broad agenda, research has tended to focus on more socio-technical areas of government operations with a dominant focus on government to stakeholder interactions in implementation and effect. Burgeoning areas of research in, for example, e-participation are still ‘very young’ in this overall ‘young’ field. The youth of the field is sufficient that there is not yet a preferred or dominant set of research methods, largely, I believe, because the researchers in the field at this stage are from other academic disciplines or are (former) practitioners and so tend to adopt more naive approaches.

There are some commonalities that are accepted in e-government though. Grönlund and Horan (2004), Andersen and Henriksen (2005), Brown (2005), and Scholl (2006) identify e-government research as the intersection of a range of disciplines—in which government (or public administration) is a mandatory participant—where unique questions that arise from the intersection must be addressed. Scholl extends his review analysis further in a later paper (Scholl, 2007) where he proposes six major concepts or high-level variables for the field and illustrates how reference disciplines support those variables (see Figure 6).

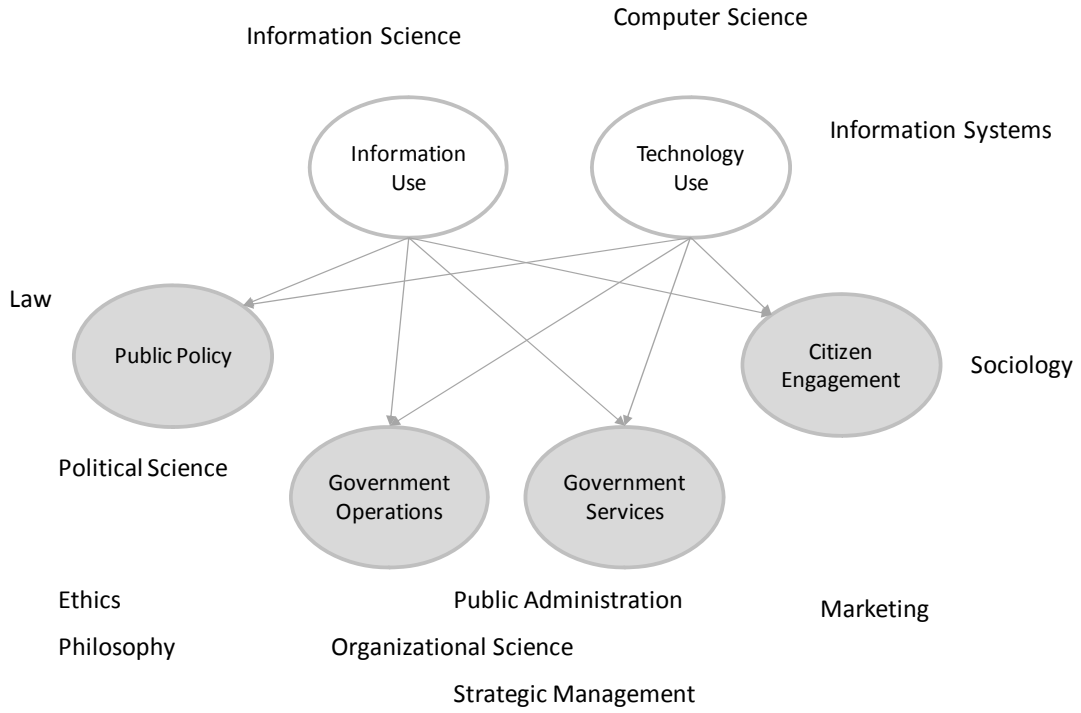


Figure 6: Relationships between key variables in e-government and select disciplinary interests (fromScholl, 2007)

This diagram is a very helpful consolidation of the critical elements of the e-government field. The recommended areas of attention from Andersen and Henriksen (2005) can be seen to arise from the interaction of the Scholl's (2007) variables, as illustrated in Table 3. Similarly, Brown's (2005) domains can be framed in terms of the possible relationships that Scholl proposes.

Table 3: Illustration of Possible e-Government High-Level Variable Combinations to Describe Research Dimensions

Dimension (from Andersen & Henriksen, 2005)	**Possible Variable Combinations (after Scholl, 2007)**
Labor intensity in work practice	Information Use ↔ Government Operations ↔ Technology Use
Regulation and service provision	Public Policy ↔ Information Use Information Use ↔ Government Services ↔ Technology Use Citizen Engagement ↔ Technology Use ↔ Government Services
Political, administrative-rational and anarchic motives	Public Policy ↔ Information Use Information Use ↔ Government Operations ↔ Technology Use
Limited market exposure	Public Policy ↔ Technology Use Information Use ↔ Citizen Engagement ↔ Technology Use

Dimension (from Andersen & Henriksen, 2005)	Possible Variable Combinations (after Scholl, 2007)
Demand paradox	Government Services ↔ Technology Use ↔ Public Policy
Strict rules and regulations	Technology Use ↔ Public Policy ↔ Information Use ↔ Government Operations

Scholl (2007) goes on to propose research questions that he asserts are central to the field of e-government (EG) research, reiterated here in Exhibit 3.

Exhibit 3: Propositions of the Central Research Questions in e-Government (EG) (from Scholl, 2007)

P1.	Central research questions in EG involve (a) multiple (both facilitating and subject area) high-level variables and (b) at least multi-disciplinary perspectives.
P2.	Transformation is central to the understanding of EG.
P2a.	The transformation-related interaction between the high-level variables is central to the understanding of EG.
P3.	Integration is central to the understanding of EG.
P3a.	The integration-related interaction between the high-level variables is central to the understanding of EG.
P4.	Participation is central to the understanding of EG.
P4a.	The participation-related interaction between the high-level variables is central to the understanding of EG.
P5.	(Information) preservation is central to the understanding of EG.
P5a.	The (information) preservation-related interaction between the high-level variables is central to the understanding of EG.

Again, these questions are consistent with the investigation areas recommended by the likes of Andersen and Henriksen (2005), Brown (2005), and Reece (2006). Importantly, Proposition 1 supports my earlier criticism of the narrower, empiricist view apparently supported by Grönlund and Horan (2004) and Norris and Lloyd (2006). Research in e-government must draw on many disciplines and approaches to cover the rich complexity that it represents; a classical, empirical-based, 'natural sciences' approach will not be sufficient.

Scholl's (2007) propositions are not flawless though. Proposition 2 articulates a common view of the potential of e-government that has been cogently criticised. Professor Ken Kraemer and his colleague John King (Kraemer & King, 2006) argue that after a decade of e-government activity, government has not been transformed. They argue that, to the contrary, e-government has tended to perpetuate the existing approaches to government and to reinforce the incumbent power structures within government. Yildiz would probably agree but does not go so far as to say so.

Kraemer and King go on to say: "One might conclude that e-government is a mere passing fad that will flare and then fade, as many other management fads have in the past" (Kraemer & King, 2006, p. 13). They soften that position by acknowledging that e-government may have some long-term effect on government but their point that the placing the transformation agenda at the centre of e-government is flawed because of the interests and power of the organisational elites are strong. I read their criticism to suggest that e-government should adopt more modest aims of improving the mechanisms and operation of government, rather attempting to transform it, and leave transformation to stronger drivers than the opportunities that ICTs offer.

Important further refinement of the idea of variables in the field is provided by Flak and his colleagues (Flak, *et al.*, 2007). They propose a refinement of two central concepts of e-government: 'government' and 'citizen'. They briefly review the conception of governments being in different tiers (e.g. federal, state, local) but note that although this is a practical distinction when considering cross-jurisdictional integration (integration being a central question of e-government according to Scholl (2007)), it does not provide insights into the "complex challenges associated with actually making such integration happen" (Flak, *et al.*, 2007, p. 15). They then propose an alternate conception which involves three distinct groups: administrators, service providers, and politicians. These groups are consistent with typical public administration analyses (Bozeman, 1979; Clarke & Newman, 1997; Lane, 2000) and resonant with Scholl's (2007) variables of Public Policy, Government Operations and Government Services. Flak et al (2007) offer a range of illustrative interactions that demonstrate the usefulness of their conception. However, they neglect one important element: compliance and/or regulation (Andersen & Henriksen, 2005; Barrett AM, 2001; Bozeman, 1979; Fountain, 2001a; Lane, 2000; Officer, 1999). This element can be added quite simply as it is not inconsistent with their model to result in Table 4.

Table 4: Sub-groups of the Government Concept for e-Government

Government (sub-)group	Brief description
Politicians	Set the broad agenda for society and the actions of government through ideologies, budget plans, policy and guidelines, laws and regulations (Flak, *et al.*, 2007)

Government (sub-)group	Brief description
Administrators	"The primary concern of this group is to govern it's [sic] agency according to directions provided by other agencies such as … governments" (Flak, *et al.*, 2007, p. 15)
Service Providers	"This group represents an agency's interface toward civil society with the purpose to ensure that public services are supplied" (Flak, *et al.*, 2007, p. 16)
Regulators	Agencies that perform regulation or evaluation functions in government (Fountain, 2001a) such as auditors, ombudsmen, and commissioners.

Flak et al also categorise constituents into three groups: "*consumers*, *activists*, and *direct decision makers*" (Flak, *et al.*, 2007, p. 17). These three roles mirror the levels of Citizen Engagement (Scholl, 2007) implied by Chadwick and May's (2003) three levels of interaction between government and constituents: managerial, consultative and participatory, illustrated in Table 5.

Table 5: Groups of Constituents and Their Correspondence with State-Constituent Interaction Modes

Constituent Groups (from Flak, *et al.*, 2007, p. 17)	Interaction Modes (from Chadwick & May, 2003)
"*Consumers* are more interested in the product and services offered by government than the political process leading to these offerings. Their concern is the quality of such services"	"[The managerial model] is a 'push' model of information dissemination: the state will place information in accessible forums and the onus is on the user to access it" (ibid., p. 278)
"*Activist* citizens seek to be more explicitly and directly connected to decision making processes and emphasize the role of open discussions in a well functioning public sphere"	"the consultative model is a 'pull' model. Here, ICTs facilitate the communication of citizen opinion to government" (ibid., p. 278)
"While activists attempt to influence the decision making, they do not actually make decisions, in contrast to a direct democracy system where citizens actually make the decisions. We refer to this group as *decision makers*."	"While the first two models of interaction stress the vertical flows of state-citizen communication, the participatory model conceives of a more complex, horizontal, and multidirectional interactivity" (ibid., p. 280)

Notwithstanding this convenient alignment between these ideas, and the allure of their explanatory power for the Citizen Engagement variable (Scholl, 2007), this research takes a more refined view of this area (discussed in detail in Chapter 4).

In summary then, e-government is an interdisciplinary field with (up to) 13 reference disciplines where the interaction of six high-level variables is considered for its transformative, integrative, participatory and/or (information) preservation impact (Scholl, 2007) on up to four elements of government (Flak, *et al.*, 2007) and some number of constituent groups (Flak, *et al.*, 2007). There is no dominant or preferred set of research methods in which to practice (although case studies have been common) and the field appears to be ready for more normative and causal research.

2.3 Scope, Boundaries, and Components

The research reported in this thesis has grown from the frustrations of a practitioner involved in delivering online services to government constituents. Consequently, its focus falls within the area that the reviews report is commonly considered (e-government services). The reviewers seem to imply that such research demonstrates immaturity in research interest and is perhaps subsidiary to the 'big issues' in e-government. For example, Chadwick and May (2003) would classify it as a 'managerial' view and see it as only a first stage toward more powerful models of interaction. Nonetheless, as established in the Problem Statement for this research (page 14), there is still a gap between the stated objectives of governments and the reality of e-government service use by constituents, particularly in Australia. The research is seen to be necessary as it attempts to meet needs that exist in reality. Whether it meets the loftier ambitions of the e-government field is a matter for others to decide.

I can now articulate a scope for the research presented here. Investigating electronic government services suggests a broad research scope involving the interactions between the high-level variables of Information Use, Technology Use, Government Services, and Citizen Engagement, drawing on the reference disciplines of Computer Science, Information Systems, Sociology, Marketing and Public Administration. Seeking a solution to the problem of insufficient adoption of e-government services narrows that broad scope to a central research area focusing on Technology Use, Government Services, and Citizen Engagement relying most heavily on Information Systems, Marketing and Public Administration. The scope is overlaid on Scholl's variables diagram in Figure 7.

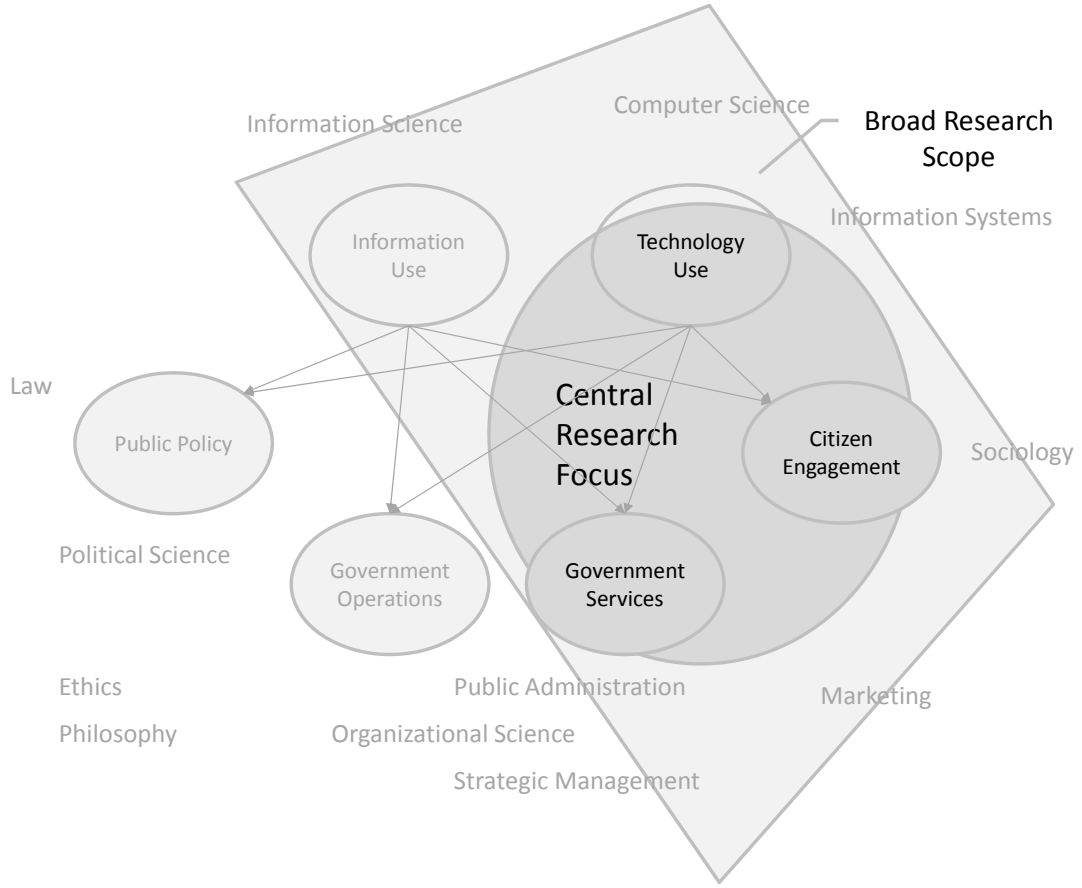


Figure 7: Illustration of the Scope of this Research on the High-Level Variables of e-Government Research

There are important limits to this research focus that cannot be shown on the diagram. This research looks only at services provided to people, individuals, interacting with government for their own ends (in contrast to interacting with government as a representative of some business or other entity). Finally, this research focuses on services that are delivered online. Although some of the output might affect processes that are also used for other delivery channels, e.g. counter-based services, the efficacy of the research is only considered in the online channel.

I can also define the main components of this research; those things that the theory seeks to manipulate to some end. Key components of this theory will be:

- Government—(Flak et al's (2007) *Administrators*) there may be occasions when e-government service implementations alter the instantiation of government itself (e.g. moving legal registers from paper form into electronic databases) including changes in processes and authority structures.
- Government services—(Flak et al's (2007) *Service Providers* and my *Regulators* from Table 5) activities undertaken by government that deliver a meaningful

output to a constituent (specifically excluding services aimed at business and other organisational entities); the activity may only be a passive provision of information, or it may result in a direct intervention with the constituent such as arrest, or education.

- Constituents—although the theory does not manipulate constituents directly, it seeks to anticipate their expectations by classifying them according to the role that they adopt when interacting with the government. This is a central issue of the research and takes a different, although sympathetic, view to Flak et al's (2007) conception of constituent groups.

2.4 Purpose

Research must have a purpose (Gregor & Jones, 2007):

> "what the system is for," or the set of meta-requirements or goals that specifies the type of system to which the theory applies and in conjunction also defines the scope, or boundaries, of the theory" (Gregor & Jones, 2007, p. 325)

Reiterating the problem from earlier: how do we increase the adoption of complex government transactions online by constituents? If the public is increasingly comfortable purchasing and ordering online, why are they not adopting e-government more vigorously? What guidance can agencies be given so that online services are more appealing, more 'adoptable'?

The problem can be stated more formally as:

> "How can Australian government agencies deliver services online in a way that promotes the benefits identified for successful e-government?"

2.4.1 Research Objective

That, then, is the purpose of this research: to compile initial guidance on online service design within a framework that draws on the idea that there are a relatively small number of roles that constituents and government play when interacting. This research is conducted in the expectation that online services designed on the basis of

such a model will be more readily acceptable to and feel more useful and user-friendly to constituents because it more closely meets their expectations.

More formally:

> "To provide a framework for online government service design guidance based on constituent roles in online government service interaction."

2.5 Summary

Chapter 1 established that adoption of e-government services by constituents is falling behind equivalent adoption of e-commerce services in the private sector. This situation constitutes a problem because the adoption of e-government services by constituents is a key means of achieving the benefits of e-government. The review of the e-government literature in this chapter has established that pursuing a solution to this problem is a legitimate concern of e-government, albeit a small part of the much larger whole. Furthermore, the review identified that while there is considerable interest in research into e-government services, there remains no account made for the expectations of constituents in their use of those services (e.g. Cullen & Hernon, 2006a; Hernon & Cullen, 2006a).

Reviewing the literature has identified the location within the field in which to place this research and the e-government variables that are under consideration (Figure 7). In that context a formal research problem and research objective have been established. In the next chapter, an appropriate research methodology will be identified, some important reference discipline theory outlined, and an approach to articulating research output will be grounded in philosophy.

Chapter 3 How Can We Formulate Advice on E-Government

3.1 Introduction

Thus far I have established a problem that seeks a solution in the field of e-government. Specifically, the slow adoption of e-government services is inhibiting the realisation of e-government benefits. E-Government services need to be more adoptable to promote the realisation of related benefits. I have then set the field for the research aimed at addressing that problem. In particular, I have identified key high-level variables of interest and reference disciplines upon which to draw.

This chapter refines the other critical element of research: what research method to use. Discussion of the research method is broken into three elements: the identification and justification of the design science research method for this issue, an introduction to well-established reference discipline theory on which the research is structured, and the justification of presenting the research output as rules and principles to guide e-government service design. Exhibit 4 locates the contribution of this chapter in the overall thesis and the development of the artefact.

Exhibit 4: Design Research Elements with Highlighted Current Element (based on \Peffers, *et al.*, 2008, pp. 52-56)

Design Process Element	**Brief description**
Problem identification and motivation	Define the specific research problem and justify the value of a solution.
Objectives of a solution	***Infer the objectives of a solution from the problem definition and knowledge of what is possible and feasible. The objectives can be quantitative or qualitative.***
Design and development	Create the artefact, which can be any designed object in which a research contribution is embedded in the design. Arguably, there is a theory embedded in the design parameters.
Demonstration	Demonstrate the use of the artefact to solve one or more instances of the problem. This could involve its use in experimentation, simulation, case study, proof, or other appropriate activity.
Evaluation	Observe and measure how well the artefact supports a solution to the problem; comparing the objectives of a solution to actual observed results from the use of the artefact.

Design Process Element	Brief description
Communication	Communicate the problem and its importance, the artefact, its utility and novelty, the rigor of its design, and its effectiveness to research and other relevant audiences.

3.2 Introduction to Method

Chapter 2 notes that there is no specific method for e-government research, although case studies seem to dominate (Grönlund & Horan, 2004; Norris & Lloyd, 2006; Reece, 2006). Scholl puts a positive spin on it by saying that e-government research "has been using almost the full spectrum of methodological and procedural approaches" (Scholl, 2006, p. 15). Not coincidentally, Heeks and Bailur (2006) are critical of the methodology elements of the papers they reviewed and can only describe the field as weakly positivist which they suggest represents an arid monoculturalism in e-government research. As was covered in Chapter 2, differences in views such as this are likely because of the different sources from which the literature that is reviewed are drawn. Reece (2006) seems convinced that e-government research is inevitably moving to more sophisticated research foci, particularly that it is moving past simple descriptive and prescriptive research to rigorous investigation of causal effects.

This research is aimed at constructing useful advice to guide e-government practitioners to design services that are more 'adoptable'. That is, the deliberate construction of an artificial thing, one of Gregor's (2002) Type V theories; the concern of design science (Au, 2001; Gregor, 2005; Hevner, *et al.*, 2004; March & Smith, 1995; Simon, 1996; Vaishnavi & Kuechler Jr, 2008). Practitioners would typically call such advice a methodology when it might at best be a method (March & Smith, 1995). Given the developmental stage of this line of thinking, a more reasonable target is a model; in this case, a collection of statements of principle about the most appropriate way to organize fundamental constructs in response to different design challenges (Heeks & Bailur, 2006; Hevner, *et al.*, 2004; March & Smith, 1995; Vaishnavi & Kuechler Jr, 2008). In considering the development of an answer to the research question and expecting a 'model' of advice that guides practitioners in design, the research is, then, most aptly framed as design science, design research, or

design science research (Au, 2001; Ball, 2001; Gregor, 2005; Gregor & Jones, 2003; 2007; Hevner, *et al.*, 2004; March & Smith, 1995; Vaishnavi & Kuechler Jr, 2008; Walls *et al.*, 1992; 2004). As the dominance of 'Design Science' in the information systems discipline is not yet universally held (Gregor, 2005; Gregor & Jones, 2003; Walls, *et al.*, 2004) I will briefly review the differences between a natural sciences view and a design science view.

3.2.1 Natural versus Design Science

Dubin (1978) produced a seminal explanation of theory building (natural sciences) that is still used as a benchmark some thirty years later. He explains that a theory is a means of explaining the experience of objects and events and their inter-relationship with other objects and events, possibly over time, noting that "the locus of the theory is the human mind" (Dubin, 1978, p. 5); the same province as Karl Popper's Third World (Gregor, 2005). He notes that "A theoretical model is limited in no way except by the imagination of the theorist in what he may use as elements in building the model, or laws of interaction among the elements, or boundaries that he chooses to set on the model" (Dubin, 1978, p. 12), which allows some latitude in the exact nature of a theory. 'Model' is an often-used synonym for 'theory' in the natural sciences (Dubin, 1978), but in design science it has a distinct application: "the concern of models is utility, not truth (the concern of theories is truth …)" (March & Smith, 1995, p. 256).

March and Smith (1995) are quite prescriptive and focus specifically on the IT field (which includes, or is a subset of, Information Systems, depending on your point of view) in their consideration of theories and models. They contend that (natural science) theories attempt to explain the world as it is experienced, whereas (design science) models attempt to explain how we would wish some part of it to exist (solution statements) to achieve some human objectives (addressing some problem) (March & Smith, 1995, p. 256). Au describes it thus: "Building and evaluating IT artifacts have design science intent, whereas theorizing and justifying have natural and social science intent" (Au, 2001, p. 5). So, design science focuses on designing theories about how some part of the world should be. Well, there is a duality in that idea that Walls et al point to: "A design theory is a prescriptive theory based on theoretical underpinnings which says how a design process can be carried out in a

way which is effective and feasible" (Walls, *et al.*, 1992, p. 37). That is, design science can also theorise about how the act of designing should take place. The result of such theorising is a process that generates things for use in the world (Walls, *et al.*, 1992).

Design science authors allow that natural science theorizing might consider the reality of the world with an instantiation of a model in it to understand why it works, but see the creation of the model itself as strictly the purview of design science (Au, 2001; March & Smith, 1995; Vaishnavi & Kuechler Jr, 2008; Walls, *et al.*, 1992), although parallel to discovery of theory (and possibly more accurately theory building as Dubin (1978) describes it) in the natural sciences. Hevner et al contend that the pursuit of truth (behavioural science activity) and the pursuit of utility (design science activity) are two sides of the same coin: "Truth informs design and utility informs theory" (Hevner, *et al.*, 2004, p. 80). The model developed in this research is still in the earliest stages of discovery and exploration. To suggest that it might be 'the truth' or even be used to reveal 'the truth' would be too much. However, establishing evidence-based claims of utility for this model is within reach. So, although Dubin's definition of a theory might allow the claim of a theory for the product of this research, the more modest, or at least more readily substantiated, naming of the product as a design science model (Au, 2001; March & Smith, 1995; Vaishnavi & Kuechler Jr, 2008) is appropriate. Furthermore, the output of this research is an artefact (a model) in itself, rather than a process for generating artefacts, albeit the model is intended for use when applying conventional design approaches.

Dubin (1978) describes the components of a theory: its units or variables, the laws of interaction between them, the boundaries of the theory, the system states that the theory encompasses, and propositions and empirical indicators that emerge from the theory. Dubin's components have parallels in the design science according to March and Smith (1995) and Hevner and his colleagues (2004), illustrated in Table 6.

Table 6: Comparison of Natural Science and Design Science Components

Natural Science Component (based on Dubin, 1978)	**Design Science Components (drawn from Hevner, *et al.*, 2004; March & Smith, 1995)**
Units or variables	Constructs
Laws of interaction	Models

Natural Science Component (based on Dubin, 1978)	Design Science Components (drawn from Hevner, *et al.*, 2004; March & Smith, 1995)
Boundaries of theory	
System states encompassed	
Propositions	Methods
Empirical indicators	Instantiations

Table 6 shows the parallels but there is a divergence of purpose between the perspectives of the natural and design sciences so these parallels are probably weak. Nonetheless, Vaishnavi and Kuechler (2008) in their recent summary of design science state that March and Smith's constructs, models, methods and instantiations represent definitive design science outputs.

The research conducted here involves elements that correspond with things that Dubin identifies, particularly his components of theories and that it is seeking, at least in part, an explanation of natural (social) phenomena. However, the arguments of leading thinkers in the Information Systems discipline indicate that, although not yet 'common vernacular', research such as this that is the deliberate creation of a means to solve a particular class of problem (in contrast to seeking enlightenment on something that 'is'), is design science research and ought best be pursued as such (Gregor, 2005; Gregor & Jones, 2003; 2007; Hevner, *et al.*, 2004; March & Smith, 1995; Peffers, *et al.*, 2008; Vaishnavi & Kuechler Jr, 2008; Walls, *et al.*, 1992; 2004). This argument has been made in the e-commerce research literature too (Au, 2001; Ball, 2001), a derivative of the Information Systems field to which the e-government research area is either a sibling or a child (also depending on your point of view). Consequently, a design science approach has been adopted for this research. The next section outlines what that means for the practice of the research reported here.

3.2.2 Conducting Design Science Research

If one is then to conduct research in design science, how does one proceed and with what result? This question has been considered recently by several information systems authors (Gregor & Jones, 2007; Hevner, *et al.*, 2004; Peffers, *et al.*, 2008; Vaishnavi & Kuechler Jr, 2008; Walls, *et al.*, 2004) building on earlier work in the discipline (Gregor, 2005; Gregor & Jones, 2003; March & Smith, 1995; Takeda *et*

al., 1990; Vaishnavi & Kuechler Jr, 2004/5; Walls, *et al.*, 1992). There are two streams of thought evident in this work: the 'how'—process and research discipline considerations (Hevner, *et al.*, 2004; March & Smith, 1995; Peffers, *et al.*, 2008; Vaishnavi & Kuechler Jr, 2008; Walls, *et al.*, 1992; 2004), and the 'what'—consideration of what a design artefact is and how it is described (Gregor & Jones, 2003; 2007; Vaishnavi & Kuechler Jr, 2008; Walls, *et al.*, 1992; 2004). There is some overlap in these discussions, inevitably, as the process and the outcome influence each other.

There is an important dichotomy in the design science paradigm (Gregor & Jones, 2007; Simon, 1996; Walls, *et al.*, 1992) that is perhaps summarised most succinctly as: "Design is both a process (set of activities) and a product (artefact)—a verb and a noun" (Hevner, *et al.*, 2004, p. 78). The importance of this dichotomy goes to what is reported in a research project: the process and/or the result (in simplest terms). Indeed, both elements may constitute the contribution of a design science research project (Hevner, *et al.*, 2004; Walls, *et al.*, 1992; 2004). One may be designing tools with which artefacts are made, or the artefact itself is the object of interest where the approach to its design is either already established or seen as less important (Vaishnavi & Kuechler Jr, 2008). Gregor and Jones (2007) allow that some manifested artefact (i.e. an IT implementation) may not be an essential part of a design theory and that the design theory may 'only' be the specification of a general process. In this case, the research project seeks to design an artefact: guidance for designers of e-government services. This objective may be seen as the design of a tool with which others will create actual artefacts (e-government services). Nonetheless, the tool is an artefact in itself and a valid product of design science research (Gregor, 2005; Gregor & Jones, 2007; Hevner, *et al.*, 2004; Simon, 1996; Vaishnavi & Kuechler Jr, 2008; Walls, *et al.*, 2004).

The process by which the design in this research has come into being has involved intuition, the innovative application of established ideas, and subjective, unstructured refinement tested informally against 'common-sense'. Galliers allows such an approach in research, describing it as a subjective approach that is "useful in building theory that can subsequently be tested [and for the] creation of new ideas and insights" (Galliers, 1992, p. 152). He notes, though, the crucial weakness of the

process being that it is unstructured and subjective by nature. He also notes weaknesses from research bias and the influence of the time at which the research is undertaken. Establishing such a starting point within a disciplined approach to research should address Galliers' concerns.

Let us consider the process of design science research, as articulated in the Information Systems discipline. Design science research allows for many alternative research processes (Peffers, *et al.*, 2008; Vaishnavi & Kuechler Jr, 2008). A recent review of research methods in design science research consolidates the earlier work of a number of authors to articulate a singular design research process, summarized in Figure 8 (Peffers, *et al.*, 2008). The same overall structure is described by Vaishnavi and Kuechler (2008) in their summary of the design science process.

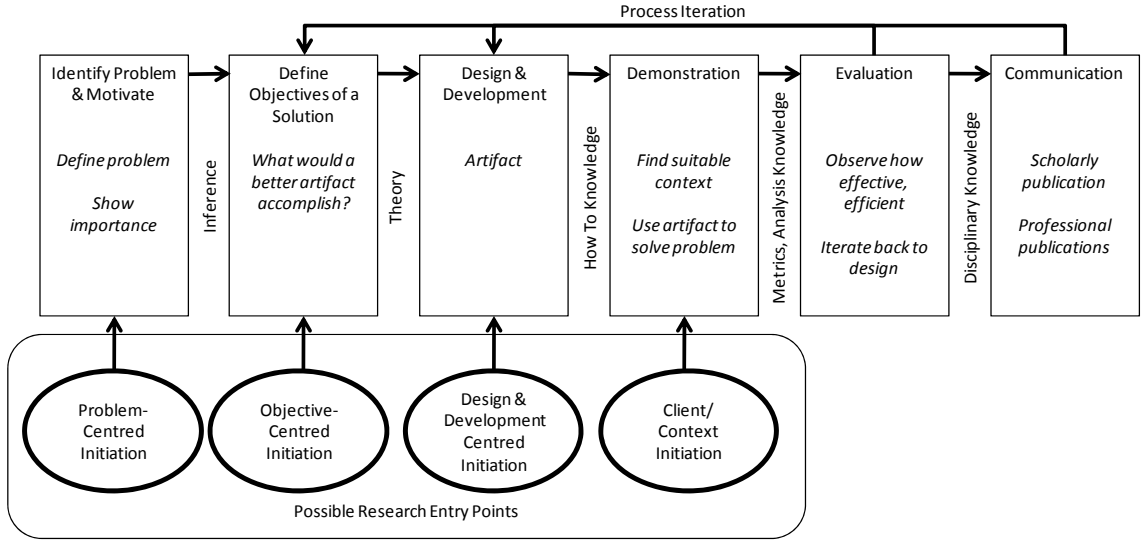


Figure 8: Design Science Research Method (Peffers, *et al.*, 2008)[3]

An important refinement to Vaishnavi and Kuechler's approach that Peffers et al provide is to allow for the process to start at any of their initiation points (Figure 8) and "move outwards" (Peffers, *et al.*, 2008, p. 56); in particular:

[3] The diagram is a slight modification of Peffers et al's Figure 1, as I feel that they showed the direction of the arrows from the initiating entry points to the process steps incorrectly.

> "a design- and development-centred approach would start with [the third] activity... It would result from the existence of an artefact that has not yet been formally thought through as a solution for the explicit problem domain in which it will be used. Such an artefact might have come from another research domain, it might have already been used to solve a different problem, or it might have appeared as an analogical idea" (Peffers, *et al.*, 2008, p. 56).

Coincidentally, this exactly describes the circumstances of this research. I was thinking about making e-government services more adoptable using 'conventional' IT approaches when a paradigm-shifting insight was offered by the work of Henry Mintzberg (1996) (described in detail in Chapter 4). As Peffers et al (2008) explicitly allow for 'retro-fitting' the process discipline to the recounting of research in communication, that is the approach adopted here. As we have established that there is a disciplined approach available with which to recount the research journey that has been undertaken, that leaves only the question of a disciplined approach to communicating the artefact designed.

3.2.3 Communicating Design Science Research

Hevner et al (2004) establish minimum criteria by which design science research ought to be judged, summarized in Exhibit 5, that offers structural elements to what ought to be reported.

Exhibit 5: Design Science Research Guidelines (Hevner, *et al.*, 2004, p. 83)

1: Design as an Artefact—Design-science research must produce a viable artefact in the form of a construct, a model, a method, or an instantiation.
2: Problem Relevance—The objective of design-science research is to develop technology-based solutions to important and relevant business problems.
3: Design Evaluation—The utility, quality, and efficacy of a design artefact must be rigorously demonstrated via well-executed evaluation methods.
4: Research Contributions—Effective design-science research must provide clear and verifiable contributions in the areas of the design artefact, design foundations, and/or design methodologies.
5: Research Rigor—Design-science research relies upon the application of rigorous methods in both the construction and evaluation of the design artefact.
6: Design as a Search Process—The search for an effective artefact requires utilizing available means to reach desired ends while satisfying laws in the problem environment.
7: Communication of Research—Design-science research must be presented effectively both to technology-oriented as well as management-oriented audiences

Similarly, Peffers et al (2008) illustrate that the structure of the process they describe can serve as a structure for the communication of the artefact, summarized in Table 7.

Table 7: Design Research Process Elements Summary (based on \Peffers, *et al.*, 2008, pp. 52-56)

Design Process Element	Brief description
Problem identification and motivation	Define the specific research problem and justify the value of a solution.
Objectives of a solution	Infer the objectives of a solution from the problem definition and knowledge of what is possible and feasible. The objectives can be quantitative or qualitative.
Design and development	Create the artefact, which can be any designed object in which a research contribution is embedded in the design. Arguably, there is a theory embedded in the design parameters.
Demonstration	Demonstrate the use of the artefact to solve one or more instances of the problem. This could involve its use in experimentation, simulation, case study, proof, or other appropriate activity.
Evaluation	Observe and measure how well the artefact supports a solution to the problem; comparing the objectives of a solution to actual observed results from the use of the artefact.
Communication	Communicate the problem and its importance, the artefact, its utility and novelty, the rigor of its design, and its effectiveness to research and other relevant audiences.

These two guidelines can be applied to this research project, as one of the indicators of its utility. But they are less useful in knowing exactly what must be manifested to have the valid output of a design research project: what does a design theory 'look like'? Gregor and Jones (2007) provide a distinguished view of this issue having set out to specifically identify what the result of design research must articulate, regardless of the process used in the research (Table 8). Their objective was to point to a systematic means of specifying design knowledge to support the rigor of the work so documented.

Table 8: Elements of a Design Theory (Gregor & Jones, 2007, p. 322)

Component	Description
Core components	
1) Purpose and Scope (the *causa finalis*)	"What the system is for," the set of meta-requirements or goals that specifies the type of artefact to which the theory applies and in conjunction also defines the scope, or boundaries, of the theory.
2) Constructs (the *causa materials*)	Representations of the entities of interest in the theory.
3) Principle of form and function (the *causa formalis*)	The abstract "blueprint" or architecture that describes an IS artefact, either product or method/intervention.

Component	Description
4) Artefact mutability	The changes in state of the artefact anticipated in the theory, that is, what degree of artefact change is encompassed by the theory.
5) Testable propositions	Truth statements about the design theory.
6) Justificatory knowledge	The underlying knowledge or theory from the natural or social or design sciences that gives a basis and explanation for the design (kernel theories).
Additional components	
7) Principles of implementation (the *causa efficiens*)	A description of processes for implementing the theory (either product or method) in specific contexts.
8) Expository instantiation	A physical implementation of the artefact that can assist in representing the theory both as an expository device and for purposes of testing.

Peffers et al (2008) offer a concise structure of a design science thesis that is not dissimilar to the traditional thesis structure. Consequently, their model will be adopted to structure this thesis. The model developed by Gregor and Jones (2007) best suits the output of the research reported here, particularly as this artefact does not have a 'physical' manifestation (e.g. in the form of a specific system instantiation). So, the completeness of the research will be evaluated against Gregor and Jones' criteria.

3.3 Problem Framing: Segmentation Theory

3.3.1 Introduction

As Chapter 1 noted and Chapter 4 will introduce in detail, a crucial structural element of the design science artefact created by this research is a market segmentation. Market Segmentation theory is well-established in the marketing discipline with over fifty years of history, and countless examples of its application, refinement, and testing. The theory has its critics (e.g. Gibson, 2001), yet its role has been reinforced in the context of the internet and electronic interactions (e.g. Bhatnagar & Ghose, 2004; Changchien *et al.*, 2004), and it remains a useful and widely accepted approach to marketing (McCrindle & Beard, 2009).

This significant body of theory is comprehensively presented in the marketing literature and I will not attempt to further justify it here. This section provides a brief introduction to the key concepts of market segmentation theory that are applied in

Chapter 4 and Chapter 5 to establish the primary structure of the research output presented here. This brief review is presented in this methods chapter as it was used as a tool for operationalising a concept rather than as a basis from which a theory was developed. Market Segmentation theory is justificatory knowledge (Gregor & Jones, 2007) for the research output rather than the field in which the research took place.

3.3.2 A Brief Introduction to Market Segmentation

The principle of market segmentation is attributed to Wendell Smith (1972), who positioned it as an alternative strategy to product differentiation. Product differentiation, then and now, involves convincing the market that your product is different from, and better than, all other alternatives available to that market (Smith, 1972). The approach massages buyers' demands to meet the characteristics of the product delivered by the supplier. A cynic might view this 'you will want what we deliver' approach as the 'classic' government bureaucratic approach to service delivery.

Market segmentation is in contrast to this approach. It actively classifies buyers by characteristics related to how and why they buy (Bloom & Novelli, 1981; Claycamp & Massy, 1972; Dubow, 1992; Engel *et al.*, 1972; Haley, 1981; Rossiter, 1985; Smith, 1972; Wedel, 2001). Suppliers adopting this approach then develop products to meet the needs of these groups (Barker, 1985; Bloom & Novelli, 1981; Claycamp & Massy, 1972; Engel, *et al.*, 1972; Hütt *et al.*, 2001; Peltier & Schribrowsky, 1997; Pires & Aisbet, 2003; Smith, 1972; Wedel, 2001). In 1956, Smith claimed that the "present emphasis upon … self-service and similar developments tends to impose a requirement for better adjustment of products to consumer demand" (Smith, 1972, p. 34). This sentiment is still true today, over 50 years later.

Smith (1972) noted that a product differentiation strategy results in a horizontal share of a broad, generalised market and a market segmentation strategy results in a vertical share of a narrow, specialised market. Rossiter (1985) describes a continuum of sorts: undifferentiated marketing—ignore segments; differentiated marketing—markets something for each segment; and concentrated marketing—market something for some segments only. A government can generally guarantee their market share across the whole market by the nature of their activities (Edwards &

Creagh, 1991; Mintzberg, 1996; Ryan, 1991). Edwards and Creagh note: "Government agencies tend, because of political and administrative constraints, to treat clients alike even though their needs differ" (Edwards & Creagh, 1991, p. 6). That is, governments tend to inherently adopt a product differentiation (Smith, 1972), or Rossiter's (1985) undifferentiated, marketing strategy. However, such a strategy is unlikely to increase the use of e-government services by the public as adoption appears to be related to individual characteristics (Bhatnagar & Ghose, 2004; Forsyth *et al.*, 2000; Peltier & Schribrowsky, 1997; Pires & Aisbet, 2003; Tan & Thoen, 2001; Wang *et al.*, 2005; Wedel, 2001). Adopting a differentiated marketing strategy, which considers such characteristics, may permit governments to tailor e-government services to increase adoption of those services (Bhatnagar & Ghose, 2004; Forsyth, *et al.*, 2000; Johnson, 1981; Peltier & Schribrowsky, 1997; Pires & Aisbet, 2003; Rossiter, 1985; Wedel, 2001). Furthermore, the refined view of constituent views and needs that the segmentation provides can also allow more detailed guidance in designing and delivering particular services.

Rossiter (1985) identifies six alternative bases for segmenting markets, starting at behavioural characteristics that directly affect the purchasing act and moving out to media vehicle characteristics that relate to how the market is reached (Exhibit 4). He describes his preferred segmentation approach as 'awareness-attitude-behaviour segmentation' where the actual purchasing trends are supplemented with data about the buyers' knowledge of and attitudes toward the product (Rossiter, 1985). Rossiter acknowledges that this is an ideal state and that it requires considerable market research to achieve.

Exhibit 6: Major alternative bases for segmentation (Rossiter, 1985, p. 7)

1) Behaviour (Current)
   a) user status
   b) usage volume
2) Awareness-Attitude-Behaviour
   a) decision-making roles
   b) 4P response elasticity
3) Benefits Sought
   a) attribute importance
   b) situation or end-use
4) Values

a) social class
b) psychographic groups

5) Demographics
   a) single demographics
   b) family life cycle

6) Media Vehicles

The next step back from Rossiter's preferred segmentation is that of benefit segmentation, a broadly accepted segmentation approach (Bhatnagar & Ghose, 2004; Dubow, 1992; Haley, 1981; Peltier & Schribrowsky, 1997; Pires & Aisbet, 2003; Rossiter, 1985). "The belief underlying this segmentation strategy is that the benefits which people are seeking in consuming a given product are the basic reasons for the existence of true market segments" (Haley, 1981, p. 309). According to Haley (1981), the acknowledged developer of benefit segmentation (Dubow, 1992), other segmentation approaches rely on descriptive characteristics rather than the causal factors; i.e. the nature of the subject rather than their motivation. Importantly, Haley establishes that segments are not defined by a single benefit, but rather the relative importance placed on all benefits derived from a product. Peltier and Schribrowsky (1997) note that benefit segmentation complicates measurement because the segments are not based on objective characteristics. Nevertheless, they conclude that "the advantage associated with its use far outweigh the costs … [as] buying motives and benefits sought also correlate quite well with market behaviour" (Peltier & Schribrowsky, 1997, p. 56).

Rossiter (1985) notes that there are some limitations to benefit segmentation, particularly around measurement, but says that the causality of the drivers is direct. Direct causality is important in this context because it will underpin motivation to adopt services. Bhatnagar and Ghose considered different segmentation approaches in electronic circumstances and concluded: "when firms use the diagnostic information available from benefit segmentation, it will reduce [the] potential for suffering opportunity losses" (Bhatnagar & Ghose, 2004, p. 765).

3.3.3 Key Characteristics of Market Segmentation

The literature proposes six necessary characteristics of good market segmentation (Barker, 1985; Engel, *et al.*, 1972; Kotrba, 1972; Roberto, 1991):

- "Mutual Exclusivity—each segment should be completely separate from all other segments;
- Exhaustiveness—every potential target adopter should be included in some segment;
- Measurability—each segment's size and profile should be measurable;
- Accessibility—each segment should be capable of being effectively reached and served;
- Sustainability—each segment should be large enough to be worth pursuing independently of other segments; and
- Differential Responsiveness—each segment should respond differently and not exactly like other segments with respect to different marketing inputs and mixes" (Roberto, 1991, p. 82).

I propose to operationalise a market segmentation discovered as a whole. Market Segmentation theory offers the characteristics of a 'good' segmentation as a tool for evaluating my work. That is, if the market segmentation can be shown to possess these six characteristics it will be considered properly constituted and likely to provide the benefits for which segmentation is employed. These criteria will be used in Chapter 5 to validate the market segmentation adopted for this research.

3.4 Principle of Form and Function

Noting the requirements for a complete exposition of a design theory described above (Table 8), I have previously described the Purpose (section 2.4), Scope (section 2.3), and Constructs (section 2.3) of the present model. This section presents the next element, namely the Principle of Form and Function.

An important aspect that Chapter 2 reveals is that e-government is still, and is likely to always be, dominated by practitioners (Au, 2001; Scholl, 2007). At heart, e-government is defined, developed, implemented and assessed by government employees, or consultants paid by them, attempting to meet the demands of their elected officials and, through them, the public at large. The reviews of academic literature leave out, by definition, the ideas, directions, issues and expectations of the people who are 'at the coal face'. E-government is inherently an applied field, just as public administration and information systems (probably the two dominant fields of

knowledge that coalesce in e-government) are and have been (Heeks & Bailur, 2006; Scholl, 2007).

So, a balance is needed. New ideas must be underpinned by existing established theory, at least in part, to demonstrate soundness; Gregor and Jones' (2007) 'justificatory knowledge'. Those same ideas must be framed in terms that are familiar and useful to practitioners without losing the rigor and accuracy that academia rightly demands. E-Government has theory available from up to 13 reference disciplines (Scholl, 2006). What terms, or in design science terminology, what form might serve well to accurately convey new ideas built on these theories for practitioners?

Chapter 4 reveals that the primary structure of the artefact developed by this research is a market segmentation. That structure is justified by well-established theory in the reference discipline of Marketing (discussed above). The structure of that segmentation is stipulated in Chapter 4 by a collection of rules. Within the structure of that segmentation is a collection of design guidance, the form of which is another collection of rule statements. Government operation is commonly rule-based (Rainey, 1983). A model to guide e-government service design in the form of rules would appear to practitioners much like a policy statement, something common in their world-view and readily applied as guidance. This next section presents the theoretical basis (the justificatory knowledge) for that decision.

3.4.1 Social Actions as a Game

In his *Philosophical Investigations*, Ludwig Wittgenstein (1953) describes social action as 'games' (Hollis, 1994). His central argument focuses on the ideas of language games, but he specifically likens such games to more commonly understood games; notably, Chess. Wittgenstein claims that games are made up of three sets of 'rules': those that define the game, those that regulate the play, and those used to train players in the game (Wittgenstein, 1953, p. 27e). He says that if we can identify the rules of the game, we can understand the game (Wittgenstein, 1953, p. 42e). He contrasts coming to understand with discovering anything new through this process (Wittgenstein, 1953, p. 42e).

Wittgenstein says that one cannot meaningfully ask for the name of something before understanding what it is (Wittgenstein, 1953, p. 15e). Furthermore, he says that the name of something represents "[w]hat cannot be destroyed; what remains the same in all changes" (Wittgenstein, 1953, p. 29e). However, he also claims that "[f]or a *large* class of cases—though not all—in which we employ the word 'meaning' it can be defined thus: the meaning of a word is its use in language" (Wittgenstein, 1953, p. 20e - original emphasis). So, we are unable to ask for the name of something until we understand it, yet we can come to know what using its name means by the use of that name in language. Surprisingly, this seems to exactly mirror the emergence of "e-government"—many people used the term without understanding what it meant and others have defined the term on the basis of its use in language. Clearly, a more substantial basis than this is needed (Grönlund, 2005; Wyld, 2004; Yildiz, 2007).

Hollis (1994) describes two of Wittgenstein's fundamental 'rules' of 'games' as: *constitutive* rules—those rules that define the game and how to play it; and *regulatory* rules—those rules that describe how to play the game well, or appropriately. Constitutive rules might involve defining the playing field, the number of players, or the taking of turns and the moves of particular pieces, penalties for incorrect play, etc. Regulatory rules seem to involve strategies and tactics, timing and coordination, as well as etiquette, dress code, etc. If you do not follow the regulatory rules, you are not playing the game well or 'properly'. If you do not follow the constitutive rules, you are not playing the game at all (Hollis, 1994, p. 153). Wittgenstein goes on to "distinguish between the essential and the inessential in a game too. The game, one would like to say, has not only rules but also a *point*" (Wittgenstein, 1953, p. 150e - original emphasis)

E-government is a social action. It involves individuals and organisations participating in interactions which, as Wittgenstein suggests, are usually characterised by rules. And e-government has a point, or the efforts of most governments over the last fifteen years in e-government are an extravagant waste. So, can we see the constitutive rules and regulatory rules that make up e-government?

3.4.2 Constitutive Rules for e-Government

The constitutive rules of e-government must be the same as the constitutive rules of government. There is a large literature in the public administration field about 'what is government?' The central research interest proposed by Scholl (Scholl, 2007) includes the transformational potential of the interaction of the field's high-level variables. Yet no new functions of government have arisen and indeed transformation results are not widely seen (Dovey & Helfrich, 2008; Fountain, 2001a; Kraemer & King, 2006).

There are examples of the transformative potential of e-commerce in the private sector. Just one example is e-bay (www.ebay.com), which has effectively turned the garage sale into an international business. Other IT-based transformations include online clearance of credit card transactions, and more lately, electronic funds transfer at point of sale (EFTPOS), or the massive transformation of telecommunications from copper-based landlines to third generation mobile devices. The latter two examples have transformed the delivery of (then) existing capabilities or services, and there are examples of the same in government (e.g. Australia's e-Tax system [www.ato.gov.au/etax]) but there are no government equivalents of e-bay where a whole new 'business model' has been established to support a previously unmet (indeed, unknown) need.

So, is e-government just government as some pundits say? (e.g.Wyld, 2004). Brown notes: "A popular line of speculation in conferences about e-government is whether it will last, either because the 'electronic' will be replaced by newer technologies or because it succeeds in permeating all aspects of government" (Brown, 2005, p. 252). I have already suggested a definition for e-government research based on Scholl's (2007) variables and research questions (section 2.3); is that sufficient? Wittgenstein has suggested that we must look for the meaning of the word in its use, so I will do that. Brown, for one, is very specific:

> "Electronic government encompasses all government roles and activities, shaped by information and communications technologies (ICTs). Going well beyond analogies to e-commerce, it encompasses the four domains of governance and public administration: the state's economic and social programs; its relationships with the citizen and the rule of law (e-democracy), its internal operations and its relationship with the international environment" (Brown, 2005, p. 241).

Brown's first sentence is a synopsis of Scholl's contention and matches my earlier definition of the research field (section 2.3). Brown's conception that e-government goes beyond e-commerce is supported by others too (e.g. Scholl *et al.*, 2009; Stahl, 2005; Tian & Tianfield, 2003). So, what constitutes e-government; what are its constitutive rules? If we take the view that the constitutive rules of e-government must be at least the same as the constitutive rules of government, is there nothing more? Wyld would have us believe "attempting to define e-government …will, at some point in the not too distant future, be a moot point. That is because it is inevitable that *e-government* will simply become *government*" (Wyld, 2004). However, I believe that we must recognise that e-government is constituted by an additional rule: "The act of government is conducted using information and communication technologies". This is a *regulatory* rule of government, but is a *constitutive* rule of e-government. Importantly then, e-government is a regulatory rule-set for government that shares constitutive rules with government and has a single additional, defining, rule. It is a means of conducting government well, or better (if you believe the e-vangelists), by using information and communication technologies.

In this form, e-government's constitutive rule certainly encompasses activities such as telephone-based service delivery that are frequently included in the scope of e-government. It would also encompass all computer-processing within government, for which there is a long tradition already established as well as a substantial body of literature. Leading researchers reflect this attitude in the structure and content of their books (e.g. Heeks, 2001b). Andersen and Henriksen describe this re-branding of a broader, historical field as "a revival after the burst of the dot-com bubble" (Andersen & Henriksen, 2005, p. 27). However, this is not the common-use form for

practitioners when they say "e-government" and, as noted earlier, we are looking for the meaning of the word in its use.

I have already declared the practitioner origins of this research. I have, too, acknowledged that its focus is in the narrower "managerial" area of government service delivery (Chadwick & May, 2003) conducted by the executive element of government. Consequently, I propose to define a regulatory rule of e-government that is a constitutive rule for this research, namely: *The act of government may be mediated by the Internet*.

"Mediate" is used here in the sense: "To effect or convey as an intermediate agent or mechanism"[4]. The Internet provides a mechanism by which the act of government is carried out or affected. The Internet itself plays an infrastructural role forming an electronic channel between government and its constituents. However, in the e-government context there is an implication in the use of the word "Internet" (or common-use synonyms such as "World-Wide Web") of applications that the parties manipulate as part of the act of government, hosted on, accessible through, but separate from the Internet itself. Such a meaning is not intended here. Similarly, the technology infrastructure used to host the Internet might, for example, include mobile phone-based interactions that are generally discussed under "m-government" (albeit, mostly by consulting firms). To the extent that the Internet is available through wireless connectivity, e-government would include such interactions and the distinction is not required.

Let me state formally, then, the various rules that frame the form and function of this design science research.

RS 1 Constitutive Rules of e-Government

R 1.1 A rule that describes government equally describes e-government.

R 1.2 e-Government is the conduct of government using information and communication technologies.

RS 2 A First Regulatory Rule of e-Government

R 2.1 An act of e-government may be mediated by the Internet.

[4] From: http://dictionary.reference.com/browse/mediate [Last Checked: 28 Dec 2009]

3.4.3 Regulatory Rules for e-Government

What, then, are the other regulatory rules of e-government? In the same way that the constitutive rules of government apply to e-government, so do many regulatory rules of government become regulatory rules of e-government. That is, e-government will not (necessarily) waive regulatory rules already established through the operation of government; rules around eligibility, timing, authority delegation, etc. Such regulatory rules in government are usually instantiated in policy. But Wittgenstein warns that regulatory rules may not be "set down in a list of rules. One learns the game by watching how others play" (Wittgenstein, 1953, p. 27e). In this case, part of the role of e-government as a set of regulatory rules for government is to decide how many of the unwritten (regulatory) rules of government action are to be maintained. That is, e-government tends to make explicit how government action is to be conducted. Formal policy and informal practice must be specifically integrated. That, in turn, can lead to ethical or moral outcomes such as a reduction in corruption or nepotism through enhanced transparency. The introduction of e-government in developing countries is often seen as a means of eradicating corrupt and inefficient practices of officials (Imran, *et al.*, 2008; UNESC, 2003).

Taking a different view and noting the common connection to e-commerce and e-business, e-government regulatory rules might include many of the regulatory rules that apply to any Internet-based activity; rules around useability, accessibility, managing throughput, attracting attention, 'stickiness', etc. But these are not definitive of e-government and might only really be regulatory rules of e-government if there are specific variations that apply to internet-based government activities (in contrast to similar private sector activities, say). The potential and realisation of that dichotomy is explored further below.

There are examples of Internet regulatory rule-sets that are e-government-specific; for example, delivering e-government services through portals (Deloitte Research, 2000b; Di Maio, 2002; Jupp & Shine, 2001; Wimmer & Holler, 2003) in contrast to through individual agency websites, or constructing service packages around 'life events' (e.g. "having a baby", "going to school", "moving home", etc) or particular demographic characteristics (e.g. "youth", "aged", "family", etc) (AGIMO, 2006c; Cullen & Hernon, 2006b; Hernon & Cullen, 2006b; Jupp & Shine, 2001). None of

these rule-sets are definitive, nor have any been shown to be 'best'. But they are all called e-government. They are all variations on the e-government 'game'. They are all examples of rule R 2.1 in application. Equally, because of their influence on organisational structures and processes 'behind' the Internet front-end, they can become regulatory rule-sets for government *per se* (Fountain, 2001a).

The regulatory rules of e-government are not wholly defined; indeed, Wittgenstein warns that they may never be. This vagueness underlies the uncertainty in the definition of e-government itself. What we can say is that e-government is a collection of regulatory rule-sets for government mediated by the Internet. Some of these rule-sets already exist (even if not rigorously defined). Furthermore, e-government as a field of study includes identifying where alternative rule-sets apply, their consequent influence on government practice, and recommending what actions to take.

3.4.4 An Illustration of Regulatory Rules in Government and e-Government

A trivial example will illustrate the application of regulatory rules, and particularly e-government rules, to an act of government. The example is the registration of dogs. A constitutive rule of government might be that governments protect the health and safety of their constituents by, *inter alia*, regulating what animals may be kept as pets. The regulatory rules applied to this constitutive rule usually involve maintaining a register of permitted pets and only allowing certain pets on the register.

Drawing on work that I have done with the Australian Local Government Association (ALGA) and the Local Government Association of Tasmania (LGAT), the following is a high-level abstraction of a typical process to register a dog for the first time in Australia. The process sketched in Figure 9 is: the government publishes information about the requirement to register dogs as pets within its jurisdiction; the constituent assimilates that information, completes a dog registration application and submits it to the government; the government verifies the identity of the constituent (this is an eligibility test); receives and processes the application, usually deciding to register the dog; receives payment from the constituent; and issues a dog registration. (Obviously, this is a highly-abstracted process description.)

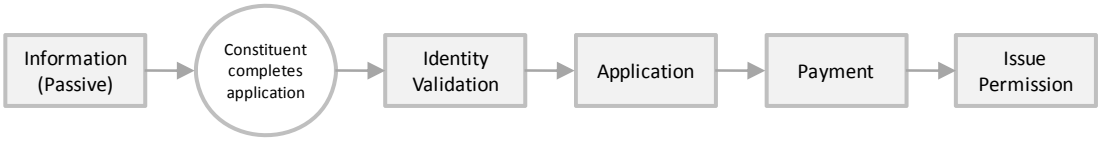


Figure 9: New Dog Registration Process

The 'Information (Passive)' process step means that information is produced and disseminated 'just-in-case' there is a need for it. This will usually be in the form of leaflets/brochures at office counters and (perhaps) available through local veterinary practices. Each of the other shaded boxes represents a 'common' step in a government administrative process. This kind of construction can ultimately articulate all the services of government. The United States Federal Government has published a high level set of government services (OMB, 2005) and the Australian Government has recently tailored that for its own purposes (AGIMO, 2009). This kind of business process abstraction frequently underlies (e-government) service design.

This brief analysis suggests that the 'service' offered by the government (Dog Registration) actually involves at least two processes. Clearly, there is a temporal gap between the first part of the process—providing information about dog registration requirements—and the latter part—registering the dog for the first time. The temporal gap ('Customer completes application') is probably usually sufficiently large that it is only in theory that the two parts are connected; i.e. the service actually starts with the unshaded circle.

Before discussing at more length the regulatory rule influences of e-government, the renewal of dog registrations is introduced to illustrate different effects of the same rules. The process sketched in Figure 10 is: the government sends a reminder to the registered owner of the dog; the dog owner determines if any changes are necessary to the details of the registration (e.g. a change of address, de-sexing of the dog, etc); if changes are needed, then the government verifies the identity of the owner (to ensure only authorised persons amend registered details) and makes the change to the register; the constituent pays the registration renewal fee; and the registration is renewed/re-issued.

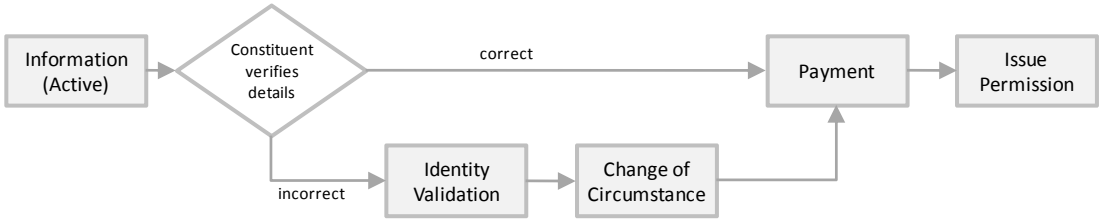


Figure 10: Dog Registration Renewal Process

The 'Information (Active)' transaction represents the government producing and disseminating specific information 'just-in-time' to the targeted recipient (i.e. sending a reminder note to the dog owner one month, say, before the registration renewal is due). The unshaded diamond is a choice made outside the process and may represent a substantial temporal gap. However, as the government awaits the response, there are not two processes here.

The *government* regulatory rules that usually apply to these services might include: which dogs can be registered and which cannot; how long a dog is registered for; how much a registration costs; the form of the register (a book or registry file); the specific details that are to be recorded in the register; the form of the registration application; the nature of the evidence of registration (e.g. a piece of paper, a dog tag, or a microchip); and how soon before expiry is the dog owner reminded of the need for renewal (if at all).

The *e-government* regulatory rules that might apply to this service might include: delivering dog registration requirement information through the government's website; creating an electronic version of the application form (either for download, completion and submission, or for direct online submission); reducing the amount of required data on the application form by drawing on other government data using the dog owner's identity as a key (for renewals); changing the form of the register from a book/file to an electronic database; changing the means of notifying the dog owner of the need to renew to e-mail; and receiving payments over the Internet.

Even this trivial service example illustrates that e-government regulatory rules can influence government regulatory rules directly (e.g. the form of the register). Importantly, it also illustrates that there are variations on e-government regulatory rules for a given constitutive rule. For example, the alternative application form approaches (download or online) or the decision to retrieve dog owner details from existing data stores to pre-populate the renewal form.

3.4.5 Summary

In summary, Wittgenstein's ideas about social actions as games defined by rule-sets are a powerful metaphor for defining the existence and application of e-government. E-government is constituted by the same rules that define government, with the additional rule of "The act of government is conducted using information and communication technologies" (R 1.2). E-government as a whole is a regulatory rule-set for government. This research is further bounded by the regulatory rule for e-government of "An act of e-government may be mediated by the Internet" (R 2.1). Although e-government draws on rules about good Internet practice, the more powerful aspects of e-government are formed when rule-sets establish guidance on how to implement e-government.

So, I stipulate my design theory as a set of (regulatory) rules. The principle form and function of the theory (a necessary element) will incorporate those rules. By linking to Wittgenstein's social action theories, I have also established some powerful justificatory knowledge for proceeding in this manner.

3.4.6 Rules and Principles: Terminology Adopted for Clarity

Although both the market segmentation and the design guidance categorised by the segments are defined in the form of rules, I will adopt a synonym of *rule* for the design guidance, calling such rule statements *principles*. The distinction is drawn for the purposes of clarity. There is a relatively small set of rules to define the market segments (identified in Chapter 4) and it is appropriate to use the work *rules* to describe them as they are specific and prescriptive. The design guidance (largely identified in Chapter 6) is also expressed as rules, but it here it is common to describe such statements as *principles* (e.g. Nielsen *et al.*, 2001). Lewis underlines the importance of using principles in this area:

> "Principles are values. Both words can mean 'required behaviour' (as in strategy) and both can mean 'having high standards of moral or ethical behaviour' (as in policy for acceptable behaviour)" (Lewis, 2009).

I will use that important dual meaning when identifying principles of design that are framed as rule statements. Lewis (2009) also highlights that it is common in related use (such as enterprise architecture) that principles have a typical form including a

name, statement, rationale and implications. In this early research work, I am only presenting the statements of principle. I draw the distinction between *rules* and *principles* in this thesis to sharpen the contrast of the two primary elements of the design science artefact: rules for a novel market segmentation, and principles of design framed by the resulting segments.

3.5 Summary of How to Formulate Advice

The previous two chapters have established the field of e-government, its high-level variables and concepts, its reference disciplines, and a critical contributory theory from a reference discipline. This chapter then identified the relevant research approach to develop advice for practitioners. Design science research was revealed as producing output that allowed specific artefacts (products and methods) to be created. Such artefacts undergo refinement as the kernel theories underlying the artefact and the design in the artefact are tested and refined through application to the problem. This research approach suits well the development and refinement of advice for practitioners.

This chapter has shown the two key insights that have underpinned the creation of the design solution presented in the following chapters. The first insight is that Market Segmentation theory describes the characteristics of a ‘good’ market segmentation. These characteristics offer a means to evaluate the operationalising of segments only described in outline. The second insight is that Wittgenstein’s ideas of social action as games justify the use of rule statements for fomalising the research output in this social action milieu. These two insights underpin the formalising of a specific instantiation of a market segmentation (the articulation of a design science artefact) through formal statements that support testing and further refinement in an environment where quantitative measurement is difficult, if not impossible.

With that base established, the next chapter moves on to highlight where the intersection of e-government and one of its reference disciplines offers useful insight for structuring the advice developed by this research.

Chapter 4 A NOVEL MARKET SEGMENTATION

4.1 Introduction

As indicated in Chapter 1, a particular insight from the e-government reference discipline of Marketing transformed my ideas about how to solve the problem of e-government service adoption. Having established necessary elements of the e-government field, I now investigate the insight that underpins this research in more detail. Firstly, I introduce segmentation in e-government in general and then the particular segmentation investigated. I adopted the segmentation proposed as written; i.e. in outline only. Consequently, I define a formal model of that segmentation for use in e-government based on principles of market segmentation. I introduce and use a template theory developed in strategic management (another reference discipline) for that purpose. The formal model is framed in terms of rules and then its initial usefulness illustrated by creating some initial design principles. More comprehensive, formal testing of the model is left for the next chapter. Exhibit 7 locates the contribution of this chapter in the overall thesis and the development of the artefact.

Exhibit 7: Design Research Elements with Highlighted Current Element (based on \Peffers, *et al.*, 2008, pp. 52-56)

Design Process Element	**Brief description**
Problem identification and motivation	Define the specific research problem and justify the value of a solution.
Objectives of a solution	Infer the objectives of a solution from the problem definition and knowledge of what is possible and feasible. The objectives can be quantitative or qualitative.
Design and development	***Create the artefact, which can be any designed object in which a research contribution is embedded in the design. Arguably, there is a theory embedded in the design parameters.***
Demonstration	Demonstrate the use of the artefact to solve one or more instances of the problem. This could involve its use in experimentation, simulation, case study, proof, or other appropriate activity.
Evaluation	Observe and measure how well the artefact supports a solution to the problem; comparing the objectives of a solution to actual observed results from the use of the artefact.
Communication	Communicate the problem and its importance, the artefact, its utility and novelty, the rigor of its design, and its effectiveness to research and other relevant audiences.

4.2 The Need for Segmentation

It is received wisdom that e-government services are targeted at one of four broad markets: businesses, constituents, other government agencies, and employees (AGIMO, 2006c; Canada, 2002; CITU, 2000a; Deloitte Research, 2000b; Fang; Jackson & Curthoys, 2001; Jupp & Shine, 2001; McClure, 2000; Tapscott, 1996). According to Market Segmentation theory, market segments will adopt and use e-government services differently, and for different reasons (Clark, 2000; Fang; Mellor *et al.*, 2001). But is the segmentation of received wisdom really sufficient? Market segmentation assists in focusing efforts at profitable buyers, or alternatively aiming products at subtly different demand characteristics (Carrick, 2001; CITU, 2000a; McColl-Kennedy *et al.*, 1994). Some pundits claim that e-commerce technologies allow us to consider 'markets of one' (Carrick, 2001; Watson & Mundy, 2001); i.e. services customised to the exact needs of each individual that uses them. Market segmentation to that level, however, reduces the likelihood of identifying benefits from addressing common needs across broad groups of the market (Clark, 2000; McColl-Kennedy, *et al.*, 1994).

I propose to refine one of the 'conventional wisdom' market segments for e-government to reveal groups of users with different adoption and use characteristics – a common goal of market segmentation (Barker, 1985; Changchien, *et al.*, 2004; Engel, *et al.*, 1972; Forsyth, *et al.*, 2000; Kim *et al.*, 2005; Peltier & Schribrowsky, 1997; Pires & Aisbet, 2003; Ryan, 1991; Smith, 1972; Spratlen, 1981; Wedel, 2001). Narrower, more homogeneous market segments are expected to allow more targeted design advice to guide e-government service developers to pick services where quick wins might reasonably be expected and to avoid complicated web-based delivery projects for groups where adoption and use is low (Changchien, *et al.*, 2004; Engel, *et al.*, 1972; Forsyth, *et al.*, 2000; Kim, *et al.*, 2005; Peltier & Schribrowsky, 1997; Pires & Aisbet, 2003; Ryan, 1991; Spratlen, 1981; Wedel, 2001). Using market segmentation in this way is a simple extension of the idea already practiced that separates 'Citizen' services from, say, 'Business' and 'Government' services. E-government services are aimed at making interactions with government easier, faster and more convenient. The segmentation will enhance the design of services to this

end by helping to organise, analyse, and manipulate ideas, designs and data more efficiently.

This chapter proposes a middle ground in market segmentation for e-government services between the 'one size fits all' approach typical of traditional government service delivery (Burn & Robins, 2001; Edwards & Creagh, 1991) and the 'mass customisation' approach (Carrick, 2001; Watson & Mundy, 2001). The segmentation is adopted from the work of Henry Mintzberg (1996) rather than being developed through more classical segmentation approaches (Claycamp & Massy, 1972; Haley, 1981; Johnson, 1981; Kotrba, 1972; Smith, 1972).

The intention behind the proposed segmentation is to partition the problem of how to design, develop and deploy effective e-government services into narrower focus areas. This partitioning involves two elements: a set of rules for identifying and defining the partitions (segments), and then a collection of design principles that relate to each segment.

4.3 Segmenting Government Constituents

One must consider who government serves to understand how moving to e-government might affect that service and its recipients (Deloitte Research, 2001; McClure, 2000; 2001). As already introduced, it is commonly-held that government serves four broad markets: citizens, businesses, other government agencies, and employees. I adopt a refinement of this received wisdom in the 'citizen' market segment to illustrate the usefulness of further segmentation on strategies for implementing e-government (Clark, 2000). The 'citizen' market segment is regularly referred to by a variety of names: citizens, customers, clients, the public, etc. Sometimes, these titles are used interchangeably, for example: "The emancipated citizen is a highly demanding client, who wishes to be treated in a customer-friendly way" (Lapre & van Venrooij, 2001); but they should not be (Cullen & Hernon, 2006b; Mintzberg, 1996; Scholl, 2001). This model defines and uses these terms with more precision.

Mintzberg (1996) proposes that constituents of government can be classified into four groups: *customers*, *clients*, *citizens*, and *subjects*. He specifically establishes that

the view of government from each of his roles is different; that an individual acting in that role will expect very different outcomes and behaviours from government (Mintzberg, 1996). These outcomes and behaviours are 'benefits' of government service (in a benefits segmentation sense) (Dubow, 1992; Haley, 1981). It is appropriate, therefore to categorise the adopted segmentation as being a benefit segmentation, which is explored in more detail in the next chapter.

Mintzberg's roles categorise constituents into segments through the lens of their intent as they seek to, and do, access the service, which does not lend itself well to 'scientific', quantitative measurement. However, the purpose of the segmentation is not for conducting empirical research to prove hypotheses but to frame advice on how to account for the needs of members of each segment. This section considers each segment as described by Mintzberg. The following section then identifies defining characteristics of relevant 'benefits'. These are consolidated into a multi-dimensional measurement scheme from which testable propositions are drawn. The next chapter then commences the evaluation of those propositions using the literature.

4.3.1 Customers

Customers are those constituents of government who purchase commodities from government agencies; for example, utilities, or lottery tickets (Mintzberg, 1996). The interactions are usually brief, and the relationship between the customer and government is a commercial one (Deloitte Research, 2001; Mintzberg, 1996). Similar interactions are often conducted by customers with non-government entities. Mintzberg questions why government still maintains roles that involve such transactions or service such constituents as the government rarely adds any value in these transactions simply because it is the government. Addressing market failures and managing public goods are two reasons for government participation here though.

The focus of attention when considering the interactions of government with *customers* is driving cost out of the transaction (Bellamy & Taylor, 1998; Deloitte Research, 2000a). The government must respond to commercial pressures or lose its customers to competitors; either private sector delivery, or other governments (Deloitte Research, 2000b). A secondary pressure that acts most in monopolistic

customer service provision is the political imperative to 'retain office' (Balmer, 1981). If *customers* feel that the government is exploiting its monopoly, it may face a voter backlash. This objective is typical of the drive towards using electronic commerce to deliver transactions to customers in the private sector to protect and increase market share (Kalakota & Whinston, 1996; Lawrence *et al.*, 1998; Tapscott, 1996).

4.3.2 Clients

Clients are constituents who purchase or receive professional services from government over a period of time, possibly over their whole lifetime; for example, health services, education, or job location services (Mintzberg, 1996). These interactions are similar in character to commercial professional services offerings (Deloitte Research, 2001; Mintzberg, 1996) where the longer the relationship goes on, the more complex and tailored the service is for the individual client. The nature of the relationship, particularly its longevity and value to the recipient, means that these services are only a government monopoly when the government has determined they should be (i.e. nationalised services). Nevertheless, the government is frequently, but not always, the first choice provider of such services.

In interactions between governments and *clients*, the focus of attention is on delivering a professionally-appropriate, quality outcome for the individual (Bellamy & Taylor, 1998). Government frequently delivers such services as a lower-cost alternative to commercial offerings to cover 'market failures'; for example, legal aid, and education (Davis, *et al.*, 1993). These services are offered to guarantee access for all government constituents, regardless of their inability to pay (Davis, *et al.*, 1993). Governments attempt to ensure that *clients* receive the correct, appropriate and complete service that they require at the minimum government cost. Interactions of this type are enhanced by e-commerce technologies, although there are clear potential benefits from e-business techniques.

4.3.3 Subjects

Subjects are constituents who receive mandatory service from government, without the opportunity to influence the parameters of service provision; for example, prison inmates, tax and rate payers, and national service conscripts (Mintzberg, 1996).

These interactions tend to be personal, to the extent that the service is tailored to individual circumstances, however the relationship is subjugatory (Mintzberg, 1996); the government compels the subject to accept the service as the government deems that it should be received. The delivery of these services is generally seen as a government obligation, although there are examples of these services being delivered by outsourced providers under the guidance and monitoring of government.

The focus of attention for interactions between governments and *subjects* is to seek a fair, consistently applied, service delivery (Bellamy & Taylor, 1998). These services are a direct expenditure of government funds and consequently must be expended with utmost regard to efficiency and probity. The nature of these services demands that attention also be paid to the correctness or appropriateness of the delivery (Bellamy & Taylor, 1998). Mechanisms that support this focus lie within the realm of e-business. Electronically-enabled internal processes provide greater efficiency in delivering these services and provide the necessary management information to ensure that the services are efficiently and appropriately delivered to the relevant constituents.

4.3.4 Citizens

Citizens are constituents who receive services from the government at a broad level; for example, the provision of infrastructure such as sewerage, roads, or air traffic control (Mintzberg, 1996). These interactions tend to be more impersonal, and are generally provided in a one-size-fits-all manner. The relationship between government and its *citizens* is essentially one of benefactor and beneficiary, although this is not a strict definition. The government is generally accepted as the appropriate deliverer of these services. However, recent trends in infrastructure outsourcing are pointing back to times when government did not have a large hand in such activities (Officer, 1999). Importantly, government maintains the role of policy setter and regulator where these services are delivered by non-government bodies.

There are some more direct services for *citizens*, though. Services that allow *citizens* to carry out their civic responsibilities from time to time fit into this group; for example, providing a means for a *citizen* to acquire a fishing permit. The permit has a limited life and the *citizen* may not ever acquire a second one, but will feel, and will be, obliged to acquire one if they want to fish. In this example service, the

government is acting to preserve the value of the public good of fish stocks by limiting access to them and requiring each fisher to seek permission as the management approach.

Citizens also have another important relationship with government, that of 'owner' (Swedberg & Douglas, 2001). Governments act to address the needs of *citizens* as expressed by them through actions such as voting, lobbying, and direct feedback through agencies and to elected representatives (Caldow, 1999; Canada, 2002; Davis, *et al.*, 1993; Watson & Mundy, 2001). *Citizens* interact amongst themselves to form and promote the needs governments seek to address (Caldow, 1999). These activities can also be enhanced by electronic interaction (Bellamy & Taylor, 1998; Caldow, 1999; Canada, 2002). As early as 1996 Tapscott described 'Internetworked Government' that included the idea of government "foster[ing] the launching of 'virtual interest groups,' which can contribute to societal well-being" (Tapscott, 1996).

The focus of interactions of governments with *citizens* is to ensure a consistent, equitable, and appropriate outcome from the whole sequence of interactions involved in delivering the service. These interactions encompass the idea of a two-way interaction between *citizens* and government to determine the nature, delivery means, and outcome of the service that government provides (Caldow, 1999; Canada, 2002; Clark, 2000; Lapre & van Venrooij, 2001). The level of sophistication that such interactions might ideally achieve requires significant complexity in any under-pinning information technologies.

4.3.5 An initial set of Regulatory Rules

An initial design science step here (Peffers, *et al.*, 2008) is to acknowledge the fundamental form of the model: a market segmentation based on the intent in the mind of the constituent when interacting with their government. As noted earlier, because the segmentation is based on the expectations of interaction (i.e. at least in part what constituents hope to get out of the interaction) it is a benefits segmentation.

To achieve the objective of a collection of regulatory rules for e-government, the segmentation must be framed in that form[5]. Recall, also, the distinction made in section 3.4.6 of the use of the term *rules* to name the definition of the market segmentation (the framework), and the term *principles* to name the design concepts framed by the segmentation.

RS 3 Segmentation Rules

R 3.1 E-government services are addressed at four major segments: constituents, businesses, other government agencies, and employees (Received wisdom)**.**

R 3.2 E-government services targeted at constituents are further segmented as: *customers*, *clients*, *subjects*, and *citizens.*

R 3.3 E-government services targeted at *customers* are typically commercial transactions for commodity-like products or services.

R 3.4 E-government services targeted at *clients* are typically professional services tailored to the needs or circumstances of the recipient delivered over a period of time.

R 3.5 E-government services targeted at *subjects* are typically prescribed services tailored to the circumstances of the recipient usually determined by law or policy and delivered over a period of time.

R 3.6 E-government services targeted at *citizens* are typically prescribed services surrounding public goods or interactions involving the constituent in the governance of the jurisdiction.

With the fundamental goal of market segmentation in mind, I will also state an initial testable proposition (considered in the next chapter) in those terms. Recall that the concepts of a 'good' segmentation and a 'benefit' segmentation were introduced in Chapter 3, section 3.3. Chapter 5, section 5.2 takes up the task of testing this proposition against those concepts. Here, the proposition is stated in those terms without further explanation:

P1. The basic market segmentation adopted is a 'good' benefit segmentation of 'the public' (constituents acting on their own behalf)

[5] In the main text, rules and principles will be stated in a concise form, often incorporating more than one segment or idea. Section 7.2.8 presents the complete set of rules and design principles in singular rule statements for each segment derived from these concise-form rules.

4.4 Identifying Characteristics to Formulate a Model

From the brief analysis of each segment proposed by Mintzberg (1996) I have synthesised some fundamental characteristics of the behaviour and expectations of each segment, presented below. The characteristics are then compiled as rules in a model in which more detailed design advice can later be integrated.

A *customer*, by definition, adopts the approach and attitudes of a typical online shopper (Mintzberg, 1996). Online shoppers use the Internet as a time-saving device, a convenient means of accessing the service, and as a research tool to determine the 'best' match to their needs, usually comparing various product (service) characteristics and price (Changchien, *et al.*, 2004; Hütt, *et al.*, 2001; Kim, *et al.*, 2005). They will complete the transaction online and usually in one session (Changchien, *et al.*, 2004; Colet, 1999; Dieringer Research Group, 2002a; 2002b; Hütt, *et al.*, 2001; Kim, *et al.*, 2005). With this level of research and comparison of product attributes and price, online shoppers can be expected to be fickle and require careful soliciting to develop an on-going relationship (Changchien, *et al.*, 2004; Colet, 1999; Dieringer Research Group, 2002a; 2002b; Hütt, *et al.*, 2001; Kim, *et al.*, 2005).

Therefore, e-government service *customers* will be considering the service as one of a range of alternatives, will seek initial information with which to make a decision, will transact their business online, and cannot be expected to return (or, in the case of monopolies, to maintain their satisfaction) without careful attention. We can presume that the characteristics of e-government services that would meet their needs would be:

- Either transactional in nature (i.e. they receive, or at least initiate, the service online) or informational about the service.
- The nature, scope, and cost of the service are unaffected by the personal circumstances of the recipient; a commodity, or at least mass-produced (i.e. some selection from a 'menu' of pre-defined alternatives).
- Commercial in nature, implying the likely presence of a fee and the presence of competitive offerings or substitutes from other (possibly non-government) suppliers in the market.

Just as important is what *customers* would not be seeking in a service. They would not be attempting to establish a long-term relationship unless it was of specific benefit to them (a characteristic that encouraged the service consumption over other offers) (Changchien, *et al.*, 2004; Hütt, *et al.*, 2001; Kim, *et al.*, 2005). And the nature of such a long-term relationship is likely to be passive on the *customer*'s part. For example, a subscription requires activity to initiate but the recipient then remains passive while the service is provided over the longer-term.

Clients, by definition, are seeking professional, long-term services (Mintzberg, 1996), a service to meet a complex need or set of needs that cannot be satisfied with a single transaction. The need will be unique to the *client*—although the service they receive may not be—and they will consider a range of alternatives looking for the service that most closely matches their requirements (Colet, 1999; Dieringer Research Group, 2002b). Information that pertains to the nature of the service, eligibility to receive it or for discounts to the cost of the service, and how to apply for and receive the service would also be of interest to the *client*.

We can presume that the characteristics of e-government services that would meet *client* needs would be:

- Both transactional (either for initiation or for on-going step in the overall service) and informational about the service, its parameters, and *client* eligibility.
- The nature, scope, and cost of the service would be significantly established or affected by the personal circumstances of the recipient.
- Once the relationship is established, there would be regular further interactions (e.g. medical check-ups, rent payments, etc).
- Commercial in nature, implying the likely presence of a fee and the presence of competitive offerings or substitutes from other (probably non-government) suppliers in the market.

Again, what the *client* would not be seeking is helpful. They are not seeking 'instant gratification' as their needs are too complex. They are also not necessarily seeking a government response.

Subjects receive services from the government largely without choice (Mintzberg, 1996; Spratlen, 1981). To a large extent, the electronic services that will pertain to

subjects will focus on improving communication and operations internally to the relevant government bureaucracy, rather than delivering services to *subjects* directly. However, any service that aids constituents to routinely comply with their obligations under law falls into *subject*-targeted service. The characteristics of services that *subjects* would seek are:

- Frequently informational in nature regarding obligations and means to comply, but can include transactions such as payment of rates.
- The nature and scope of the service will be substantially affected by the personal circumstances of the recipient.
- Transactions would occur on a regular, if not frequent, basis.
- Specifically sourced from the government, although some services may be provided by third-parties under contract or other arrangement (e.g. tax accountants).

The majority of services that *citizens* receive are in the nature of public goods and are rarely delivered electronically (Mintzberg, 1996). However, there are some services that *citizens* would seek, for example, information on the operations of government, or details of current or proposed legislation or policy and services such as permits for infrequent, controlled activity. These examples point to the characteristics of e-government services that *citizens* might seek:

- Largely informational in nature with some obvious transactions; also providing feedback on policy or legislation might be considered transactional.
- The nature of the service is unaffected by the personal circumstances of the recipient; either a commodity or a 'menu' selection.
- Specifically sourced from the government, both as the originating source and as the authoritative provider.

4.4.1 Dimensions for Identifying Service Characteristics

The preceding analysis points directly to four 'dimensions' on which e-government services may be characterised[6]. These dimensions are perspectives of the service that

[6] The following characteristics can actually apply to any government services (i.e. not only those delivered electronically); however, the context of this research is electronic delivery and so discussion is restricted to and framed in those terms.

provide an ability to differentiate between the segments. As such, they form constructs for the design theory, albeit, lower-level, situation-specific constructs, in contrast to the larger-scale defining constructs described earlier. The four dimensions are:

- **Nature of the service**—a dual factor dimension that indicates whether the service requires activity or passivity by the service recipient (to achieve service outcomes). The dual factor is that activity is synonymous with a transaction (i.e. having identified the transactional service, the constituent must continue to [inter]act to achieve service outcomes) and passivity is synonymous with information provision/retrieval (i.e. having located the relevant information the constituent is passive in receiving the service; they may read it, or not, the service is concluded with provision).
- **Interactions involved in the service**—some services can be delivered and completed in a single interaction while others may take many interactions to affect the service's outcomes, or indeed be an endless series of interactions for delivering a continuing service. Here, interaction is not restricted to the electronic environment parameters of the passing and acknowledgement of a message (say, in the form of a web page), but is considered at the 'business' level of all the interchanges/messages between service provider and recipient needed to affect a single valuable service outcome. In e-government, this includes interactions where information is sought and provided as well as more obvious 'valuable' interactions involving the payment of money.
- **Differentiation in the service**—some services offer only commodity outcomes (e.g. a general 'fact sheet'), or outcomes available in a limited, pre-determined 'menu' of alternatives (e.g. National Park entry fees). Other services are tailored to meet the specific needs or circumstances of the individual recipient (e.g. health care, or job-seeking services).
- **Reliance on the government**—constituents expect that some services must or ought to be provided by (only) the government (e.g. electoral management) whereas other services might be provided by the government among others (e.g. education). Similarly, there are some services that can only be provided by the government (e.g. foreign relations, or national defence) and there are some where

the government chooses to participate; often to fill market gaps (e.g. utilities) or as a form of market regulation.

These four characteristics of e-government services can be described as binary constructs to provide a frame of reference for each 'dimension'. This approach coincidentally parallels the conceptual frame of templates described by El Sawy and Pauchant (1988). So, I have identified a template of e-Government Services Characteristics (Table 9) with a *template-theme* of the service characteristics that are salient to constituent expectations and behaviour with the *template-constructs* described above, giving a *template-articulation* of four (El Sawy & Pauchant, 1988, p. 461). This parallel offers the opportunity to test and use the template in ways similar to El Sawy and Pauchant (1988) as part of the evaluation of the overall model (discussed further in the next chapter).

Table 9: e-Government Service Characteristics Template Summary

Template Construct	Brief Description	One Pole	Other Pole
Nature of service	The level of activity involved in achieving service outcomes	Passive (Informational)	Active (Transactional)
Interactivity	The number of interactions required to achieve a service outcome	Single	Multiple/Repetitive
Differentiation	The extent to which the service is tailored to specific recipient needs or circumstances	Commodity/Menu	Individually Tailored
Reliance on Government	The extent to which the government is a necessary participant in achieving the service outcome	None	Complete

The grouping of the repetition of a transaction with multiple transactions and 'menu' items with commodities is done for convenience. Although there is a distinction between these ideas, their effect on the segmentation does not warrant complicating the *template-constructs* or increasing the *template-articulation*.

4.4.2 Regulatory Rules for an e-Government Service Characteristics Template

We can now compile some formal rules to define the e-Government Service Characteristics Template.

RS 4 e-Government Service Characteristics Template Rules

R 4.1 (*Template-theme*) e-Government services have characteristics that are salient to constituent expectations and behaviour.

R 4.2 (*Template-constructs*) e-Government services may be described using four major characteristics: the Nature of Service, the level of Interactivity, the level of Differentiation, and the Reliance on Government for interaction efficacy.

R 4.3 (*Template-constructs*) The Nature of Service characteristic is defined as a binary construct with polar measurements of 'Passive (Informational)' and 'Active (Transactional)'.

R 4.4 (*Template-constructs*) The Interactivity characteristic is defined as a binary construct with polar measurements of 'Single' and 'Multiple/Repetitive'.

R 4.5 (*Template-constructs*) The Differentiation characteristic is defined as a binary construct with polar measurements of 'Commodity/Menu' and 'Individually Tailored'.

R 4.6 (*Template-constructs*) The Reliance on Government characteristic is defined as a binary construct with polar measurements of 'None' and 'Complete'.

The *template-consensus* is established by El Sawy and Pauchant (1988) as the extent to which there is consensus about the *constructs* of the *template* among those considering the *template* in a particular (strategic) context. Here, e-government service designers (practitioners) are the nominated interest group as although constituents are the target of e-government services, they do not think of the services in the terms that the *template* expresses them. Furthermore, the *template* and its *constructs* are designed to assist practitioners to meet constituent expectations, not (necessarily) for constituents to understand services on some new level. A high level of *template-consensus* will indicate that the *constructs* are meaningful to practitioners, which will, in turn, increase their acceptability and facilitate use of the *template*.

Identifying and describing this template establishes the need for another testable proposition, namely:

P2. The template-consensus *for the e-Government Service Characteristics Template is high for e-government service designers*

The e-Government Service Characteristic Template can be used to indicate the constituent expectations that would be best met for each segment (Table 10).

Table 10: Summary of Segment Expectations on (e-)Government Service Characteristics Template

	Interactions		Differentiation		Reliance on Government	
Segment	Single	Multiple/ Repetitive	Commodity/ 'Menu'	Individually Tailored	None	Complete
Customer	X		X		X	
Client		X		X	X	
Citizen	X		X			X
Subject		X		X		X

Table 10 is missing one *template-construct*: the Nature of Service (passive/informational to active/transactional). However, this is not a dimension for measuring the 'benefit' of a service and so it is not used (Chapter 5 provides further information on this point). Table 10 shows only four of the eight (2 x 2 x 2) possible combinations of these *template-constructs*. To reinforce the usefulness of the *template-constructs*, I will now consider the others.

The combination 'Multiple–Commodity–No Reliance' implies a set of transactions to acquire a commercially-available service that is not tailored to constituent needs. It is difficult to imagine the need for multiple transactions to acquire a commodity, especially given the lack of tailoring, but such a pattern of activity would still constitute a *customer* transaction as the commodity and commercial nature drive the concept of 'customer' here.

The combination 'Single–Individually Tailored–No Reliance' implies a single, complicated transaction, or a small level of tailoring. If the transaction is complicated, the service is appropriately classified as *client*. If, however, the transaction has only a small level of tailoring, the transaction is actually a *customer* segment service. Combining these two observations reinforces that for the segments that are not reliant on government participation, the level of personalisation or tailoring of the service is the key determinant for segmentation.

The combination 'Multiple–Commodity–Reliant on Government' does not remain comfortably within the *citizen* transaction as the implication is that the government would oblige the user to conduct a set of transactions for some 'commodity' government service. Such obligation implies that such a combination is a *subject* activity. The 'Single–Individually Tailored–Reliant on Government' combination

can be considered in the same light; a complicated transaction is still a *subject* transaction, a small level of tailoring is a *citizen* transaction. Here the key distinction between segments where government participation is required is the extent to which the constituent is involved in a series of transactions; i.e. the extent of the on-going relationship between the government and the constituent. These conclusions allow us to modify Table 10 to form Table 11:

Table 11: Segment Characteristics on Three Template-Constructs (All possible combinations)

Segment	Interactions		Differentiation		Reliance on Government	
	Single	Multiple/ Repetitive	Commodity/ 'Menu'	Individually Tailored	None	Complete
Customer	*Don't care*		X		X	
Client	*Don't care*			X	X	
Citizen	X		*Don't care*			X
Subject		X	*Don't care*			X

Table 11 encapsulates a filter for this market segmentation. That is, by considering an e-government service in the light of this filter, one can determine which segment the service addresses.

4.4.3 Regulatory Rules for Identifying Services-to-Segment Matches

RS 5 Market Segmentation Filter Rules

R 5.1 A customer service is identified by the combination of service characteristics of 'Commodity/Menu' level of Differentiation and 'No' Reliance on Government for service efficacy.

R 5.2 A client service is identified by the combination of service characteristics of 'Individually Tailored' level of Differentiation and 'No' Reliance on Government for service efficacy.

R 5.3 A citizen service is identified by the combination of 'Single' level of Interactivity and 'Complete' Reliance on Government for service efficacy.

R 5.4 A subject service is identified by the combination of 'Multiple/Repetitive' level of Interactivity and 'Complete' Reliance on Government for service efficacy.

The proposed approach to determining a segment for a given e-government service by analysing its characteristics according to the e-Government Service

Characteristics Template should be both necessary and sufficient to be properly useful and as a minimum standard for efficiency and effectiveness of the filter.

Again, there are testable propositions to articulate:

P3. The combination of 'measurements' on three template-constructs *within the e-Government Service Characteristics Template presented in the filter is necessary to uniquely determine a segment for each e-government service.*

P4. The combination of 'measurements' on three template-constructs *within the e-Government Service Characteristics Template presented in the filter is sufficient to uniquely determine a segment for each e-government service.*

It is also important to capture the idea of 'differential responsiveness' and segment homogeneity, key market segmentation ideas (discussed in more detail in the Chapter 5). In short, if there were not different behavioural patterns in different segments, there would be no need for the segments and if the members of the segments did not behave consistently one would be unable to target them as a segment/group.

P5. e-Government services identified as belonging to a particular segment using the filter have similar usage patterns to other services in the same segment

P6. e-Government services identified as belonging to a particular segment using the filter have different usage patterns than services belonging to a different segment

4.5 Applying the segments

Even at this initial level (the brief description of four segments of constituents), rudimentary design guidance can be offered that reflects the refinement offered by a segmented view. In this section, the insights already available from the segmentation are used to offer guidance on common e-government service design issues that have proven difficult, if not intractable, over many years (AGIMO, 2005; 2006a; 2007; 2008; Titah & Barki, 2006).

Recall from Chapter 1 that key issues impeding the development of e-government include:

- Identification and authentication of individuals;
- Security and privacy concerns;

- Determining which services to integrate; and
- Deciding whether to use complex multi-jurisdictional service arrangements to achieve 'seamless' government.

Market segmentation can provide alternative lenses through which to view these issues (Clark, 2000; McColl-Kennedy, *et al.*, 1994). Not all constituents of government have or need the same view on these important matters (Clark, 2000; Deloitte Research, 2001; Mellor, *et al.*, 2001; Scholl, 2001) and nor is it practical to make decisions about, say, service delivery partnerships on a one-by-one basis. I will now review how the adopted market segmentation can frame appropriate rules in these issues for individual constituent services.

4.5.1 Individual Identification

A key issue for e-Government services is whether and how to identify individuals using the electronic service (AGIMO, 2006c; Carrick, 2001; Chamberlain & Castleman, 2001; Cohen & Eimicke, 2001; e-Envoy, 2001; Kunstelj & Vintar, 2004). The characteristics of the market segmentation proposed provide insight into this issue. By considering the nature of the services delivered to each segment, and the use to which those services would be put, guidance on the need for identification can be developed.

Customer interactions, as defined, are usually simple purchase-like transactions or the collection of information provided by the relevant source, usually for free. Such interactions are usually or could be conducted anonymously, even where payments are involved. (Although credit cards are a form of identity, the use here is not to identify the user.)

Client interactions are heavily dependent upon the identity of the recipient, usually because the individual's circumstances dictate the nature and extent of the service. In keeping with this high-individuality in service delivery, *clients* are probably already identified by some reference number provided by the agency(s) providing the service. This identifier could be used for identification in online service delivery, possibly with the addition of a password or personal identification number (PIN) for authentication. Alternatively, recognising that *client* expectations are influenced by

the approaches of non-government suppliers, the use of other *client*-supplied unique identifiers such as an e-mail address would suffice.

Similarly, *subject* interactions are heavily dependent upon the identity of the recipient, again because the individual's circumstances dictate the extent of the service. Here too, *subjects* are almost certainly already identified by some form of reference number within the relevant service delivery agencies. Furthermore, the nature of the government-*subject* relationship allows the government to insist upon authentication as well as identity, either through passwords or PIN numbers, or through more sophisticated technologies, if required.

Citizen interaction need not inherently be anonymous, but the nature of *citizen* interaction as defined here suggests that anonymity might promote greater uptake of services; for example, anonymity might increase the use of electronic discussion boards with topics related to current government policy areas. Also, where a citizen needs to identify themselves (e.g. for the issue of a permit to fell a tree) the identity is not used to link to other records. It is really only captured to tie the physical manifestation of the permission to the person to whom it was issued.

It is clear from this brief review that the market segmentation can assist in decisions regarding whether or not to identify constituents during interactions.

4.5.2 Security and Privacy

The e-government implementation issue probably most concerning for Australians is the implication of significant insight by government on 'everything about everyone' as e-government services proliferate (Accenture, 2003; AGIMO, 2006c; Bellamy & Taylor, 1998; Chamberlain & Castleman, 2001; Deloitte Research, 2000b; Mellor, *et al.*, 2001; PIU, 2000; Privacy Commissioner, 1999). A balance must be drawn between the efficiency of government and the privacy of its constituents (AGIMO, 2006c; Bellamy & Taylor, 1998; Chamberlain & Castleman, 2001; Cohen & Eimicke, 2001; Deakins, *et al.*, 2001; Privacy Commissioner, 1999). Inevitably, the question must be put to the constituents: '*are you willing to pay, through your taxes or otherwise, for the inefficiencies left in the system to protect your privacy?*' There will also be difficult policy and technical issues around how long information must be maintained, and how long it is validly used in decision making. This is a non-

trivial policy area that is not addressed in this research. However, the market segmentation does offer a means of determining where progress can continue to be made while robust policy solutions are developed.

As the government rarely competes for its *customers*, and we have already discussed that *customer* interactions would normally be anonymous, unrelated over time (by definition), and we are deliberately not seeking 'mass customisation' segmentation, there is probably little benefit in remembering the *customer* from one interaction to the next. Consequently, the potential to compromise the constituent's privacy is minimal. Security during the interaction, particularly for payment transactions, is likely to be valued; however, the common level of security provided by commercial sites (e.g. SSL-based server security for transactions) is probably sufficient.

Interactions with *clients* involve personal information and it may be mandatory to collect the *client*'s history over time as a basis for further service determination. These are exactly the elements that lead to demand for highly secure and confidential electronic channels (Carrick, 2001). The development of acceptable security approaches and believable guarantees of privacy are required for these services to be adopted.

Just as *clients* demand security and privacy, *subjects* will have similar demands for exactly the same reasons. Indeed, because of the subjugatory nature of their role in the interactions, the expectation for security protections may be higher than for *clients*. The opportunity to enforce high levels of authentication of identity in *subject* relationships may actually promote the resolution of the security issues here ahead of the *client* relationships. As a consequence of the subjugatory relationship, although the expectation of privacy (i.e. not sharing constituent information between agencies) will likely be equivalent to *clients*, it will likely be less-regarded by service designers because of government policy objectives for efficiency and integration in certain jurisdictions (e.g. criminal justice) (Deloitte Research, 2000b).

Just as *citizen* interactions are similar to *customers* in the identity matter, the need for security and privacy may be similar too. There is probably little benefit in remembering the individual *citizen* from one interaction to the next, although demographic trends are potentially important; *citizens* will not expect to be remembered. This means that their privacy can be better assured. Security during the

transaction may be necessary, particularly to convince constituents of their anonymity, but this is unlikely to require more sophisticated technology than is already available through SSL-based server security and anonymising technologies such as crowds, onion routing or LPWA (Gabber *et al.*, 1999; Goldschlag *et al.*, 1999; Reiter & Rubin, 1999).

Again, the segmentation allows decisions to be made about where progress can be made to develop and deliver e-government services while the thorniest issues inhibiting implementation are resolved. The matters of privacy and its implications in service design are discussed further in Chapter 6, section 6.4.4 where the nature of government is considered for its effects on constituent expectations.

4.5.3 Service Integration

Another key focus of current e-government activity in Australia and overseas is integrating e-government services (AGIMO, 2006c; Alston, 2002; Deloitte Research, 2000b; Di Maio, 2001b; e-Envoy, 2001; 2001a; Jupp & Shine, 2001; Lapre & van Venrooij, 2001).

Australia has turned its attention to the challenging task of integrating services across agencies and across jurisdictions. This goal is one of the archetypal catch cries of e-government: “From the user’s perspective, e-government should enable citizens and business to deal with government on a vast range of matters, any time of the day or night, without having to understand which part of government is providing the service they require” (NOIE, 2002a, p. 5).

So, what does ‘integrated services that hide the machinery of government’ actually mean? In considering the actual services, there are four variations that are lumped together into ‘integrated services’ discussions:

- All relevant agencies offering the same service in a common manner, sharing data definitions and at best sharing data, but no technological integration between the services being offered (e.g. Tasmania’s CouncilConnect http://www.councilconnect.tas.gov.au/councilc/home.do);
- Services are collected together under a common theme or event. The services are not inherently integrated, or even with a common look-and-feel, but are grouped in ways that aid discovery and promote comprehensive completion of necessary

services (e.g. Australia.Gov http://www.australia.gov.au/, HomeInSite http://www.homeinsite.tas.gov.au/, FishOnline http://www.fishonline.tas.gov.au/, etc);

- Services are delivered by a single provider as an agent of other government agencies. Singular services are offered by the agent and the integration is hidden from the 'customer' (e.g. Centrelink, ServiceTasmania, ServiceSA); and
- Services are technologically integrated into a pseudo-supply-chain application. This requires the most sophisticated integration work and is not often implemented (e.g. online ABN registration process http://www.abr.business.gov.au/).

Regardless of the extent of claimed or proposed integration, there are inhibitors to 'perfect' integration (i.e. a single, coherent instance of a service offered regardless of the legislative or jurisdictional distinctions underlying the different elements of the service). The dominant inhibitors are the need to maintain a multi-channel offering for the vast majority of government services (AGIMO, 2006c; 2008; Cullen & Hernon, 2006a; Dovey & Helfrich, 2008) and the political requirements for autonomy and sovereignty, particularly when crossing jurisdictions (Balmer, 1981; Painter, 1998b). That is, each agency at each level of government will be motivated to maintain its own offering of its element of some over-arching integrated service to accommodate those customers that do not require the whole integrated service, to accommodate unique exceptions, and to maintain a means of demonstrating the delivery of undertakings made by the relevant political bosses (typically, but not exclusively, Ministers) (Barrett AM, 2002b).

Consequently, integrated services will tend towards the aggregation of existing self-contained services (or parts thereof) either through the simple collection techniques illustrated in portals that are available today, or through more sophisticated constructions where some supra-government service automatically links together the relevant and necessary components of the integrated service through electronic integration with the components maintained and offered by the participating agencies. There have been some early attempts as such services, with the earliest being the Business Entry Point and the Australian Business Number Registration process (JCPAA, 1998). Others have been trialled as part of the Trials of Innovative

Government Electronic Regional Services (TIGERS) project (JCPAA, 1998). The Australian and State governments, through coordinating bodies such as the Council of Australian Governments (COAG) continue to have a focus on refining how they can collaborate and how to produce seamless services for constituents (MAC, 2004) and the Australian Government's most recent review of its use of IT included the recommendation to seek collaboration when integrated services could be delivered to constituents (Gershon CBE, 2008).

This is a difficult area with significant technological hurdles to overcome, as well as possibly intractable political issues (Carrick, 2001; Deloitte Research, 2000b; 2001a; Jupp & Shine, 2001; Lapre & van Venrooij, 2001). How might the market segmentation assist in this area?

The relative simplicity of *customer* interactions suggests that they are unlikely to benefit from integration substantially. It is certainly possible that bundling transaction services together in a portal and facilitating a single payment for a variety of services would be beneficial, but these are not substantial integration issues (Deloitte Research, 2000b; Jupp & Shine, 2001; Lapre & van Venrooij, 2001).

There may be opportunities for integrating services to *clients* as the nature of the services is more complex and frequently benefit from incorporation in a more holistic view of the constituent (AGIMO, 2006c; Deloitte Research, 2000b; 2001a; Lapre & van Venrooij, 2001). However, Australian government agencies that deliver *client*-type services are already bundles of similar services to at least some extent as a result of several years of 'customer-centric focus' in government (AGIMO, 2006c; Deloitte Research, 2000a; MAC, 2004).

The opportunities for integrating services to *subjects* stem from the potential efficiencies in administering the service that integration delivers, rather than from adding value to the service itself (e.g. the concept of a completely integrated justice system) (Deloitte Research, 2000b). Integration at this level is exactly where the major difficulties lie and so this segment is likely to be a low priority target for integration activity until the issues can be addressed.

The opportunities for integration in services to *citizens* are likely to be limited, given the nature of the services and the absence of existing services to integrate.

Assessing integration priorities using the market segmentation developed indicates that there are areas where progress can be made while difficult technical and political inhibitors are addressed. The Australian and overseas governments are already delivering *customer* services through portals with some success (AGIMO, 2006c; Deloitte Research, 2000b; e-Envoy, 2001; Jackson & Curthoys, 2001; Jupp & Shine, 2001; Smolenski, 2000). Portals that aggregate *client* services will tend to focus on cross-government grouping of services and can still add value for the constituents (Deloitte Research, 2000b). The other market segments will remain a lower priority.

4.5.4 Multi-jurisdictional Service Integration

As a final example, I apply the segmented-market perspective to the issue of whether third-parties can or should be involved in e-government service delivery, either through integration of e-government services with third-party services, or by the formation of public-private partnerships where third-parties act on behalf of the government in service delivery (Chamberlain & Castleman, 2001; Deakins, *et al.*, 2001; e-Envoy, 2001; PIU, 2000).

If there was to be a supra-governmental service it would be operated by some organisation (Painter, 1998b). As the ideal circumstances of integrated services arch over all three levels of government in Australia, the organisation is likely to be framed in terms consistent with other inter-governmental relations approaches; for example, the Murray-Darling Basin Commission, the Australian Consumer and Competition Commission, or the Australian National Training Authority. Such organisations have been applied to a variety of cross-jurisdictional issues, with mixed effectiveness (Barrett AM, 2002b; Painter, 1998a; 1998b; 1998c).

But an organisation supporting the delivery of cross-jurisdictional integrated e-government services will almost certainly include the added complexity of involving at least one private sector partner (Barrett AM, 2002b; Painter, 1998a; Wettenhall, 1986) given the need for specialist technical skills and whole-of-nation coverage for support. A private sector partner is not guaranteed, but I consider it as it is a more complex problem than ‘straightforward’ intergovernmental relations (if there is such a thing!).

The arrangements that might be necessary are difficult to describe concisely. In an effort to capture the whole arrangement, Figure 11 is used to help guide the description that follows.

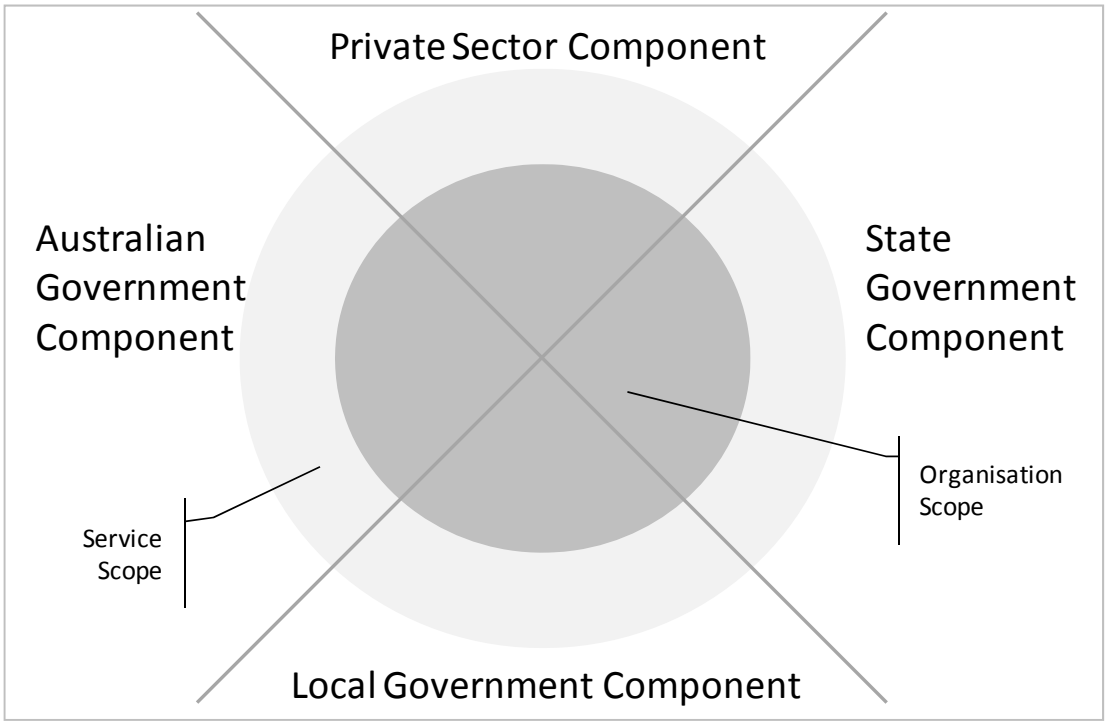


Figure 11: Sketch of Supra-Governmental Organisation Scope and Interests

The organisation (central circle in Figure 11) is composed of the interests of the main jurisdictions and provides the environment in which the integrated service is delivered. The service, however, is composed of more than just those operations that lie within the organisation; the service boundary is represented by the outer circle in Figure 11. This incorporates the idea that each participant would offer some of or their entire component of the integrated service as a stand-alone offering under their own 'brand'. The relative proportion of each participant would change for each integrated service, and many would not include some private sector online service directly, but the general condition suggests that all participants are involved in the service, and that all those involved in the service are involved in the organisation that delivers the integrated whole (the scope of the segments in Figure 11).

One further complication that Figure 11 cannot represent without cluttering the diagram unacceptably is the fact that each participant is very likely to actually be some number of participants from each jurisdiction; that is, many Australian Government agencies; many (probably all) States, and likely many State-level

agencies; many, if not all, Local Governments; and possibly several private sector players within a consortium involved in the organisation.

It would be difficult to overstate the complexity of this organisation, and it is likely that there would be several such organisations, probably a minimum of one in each sector (e.g. health, taxation, welfare, industry development, etc), if only to assuage public concerns about centralised data holdings by the 'Big Brother' government(s). The nature of this supposed organisation is fascinating because of that complexity. Obvious areas where wholly new approaches are likely to be needed are in: formal participation structures (some hybrid of intergovernmental arrangements and public companies), the governance structure (the membership of a board of directors would be hotly contested), accountability, and how such an organisation would evolve over time in the face of changing technology, changing consumer demands, and regular changes of government (politicians and policies). It is little wonder that many information technology professionals are of the view that, in e-government "the technology is easy, the politics is where the real issues lie" (Cole, 2001).

Importantly, a critical matter for an organisation of this nature delivering integrated, 'seamless' e-government services on behalf of the various jurisdictional stakeholders is the accountability for the delivery of complex, integrated, electronic government services.

Here, I will use the following definition of accountability: "… the legal obligation to be responsive to the legitimate interests of those affected by decisions, programs, and interventions. To be responsive includes the duty of care and the requirement that information concerning expenditure of funds and the exercise of public authority should be given to the individuals affected, including legislators" (Considine, 2002, p. 22). This is important in both private and public organisations, but is generally more important in public organisations (Bozeman & Bretschneider, 1986). "The ability of the public sector external auditor to report in detail to the public domain of Parliament on the efficiency and effectiveness has no similar parallel in the private sector" (Barrett, 1996, p. 5). In the private sector, provided the decision-maker does not break the law, they may choose to do as they wish with no requirement to justify their decisions to others (Bozeman, 1979; Quiggin, 1999). The higher level of scrutiny in public organisations leads to higher levels of accountability mechanisms

(Bozeman & Bretschneider, 1986) usually implemented as controls over process and procedures (the means) (Barrett AM, 2002a; Considine, 2002) because of the difficulty in identifying performance and output measures (the ends) to control (Bretschneider, 1990; Rainey, 1983).

The general public expects that the government is working in their (the public's) best interests; a feeling of proprietorship and a fundamental belief that this is what government exists to do (Rainey *et al.*, 1976; Singh, *et al.*, 2001). In circumstances such as an integrated service provided across many tiers of government and involving private sector partners, the public will typically not be able to grasp the complexity of the accountability issues involved (Haque, 2001). But they will have a simple requirement: its operation must be fair, equitable, correct, timely, and not inadvertently disadvantage them. One suggestion is that "a reasonable test…might be that [the accountability arrangements] are at least equivalent to the transparency and accountability …if such arrangements were contained within one jurisdiction" (Crompton, 2004, p. 5). The public will want to be assured of this not by some complicated collection of audit reports but through a simple statement, preferably by an elected official who can be held electorally responsible that "everything is fine". They will want to know that the large, detailed, audit reports exist, but not be particularly interested in the details themselves (Balmer, 1981).

Customer interactions are potentially the most amendable to third-party delivery, either through integration with third-party services or by third-party delivery on behalf of the government. A key qualifier of this might be the need for *customers* to be assured that the information they are receiving originated from the government, and not from the third-party (Al-Kibsi *et al.*, 2001; Deloitte Research, 2001). The credibility of the service could be reinforced through appropriate branding of government information, even when presented within broader third-party services (Al-Kibsi, *et al.*, 2001; Deloitte Research, 2000b; 2001a).

Even though *client* interactions are often very personal and long-term, the need for the government to explicitly deliver the service is low. Provided that the third-party deliverer is seen to be professional and to meet appropriate standards in service delivery, *client* services can be delivered on behalf of the government by third-parties (for example, education, and health services). Similarly, the ability to bundle *client*

services with related services offered in the private sector is seen as valuable (AGIMO, 2006c; Deloitte Research, 2000b; Lapre & van Venrooij, 2001).

There is a very real need for the government to be seen to be delivering the service to *subjects*, even if third-party service providers are involved (for example, tax assessments and the role of tax agents). Although private prisons operate in some states of Australia, few prisoners would be of the view that they were not prisoners of the state or the Commonwealth. No one wishes to pay tax to anyone but the government.

Again, it is important for the government to be seen to be delivering the service for *citizens*, although there may be occasions where the government must be seen to absent while the service is actually consumed (for example, an un-moderated political debate on a government-provided electronic forums to facilitate and promote free speech and civic engagement); Lapre and van Venrooij (2001) report on research that indicates that moderated debates can still promote substantial engagement though. If the *citizens* feel that they are only being served by lobby groups or other non-government peak bodies (e.g. industry associations) they may feel that their voice is being filtered before the government hears it (Lapre & van Venrooij, 2001).

Table 12 summarises the guidance indicated by the market segmentation as described above:

Table 12: Summary of Market Segmentation Guidance

Issue	Customer	Client	Subject	Citizen
Individual Identity	Not required	Use existing reference number Offer some authentication	Use existing reference number Use sophisticated authentication	Not required Allow voluntary identification
Security and Privacy	SSL-based transactions No privacy issues	High-level security Significant privacy issues	High-level security Significant privacy issues	SSL-based transactions No privacy issues (if anonymous)
Integrated Services	Portal to bundle related services	Portal to bundle related services	'Back-office' system integration	(Probably) Not relevant
Third-party Delivery	Visible third-parties OK May benefit from Government branding	Visible third-parties OK May benefit from Government accreditation	Invisible third-parties OK Must be strongly Government branded	Third-parties NOT OK Government provided, but not necessarily government controlled

4.5.5 Areas that Segmentation Cannot Address

There are some areas where the market segmentation does not provide any particular assistance. I will briefly review two such areas: provision of support for certain services, and over-arching infrastructure issues.

The e-government Australia has implemented to date is more of a 'consumer democracy' (Bellamy & Taylor, 1998), or a 'thin democracy' (Astrom, 2001) than a 'strong democracy' (Astrom, 2001; Bellamy & Taylor, 1998). In Australia, there are only a few examples of support for electronic citizenship; the interaction of citizens among themselves to determine appropriate responses to changing events (AGIMO, 2006c; Astrom, 2001; Bellamy & Taylor, 1998; Caldow, 1999; Lapre & van Venrooij, 2001) and which Tapscott (1996) sees as so crucial to an 'Internetworked Government.' Similarly, the role of elected representatives is somewhat unclear. If governments were driven by the data inevitably collected in interacting with constituents, and policy-making public servants are empowered by that data to adjust policy and legislation to respond most appropriately to changing requirements (Bellamy & Taylor, 1998; Chamberlain & Castleman, 2001; Deloitte Research,

2000b; Di Maio, 2001a), what do the politicians do? Although the market segmentation identified here clarifies what scope of services are under-supported (*citizen* services), it does not assist in identifying how to further promote their support at a policy level.

The other key element that the market segmentation cannot assist in is the infrastructure on which to operate the e-government. By nature, government services generally apply to all constituents; at least *citizen* and *subject* services (Bellamy & Taylor, 1998; CITU, 2000a; Deakins, *et al.*, 2001; Jackson & Curthoys, 2001; PIU, 2000; Smolenski, 2000). Consequently, all constituents must have access to the service. If the infrastructure for the delivery of these services is not available, constituents will be unable to access the services (Bellamy & Taylor, 1998; CITU, 2000a; Deakins, *et al.*, 2001; Jackson & Curthoys, 2001; Kalakota & Whinston, 1996; PIU, 2000). Currently the responsibility for the delivery of this infrastructure in Australia rests in the commercial sector, although regulated by government, including a 'universal service obligation' aimed at achieving consistent, equitable access for all Australians (Australian Communications and Media Authority, 2010). There may yet prove to be a compelling case for the ownership and responsibility for the provision of the electronic infrastructure to lie with government so that it can fulfil its fundamental role (Deakins, *et al.*, 2001; Kalakota & Whinston, 1996; Weill & Broadbent, 1999). As suggested in the discussion of security and privacy, it may come to a question for constituents.

PS 1 First Design Principles from Segmentation

P 1.1 **e-Government services for *customers* and *citizens* should not require the constituent to identify themselves, and if identity is collected, its retention beyond the present interaction must be at the constituent's discretion.**

P 1.2 **e-Government services for *clients* and *subjects* must require the constituent to identify themselves and retain information pertaining to the constituent from one interaction to the next.**

P 1.3 **e-Government services for *customers* and *citizens* should offer secured interactions for sensitive elements of the interaction (e.g. personal information collection and financial transactions).**

P 1.4 e-Government services for *clients* and *subjects* should be conducted through secure interactions to the maximum extent possible (i.e. from as early in the interaction as possible through to completion).

P 1.5 e-Government services for *clients* should allow non-government provided identifiers to be used (e.g. e-mail address), should use practical authentication to validate identity (e.g. password or PIN), and must provide credible reassurance about the privacy of the constituent's data.

P 1.6 e-Government services for *subjects* should use government-provided identifiers, should use as strong authentication as practical and should offer information about how the constituent's personal data is used.

P 1.7 e-Government services for *citizens* should offer the option of government-provided identifiers as a means of simplifying constituent identification, but this must not be the only means of the constituent identifying themselves for a service.

P 1.8 e-Government services for *subjects* and *clients* that rely on cross-agency, cross-jurisdictional and/or public-private partnership operations should explicitly identify the organisations involved.

P 1.9 e-Government services for *subjects* that rely on cross-agency, cross-jurisdictional and/or public-private partnership operations must explicitly brand service outputs with the authorising government agency.

P 1.10 e-Government services may be delivered by third parties for *customers* and *clients*; service outputs may derive credibility from government 'branding' for *customers* and *clients*.

P 1.11 e-Government services delivered by third parties to *citizens* and *subjects* must be clearly branded as government services.

P 1.12 e-Government services for *subjects* and *clients* that rely on cross-agency, cross-jurisdictional and/or public-private partnership operations should assert the extent to which personal data is shared between the organisations, and must identify the process for seeking remedy in the event of dissatisfaction with the service.

4.6 Summary

This chapter has presented the central contribution of my research: a novel market segmentation of the constituents of government for use as a framework for classifying e-government service design guidance. The segments are defined primarily by the expectations in the minds of constituents as they interact with government through some service. Although the constituents are said to be within a

segment, it is the services that will be ‘fixed’ within segments; constituents move around the segments as they use different services and consequently their expectations change. The exposition of the segments has formalised a proposed segmentation scheme and developed critical aspects of that segmentation to allow it to be routinely applied. These elements are captured within rulesets. As an initial illustration of the usefulness of the segmentation, a review of the primary implementation barriers for e-government services was presented and initial design guidance was created, categorised by the segments and presented in the form of design principles.

With the design science artefact, a framework based on a market segmentation, now revealed, the next step is to validate and verify that framework to the extent possible (Chapter 5). Once that is achieved, some illustrations of its use will be presented as initial evidence of the framework’s usefulness (Chapter 6).

Chapter 5 VALIDATING AND VERIFYING THE SEGMENTATION

5.1 Introduction

I have established a market segmentation to help form regulatory rules for e-government service design (Chapter 4). In conjunction with the rule statements that define the segmentation, a series of testable propositions was articulated, as required for a design science theory (Gregor & Jones, 2007; Peffers, *et al.*, 2008). This chapter begins the process of testing those propositions as an initial validation and verification of the segmentation. There are two elements to this:

- Validation of the segmentation drawing on the literature to establish the coherence and appropriateness of the segmentation and to ground it in the established market segmentation literature; and
- Verification of the usefulness of the template and its constructs in identifying services within an example set of government services and then in revealing different patterns of behaviour in the use of those services.

Exhibit 8 locates the contribution of this chapter in the overall thesis and the development of the artefact.

Exhibit 8: Design Research Elements with Highlighted Current Element (based on \Peffers, *et al.*, 2008, pp. 52-56)

Design Process Element	Brief description
Problem identification and motivation	Define the specific research problem and justify the value of a solution.
Objectives of a solution	Infer the objectives of a solution from the problem definition and knowledge of what is possible and feasible. The objectives can be quantitative or qualitative.
Design and development	Create the artefact, which can be any designed object in which a research contribution is embedded in the design. Arguably, there is a theory embedded in the design parameters.
Demonstration	***Demonstrate the use of the artefact to solve one or more instances of the problem. This could involve its use in experimentation, simulation, case study, proof, or other appropriate activity.***

Design Process Element	Brief description
Evaluation	Observe and measure how well the artefact supports a solution to the problem; comparing the objectives of a solution to actual observed results from the use of the artefact.
Communication	Communicate the problem and its importance, the artefact, its utility and novelty, the rigor of its design, and its effectiveness to research and other relevant audiences.

5.2 A 'Good' Benefit Segmentation

I will start with the validation of the market segmentation. That is, I will attempt to validate the following proposition by connecting the proposed segmentation to the market segmentation literature:

P1. The basic market segmentation adopted is a 'good' benefit segmentation of 'the public' (constituents acting on their own behalf)

As discussed in Chapter 3 (section 3.3, page 68), market segmentation has, at its heart, the concept that the total 'market' can be partitioned into smaller, more homogenous groups (segments) using certain segmentation criteria (e.g. demographic facts). Recall, also, that of six alternate segmentation criteria sets (Exhibit 6, page 70), the 'benefits sought' category was considered highly (Rossiter, 1985) and has its own history of use, refinement and theory, called Benefit Segmentation (Haley, 1981; 1984).

Mintzberg specifically establishes that the view of government from each of his roles is different; that an individual acting in that role will expect very different outcomes and behaviours from government (Mintzberg, 1996). As indicated in Exhibit 6, a major characteristic of benefit segmentation is the 'situation or end-use' of the product or service. The situation of use points directly to why Mintzberg's segmentation offers opportunities for design guidance. His roles speak to expectations of constituents as they are in the 'situation of use' of government services. Categorising those expectations across all government services into smaller, more homogenous sets offers the power of segmentation to service design, which is what this research seeks to achieve. The outcomes of government service use and the behaviours involved in the use of the service are 'benefits' of government service (in a benefit segmentation sense) (Dubow, 1992; Haley, 1981). It is appropriate, therefore to categorise the proposed groupings as a form of benefit segmentation.

Having established the type of segmentation, the next sections will establish that it is a 'good' segmentation by validating its characteristics against those established as necessary for segmentations. Each of the characteristics of a market segmentation described in section 3.3.3 (page 71) will be used to assess if the adopted segmentation is 'good'.

5.2.1.1 Mutual exclusivity

It is both easy and difficult to show compliance to this requirement. Initially, there is the proposition that by definition the segments are mutually exclusive—the easy answer. Of course, the slightest reflection reveals that an individual will fall into any or all of the categories over time (Mintzberg, 1996), and may occasionally feel as if they are in more than one category at once. The answer to this is that the nature of the services and the attitude that individuals adopt when seeking and receiving them means that they are mutually exclusive *while being used*; an individual will not seek a *customer* service and a *citizen* service at the same time (although he/she may seek them consecutively). Importantly, I have not yet discovered circumstances in where the benefit bundle offered in a government service in Australia appears to address needs sought by more than one segment. Greater future integration of government services (AGIMO, 2006c) might alter that perspective.

5.2.1.2 Exhaustiveness

The segmentation was adopted on the basis that it appeared exhaustive. The segmentation does not attempt to exhaust all possible government services; the services directed to businesses and other governments are explicitly excluded. At the same time that the data analysis presented in Chapter 5 and Annex A was being conducted, the Australian Government published the *Government Online Services Compendium* (NOIE, 2002b). Through contacts developed as a consultant to the National Office for the Information Economy (NOIE), I was provided access to the source data that listed the 1,529 online government services at the time. Each service described on the register was categorised by the department responsible as being targeted at one or some of four classical segments (called 'Beneficiary Groups' in the Compendium): 'Citizen', 'Business', 'Government' and 'Employee' (refer to section 4.2, and rule R 3.1 in particular). Table 13 summarises how the services were

classified by their owners. As a first attempt to ascertain the exhaustiveness of the adopted segmentation, those services marked for 'Citizens' were investigated. The broad category of 'Citizen' represented the largest target area for Commonwealth e-government services.

Table 13: Distribution of Australian Government Services across Broad Segments (Source: Project data)

Target Groups	Number	Percentage
Business	351	22.96%
Business Citizen	150	9.81%
Business Citizen Employee	6	0.39%
Business Citizen Employee Government	118	7.72%
Business Citizen Government	143	9.35%
Business Employee	23	1.50%
Business Employee Government	48	3.14%
Business Government	144	9.42%
Citizen	425	27.80%
Citizen Employee	9	0.59%
Citizen Employee Government	9	0.59%
Citizen Government	43	2.81%
Employee	1	0.07%
Employee Government	5	0.33%
Government	54	3.53%
Total	**1,529**	**100.00%**

I worked with a student to classify the services described as being targeted at 'Citizens'. Independently, we the reviewed the description of each service and encoded each according to the dimensions in the e-Government Services Characteristics Template (Ruleset RS 4, page 98). We then combined our results and, through discussion, resolved the few discrepancies that our individual interpretations developed. The encoding then allowed us to apply the Market Segmentation Filter Rules (Ruleset RS 5, page 100) to classify each service as one, and only one, of the four proposed segments. All the services considered were able to be classified in this manner and all segments were represented in the classification. These findings not only support the idea of exhaustiveness, but reinforce the view that the segmentation is mutually exclusive and measurable.

Unfortunately, no further data (for example, usage or adoption rates) were available for further analysis. This analysis is also limited by the not including those services that include 'Citizens' as one of a few segments to which a service is targeted. Furthermore, and more telling, the passage of time has made the claim of exhaustiveness out-dated as the Australian Government now offers a different set of services, consolidated and available online at www.australia.gov.au.

Similarly, as described in Annex A and illustrated in Table 45, all 'Citizen' 'services' identified in the financial transactions data from the ACT Government were able to be uniquely categorised by the Market Segmentation Filter Rules. These two successful applications are offered as evidence of the exhaustiveness of the approach.

The segmentation is claimed as exhaustive on the basis of its definition and the lack of evidence (yet) of services or individual-level needs that are outside the segmentation proposed.

5.2.1.3 Accessibility

The segments are accessible as any individual can be part of any group, all individuals are part of all groups at some time, and they are so by their requirements (needs) not their nature (i.e. demographics). Taking the reverse perspective, a government can access any segment simply by addressing the needs of that segment.

5.2.1.4 Sustainability

Again, as the segments can and (over time) do contain all individuals in the government's market, the segments are all sustainable. That is, there is no restriction for any individual, acting on their own behalf, choosing to use a service that is defined in any category. Similarly, as the needs of the whole population must be served, there will always be at least some demand for services in each of the segments. In contrast to, say, demographic-based segments where there may be segments defined that contain no constituents or even just a sufficiently small number to be untenable (unprofitable, in commercial terms) to service (Barker, 1985; Claycamp & Massy, 1972; Haley, 1981; Johnson, 1981; McColl-Kennedy, *et al.*, 1994), the segments proposed are framed in terms of the expectations of the constituent using the service and so any service within the segment sustains the segment, as does any use of the service by a constituent.

A threat to this might arise if government was to divest itself of all services in a particular segment (*customer* seems most under threat), but although there were some trends in this direction in recent years (Bloom & Novelli, 1981; Edwards & Creagh, 1991), the broad underlying government responsibility to address market failures means that all segments are likely to always be addressed and necessarily considered sustainable (Quiggin, 1999).

5.2.1.5 Differential Responsiveness

As the nature of services offered to each segment varies to meet the different characteristics of the needs of segment members (refer to Measurability discussion below), each segment will have a different responsiveness to marketing stimuli (Bloom & Novelli, 1981; Changchien, *et al.*, 2004; Hütt, *et al.*, 2001; Kim, *et al.*, 2005; Ryan, 1991). *Subjects*, for example, are largely compelled to adopt the service (Mintzberg, 1996; Spratlen, 1981) and hence would require and respond to different marketing signals than *customers* who are being variously lured by the variety of potential service deliverers in the market (Changchien, *et al.*, 2004; Hütt, *et al.*, 2001; Kim, *et al.*, 2005). Similarly, the adoption and transaction rates within each segment will differ from other segments, in this case as much because of the different nature of services and their demand/delivery cycle as because of the different characteristics of the constituents.

5.2.1.6 Measurability

In this benefit segmentation, segments are based on the type of service to access and the relative priorities for different services (Haley, 1981; Spratlen, 1981). Measurability is therefore a matter of how we identify the nature of services that makes them beneficial to different constituent groups. Members of each segment must be identifiable through the measurement of some characteristic(s) (Bhatnagar & Ghose, 2004; Bloom & Novelli, 1981; Engel, *et al.*, 1972; Peltier & Schribrowsky, 1997; Pires & Aisbet, 2003; Rossiter, 1985). Obvious and frequently used examples are characteristics such as demographics, or (social) values (Rossiter, 1985). More potent measures in a commercial environment are previous buying behaviour, brand awareness and brand attitude (Bhatnagar & Ghose, 2004; Bloom & Novelli, 1981; Changchien, *et al.*, 2004; Hütt, *et al.*, 2001; Rossiter, 1985; Ryan, 1991).

In benefit segmentation, the definition of benefits involves a combination of factors that complicates measurement (Haley, 1981; Peltier & Schribrowsky, 1997). Similarly, the requirements of government to meet the needs of all constituents can blur measurement dimensions (Bloom & Novelli, 1981; Ryan, 1991). Nevertheless, the e-Government Service Characteristics Template (refer to section 4.4 and Ruleset RS 4) offers a way of measuring which segment an individual is acting within.

As a brief illustration of this claim, I present an excerpt of a more comprehensive demonstration of the application of segments developed later (section 6.2). Figure 12 presents two government service processes previously introduced: Dog Registration, and Dog Registration Renewal (shown earlier as Figure 9 and Figure 10). Table 14 then demonstrates the application of the e-Government Service Characteristics Template to determine the relevant segment for each service.

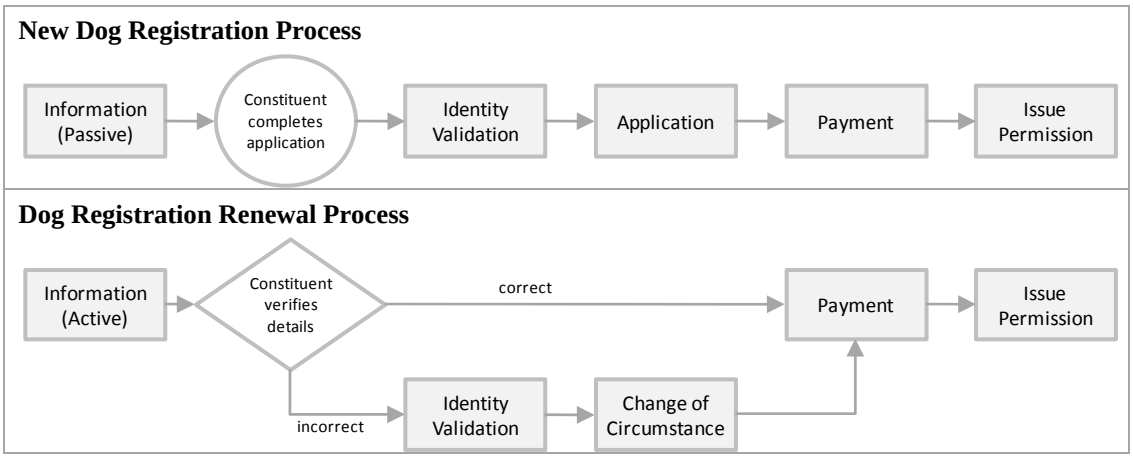


Figure 12: Example Typical (Local) Government Services

Table 14: Example 'Measurement' of Typical (Local) Government Services using the e-Government Service Characteristics Template

Service	Template Construct		Segment
Dog Registration	Nature of Service	Active	
	Differentiation	Commodity/Menu	Citizen
	Interactions	Single	
	Reliance on Government	Complete	
Dog Registration Renewal	Nature of Service	Active	
	Differentiation	Commodity/Menu	Subject
	Interactions	Multiple/Repetitive	
	Reliance on Government	Complete	

This excerpt of the more detailed later presentation (section 6.2) illustrates the 'measurement' capability that the e-Government Service Characteristics Template offers in support of the claim of measurability for the segmentation as a whole. As the segmentation is being used to suggest approaches to e-government service

design, not to quantifiably prove hypotheses, this level of 'measurement' is deemed sufficient.

So, the preceding argument, with the support of the marketing literature, has established that:

- This segmentation applies to 'the public' only – by definition;
- The segmentation is a benefit segmentation because it groups constituents into segments on the basis of the benefits they receive by having their differing requirements met; and
- The segmentation is a 'good' segmentation because there is a defensible argument to support the segmentation against the six criteria set for 'good' segmentation by the literature.

Consequently, I claim that P1 is supported. Of course, as the segmentation is being 'back-fitted' to these criteria, this claim is not absolute. However, the segmentation is sufficiently convincing to be worthy of further exploration.

5.3 The Usability of the Segmentation

The second proposition that has been established points to the usability of the e-Government Service Characteristics Template:

P2. The template-consensus *for the e-Government Service Characteristics Template is high for e-government service designers*

Research to date has not explicitly tested this proposition. Ideally, of course, a formal experiment might be conducted where some service designers apply the *template* in their design of e-government services and then the researcher surveys their views on its usability. A slightly lesser test for the proposition would be to introduce and explain the *template* to e-government service designers and survey their views without the implementation element. This approach to evaluating a design science research output has been formalised as an "applicability check" by Rosemann and Vessey (2008). Their specific approach was not applied in this instance as the technique was published at the same time as the review of this research was conducted with practitioners. Repeating the process using Rosemann and Vessey's formal approach is future research.

The *template* and its *constructs* have been introduced to some e-government service designers in the Queensland Government (a State Government in Australia; www.qld.gov.au). (Note that the conceptual device of a *template* is novel to this thesis.) I made a presentation to a practitioner conference in August 2008 on the potential influence that the segment could have on service design decisions, based on the research presented in Chapter 6 (particularly, section 6.3 and section 6.3.5, page 185). That presentation attracted the attention of the Queensland e-Government Strategy Project team that was in the process of reviewing and re-writing the e-government strategy for the whole of the Queensland Government. I was invited to make that same presentation to four different groups of Queensland Government e-government practitioners from within the Strategy Project team and from other representatives across the Queensland Government and even to local government representatives. I was also invited to offer insights based on my research to the strategy review process. Informal feedback from participants at those presentations (including the practitioner conference) was uniformly positive (pers. comm., 2008). Key members of the Strategy Project later wrote to me specifically acknowledging that the segments made sense to them and that the perspective it gave to service design was valuable and useful (pers. comm., 2008).

To date, the *template* and its *constructs* have been introduced to academic practitioners through publication in conference papers and journals. As noted above, the concept of a *template* is novel to this thesis presentation. The details of the segmentation, the dimensions that are now labelled *template-constructs*, and the 'goodness' of the market segmentation have previously been published. This approach to evaluation corresponds with the 'Description' evaluation pattern described by Vaishnavi and Kuechler (2008). Recognising that such an evaluation is the weakest form, according to Vaishnavi and Kuechler, I suggest that peer-reviewed publication is an indicator of acceptability of an idea. Consequently, the publication of (Turner, 2002; 2006) is offered as minimum support of this proposition; other conference papers also relate (discussed in the Preface, particularly on page vii). Clearly, however, more work remains to be done here.

5.4 The Necessity and Sufficiency of the Segmentation

If the *template* is to be useful for identifying services that address each set of needs that constituents feel when acting in a segment, the *template-constructs* must offer a comprehensive means of categorising services for this purpose (i.e. they must be sufficient) and for efficiency, all *template-constructs* must be used in making that determination (i.e. they must be necessary). These ideas are captured in Propositions 3 and 4:

P3. The combination of 'measurements' on all template-constructs *within the e-Government Service Characteristics Template presented in the filter is necessary to uniquely determine a segment for each e-government service.*

P4. The combination of 'measurements' on each template-construct *within the e-Government Service Characteristics Template presented in the filter is sufficient to uniquely determine a segment for each e-government service.*

In an attempt to validate these propositions, an experiment was conducted using data from actual e-government service transactions. The experiment overlaid the segmentation on the services and then used statistical techniques to validate the differences between segments as seen in the data so categorised. The following section describes this experiment in support of these two propositions and as a preliminary to attempting to support further propositions.

5.4.1 An Experiment with e-Government Transaction Data

The Australian Capital Territory (ACT) Government kindly provided data involving summary results of all financial transactions conducted by the government over the period mid-2000 to mid-2004.

The data provided by the ACT Government was particularly useful in that they had a parallel for adoption through usage rates and also contained financial values for the transactions. The data was limited, however, because it was drawn from financial system records. This meant that the data included transactions that were only administrative in nature (e.g. journal transfers or reconciliation transactions) and did not include information on services that did not involve some fiscal element (e.g. retrieving forms for applications or other information services). As discussed in

section 5.4.1.3, the services represented by the financial transactions did cover all four proposed segments, but they did not do so evenly, either in number of services per segment (Figure 16, page 141) (or over time, discussed in Annex A, see especially section A.4.1).

5.4.1.1 The Australian Capital Territory (ACT)[7]

The Australian Capital Territory (ACT) is a city-State jurisdiction of approximately 2,350 square kilometres (ABS, 2008b) selected as the site for the national capital in 1907 (CMD, 2004) and established as the seat of government in 1927 (CMD, 2004). The city of Canberra, in the ACT, is Australia's national capital. 'Canberra' comes from the local Aboriginal word 'Kamberra' meaning 'meeting place'. As Australia's capital city, Canberra is the focal point for activities and events that affect and influence the nation. It is the home of Federal Government and the public service, a focus for business and industry, home to the international diplomatic community, and a place of study with five university campuses in the city (CMD, 2004).

"The Territory, because of its position as the site of the National Capital and Seat of Government, as well as the Commonwealth legislation governing its planning, land management and environmental responsibilities, is unlike any other Australian jurisdiction" (CMD, 2004, p. 5). The ACT is governed by an elected Legislative Assembly with a formally recognised opposition (ABS, 2008a). The ACT has the same jurisdictional powers as other States and Territories in Australia's federal system encompassing "education, police, public health, public transport, agriculture, roads, community services, corrective services, mineral resources, emergency services, ports and the oversight of local government" (ABS, 2008a, p. 117). Importantly though, there is no local government layer in the ACT (unlike all other State-level jurisdictions in Australia) and the Territory government has direct responsibility for local services (ABS, 2008a).

"The ACT economy is markedly different to all other jurisdictions in that it is still dominated by the public sector. It has a highly specific economic profile due to the nature of its services and industries, the high proportion of people in Commonwealth employment, and the education sector incorporating the Australian National

[7] The following description draws on government sources based on the 2006 Australian Census.

University, the Australian Institute of Sport, the Australian Defence Force Academy and the University of Canberra" (CMD, 2004, p. 11). The ACT has the highest population density (because Canberra represents such a large proportion of the Territory's land area), the highest employment participation rate and the lowest unemployment rate in Australia (ABS, 2008a), and its workforce has the highest average income and the highest level of tertiary education qualifications in Australia (ABS, 2008b).

> "Over half (52.2%) of all occupied private dwellings in Canberra-Queanbeyan had broadband Internet access at the time of the 2006 Census, and nearly three-quarters (74.0%) had some form of Internet connection (i.e. broadband, dial-up or other connection). These were the highest proportions for any capital city in the nation" (ABS, 2008b, p. 53).

Figure 13 offers a comparison of the ACT with all of Australia on the statistics presented in Chapter 1 (see particularly, section 1.5 and Figure 1) to illustrate the ACT's relative propensity for adoption of online activity.

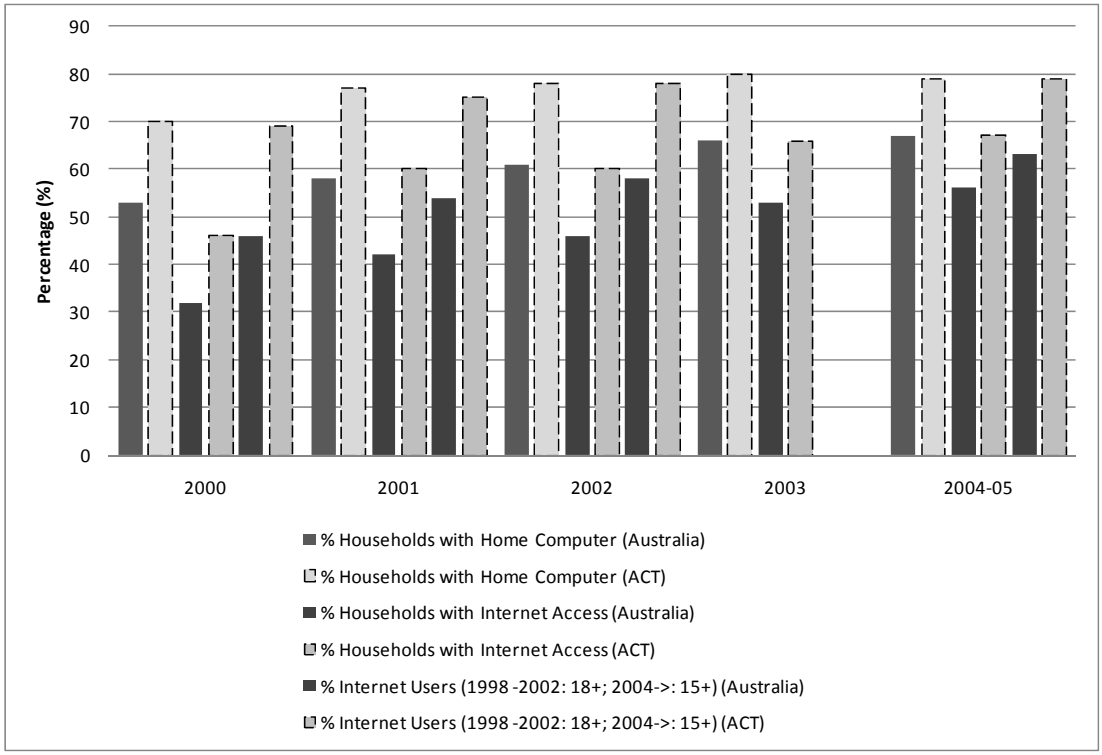


Figure 13: Comparison of the ACT against All Australia on Three Key Indicators of Propensity to Adopt Online Activities (Compiled from: ABS, 2001; 2003; 2004; 2005)

This potted description of the ACT should paint a picture of a city-State with a robust economy populated by educated, above-average earners with generally good access to the Internet. In short: a place with a multitude of typical indicators of high-levels of Internet and e-Government adoption.

5.4.1.2 Data on Financial Transactions by the ACT Government

The raw transaction data provided by the ACT Government was a standard report output from the government's financial management system (called FinanceOne at the time, now TechnologyOne Financials [www.technologyonecorp.com/Financials]) and provided as a series of Microsoft Excel workbooks (spreadsheets); one for each financial year with each month of the year as a separate worksheet within each file.

The data was presented with one record to consolidate the financial transactions for each agency, for each account code, for all payment channels, for the month, in the form illustrated in Figure 14.

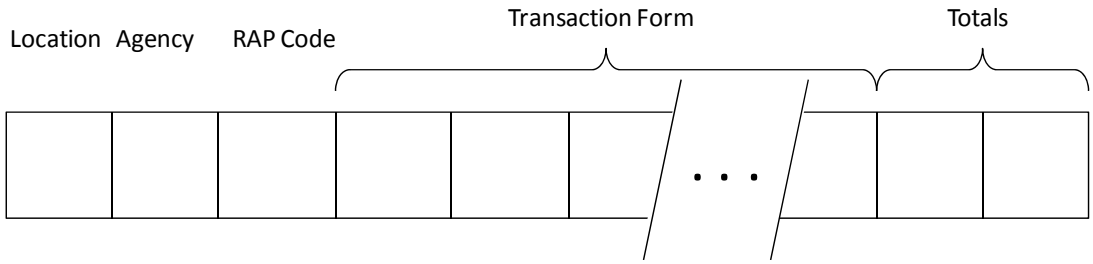


Figure 14: Structure of Transaction Record Provided by ACT Government

The record structure contains 23 columns, the bulk of which are aggregated values, described below:

- **Location:** a two-digit numerical code representing the channel through which the transaction took place, including shopfronts, kiosks, postal mail, and online.
- **Agency:** a three-letter code representing the agency within the government that recorded the transaction.
- **RAP Code:** a six-digit numerical code representing the account to which the transaction was posted in the system. This code was 'translated' by the reference table provided by the ACT Government where each code is correlated with a 30-character description. For the purposes of this analysis, a transaction to an account code was equivalent to a 'Service'—i.e. it was assumed that any transaction represented some part of a service provided by the ACT Government to some entity, including itself (i.e. some other agency with the government).
- **Transaction Forms:** nine different forms of payment are presented with two columns of data for each: one column is the total transactional value for that RAP Code for that month paid in that form through that channel; and the second column is the number of transactions involved in recording that value.
- **Totals:** two columns that accumulate the transactional value and number of transactions for all transaction forms for that RAP Code for that month, through that channel.

Careful inspection of the data revealed that RAP Codes are essentially unique across all agencies (refer to Annex A for details), so the Agency value was redundant for analysis. The Agency value did provide a context when the RAP Codes were coded against the *template-constructs* (discussed further below). The fifteen values of Location were consolidated into five channels as indicated in Table 15. The translation values for the Location Codes were embedded within each worksheet.

The Literal Meanings of the acronyms were interpreted by the author (a long-time ACT resident) and validated with ACT Government representatives.

Table 15: Attribution of ACT Government 'Location' Code to Service Delivery Channel

Location Code	Translation Provided	Literal Meaning	Attributed Channel
1	TSF	Canberra Connect Tuggeranong Shopfront	Shopfronts
2	CSF	Canberra Connect Civic Shopfront	Shopfronts
3	BSF	Canberra Connect Belconnen Shopfront	Shopfronts
4	PALM/ACTIC	Planning and Land Management Service Counter (ACT Information Centre)	Shopfronts
5	PALM/SF	Planning and Land Management Service Counter (Headquarters Shopfront)	Shopfronts
6	REVENUE CSC	ACT Government Revenue Customer Service Centre	Shopfronts
8	PALM/DICKSON	Planning and Land Management Service Counter (Dickson shopfront)	Shopfronts
9	PALM/MITCHELL	Planning and Land Management Service Counter (Mitchell shopfront)	Shopfronts
10	Publications	ACT Government Bookshop	Shopfronts
11	WSF	Canberra Connect Woden Shopfront	Shopfronts
24	Internet	www.canberraconnect.act.gov.au	Internet (&BPay)
26	Australia Post	Any Australia Post outlet	Australia Post
27	AUSTRAPAY	Cheque processing (mail payments)	Postal Mail
28	Austouch	Electronic kiosks operated by the ACT Government in public places	Austouch
29	BPAY	Online payment provider, BPay (www.bpay.com.au)	Internet (&BPay)

5.4.1.3 Advantages and Disadvantages of the Experiment

Before proceding to the analysis of the experiment conducted on the ACT Government data, two key limitations of the experiment must be noted: 1) the experiment relies upon secondary data captured as part of 'normal processing' of ACT Government computer systems rather than primary data captured for the purpose of this research; and 2) the experiment was conducted on data collected some time before final publication of this thesis and not updated since.

As noted by authors in many fields of research (e.g. <Neuman, Cowton, Simonton>), secondary data can have several advantages for research. In particular, in the context of this research, the lower cost of data acquisition (free, in this case), the real-world

nature of the data removing concerns of laboratory effects and extrapolation, and the opportunity to assess data over a considerable timespan countering 'snapshot' limitations, were all powerful advantages of this data source. The experiment sought to test if the proposed segmentation could be applied and, if successful at that level, if any interesting observations arose from the partitioning of the data. The experiment was exploratory rather than being intended to prove some particular theoretical position (other than the applicability of the segmentation). For these reasons, secondary data was considered appropriate for the experiment. Identifying relevant primary data, designing and conducting relevant field experiments, then collating and analysing a more targeted but likely much smaller set of data to achieve the same exploratory end was discarded as too much effort for too little return. Due caution has been applied to the conclusions drawn from the secondary data analysis in recognition of the lack of control over its collection by the researcher.

The experiment was conducted using the collection of data provided by the ACT Government in 2005. The extent of the four-plus (financial) years of data offered sufficient range for the exploration planned at the time that it was conducted. The period was not selected because it was significant; it was simply available. Once the analysis had been conducted and the conclusions (presented below) reached, the research moved on to refining the understanding of the segments and what guidance might arise from them. The research has not attempted to repeat the experiment with more contemporary data (i.e. since 2005) as the exploration served its purpose and the limitations of the analysis (discussed below) suggested that other avenues of research were more valuable. Future analysis of the differences of adoption and activity would be valuable if the application of the segmentation precedes the offering of the services to constituents. Primary data could then be captured about the constituent's adoption, their expectations at the time of adoption, and the effect of segment-guided design changes made. Such primary data would be extremely valuable in 'proving' the merit of the segmentation and its associated design guidance.

5.4.2 Preliminary Data Analysis

To segment the 'Services' represented by the transactions, the short description of each account code was considered in the context of the Agency that owned that code

and marked as one of the four broad groups: 'Business', 'Business/Citizen', 'Citizen', and 'Internal' (refer to Annex A for a more detailed description of all analysis processes). Here 'Citizen' means constituent. The term is used to parallel the 'classic' e-government segments of: Business (G2B), Citizen (G2C), Government (G2G), and Employee (G2E) noted in section 4.2 and rule R 3.1. The coding was validated with expert contacts in the ACT Government who made some small changes to correct misunderstandings. Figure 15 shows the segmentation results from this first step (Number of 'Services' [n] = 415).

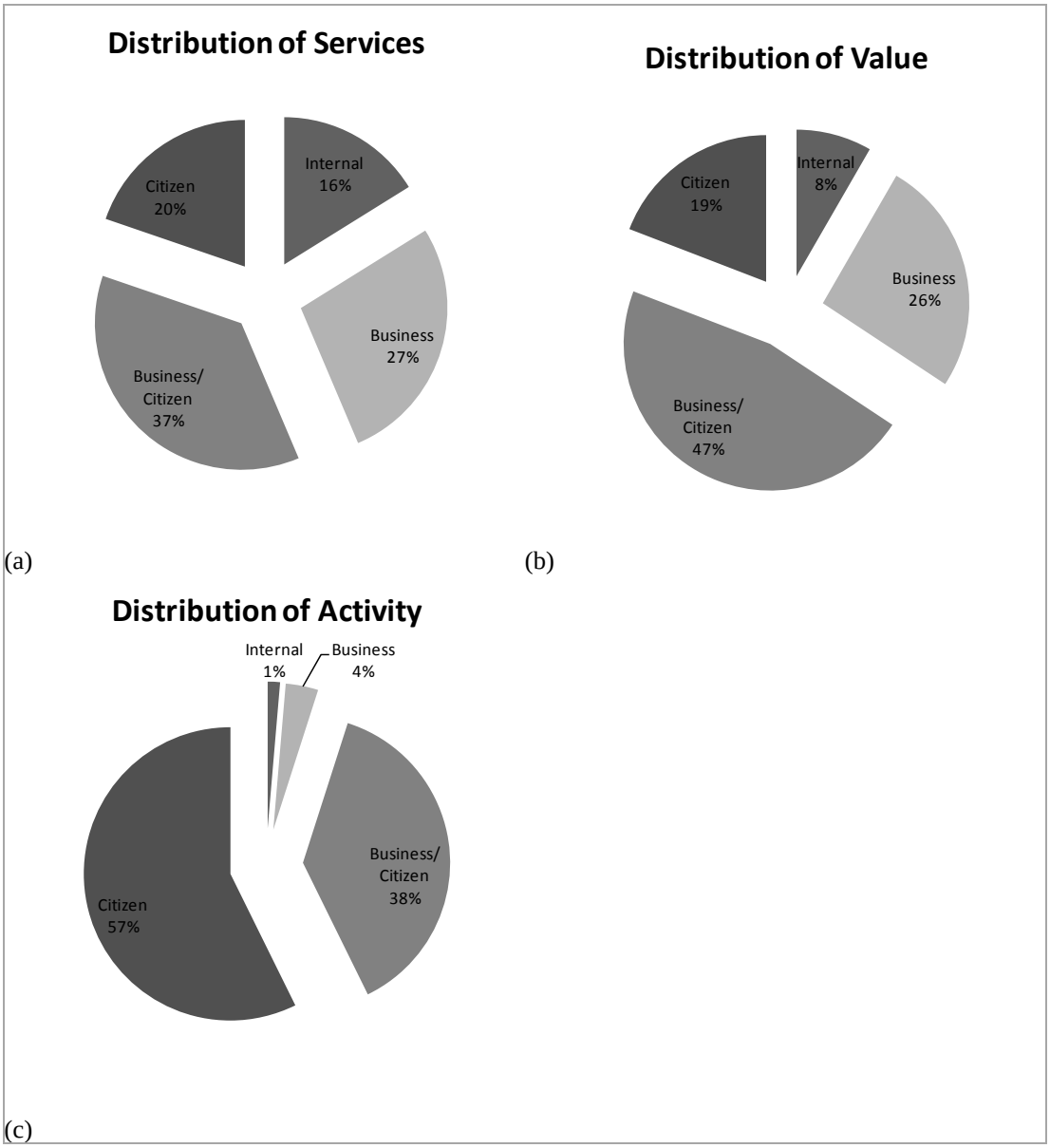


Figure 15: Distribution of Financial Transactions over 'Broad' Segments (Source: project data)

provides an interesting initial analysis point: the distribution of transaction value across the broad segments is not substantially different to the distribution of different types of transaction ('Service') across the segments, but the level of activity (i.e. the number of actual interactions that led to that value of transactions) is dominated by the 'Citizen' segment. In short, the ACT Government appears to transact a large number of small value transactions with 'Citizens' and a smaller number of larger value transactions with 'Business'. Intuitively, this is not a surprising result. It seems most likely that transactions with 'Business' will be tied to regulatory and compliance activities that occur regularly but not frequently during the year. 'Business' fees and charges are also likely to be larger than 'Citizen' fees and charges because of the perceived ability to pay and through tying fee amounts to income or revenue streams. This intuitively unsurprising result also lies on the very boundary of this research's interest and so is not considered further.

5.4.3 'Citizen' Segment Findings and Discussion

The 30-character description of the 234 'Services' that were identified in the 'Citizen' and 'Business/Citizen' segment were considered by three researchers (the author and two students). The description was read, the characteristics of the 'Service' inferred from the description within the context of the Agency offering it, and the researcher's judgement of which end of each *template-construct* applied was recorded. The assessments were recorded in a table where the 'Services' were rows and there was a column for each end of each *template-construct;* the numeral one represented that the *template-construct* end applied to that 'Service'; a numeral zero represented that it did not. The results of the coding by all three researchers were compared and the few discrepancies in measurement were discussed and resolved by consensus. These *template-construct* measurements were then interpreted according to

Table 16 (Table 44 in Annex A presents the coded ‘Services’).

Table 16: Market Segmentation Filter Rules as *template-construct* measurements

Narrow Segment	Interactions		Differentiation		Reliance on Government	
	Single	**Multiple/ Repetitive**	**Commodity/ Menu**	**Tailored**	**None**	**Complete**
Customer	1	0	1	0	1	0
Customer	0	1	1	0	1	0
Client	1	0	0	1	1	0
Client	0	1	0	1	1	0
Citizen	1	0	1	0	0	1
Citizen	1	0	0	1	0	1
Subject	0	1	1	0	0	1
Subject	0	1	0	1	0	1

5.4.3.1 Market Segmentation Filter Rules – Necessity of Template-Constructs

Proposition 3 asserts that the combination of measurements on three of the *template-constructs* is necessary to determine the relevant segment; the Market Segmentation Filter Rules. The discussion that introduced the *template-constructs* established that all three constructs were characteristics of services that could be used identify to which segment the service belonged; indeed, that was their purpose. Importantly, that same discussion established that the segments could be identified by combinations of only two *template-constructs*, but that all three were ultimately used to identify all four segments. The coding of real government services using the *e-Government Service Characteristics Template* offers the opportunity to test these assertions.

Table 17 details the number of times each end of the Differentiation *template-construct* is coded with each value in the Interactions *template-construct.* Table 17 indicates that there is a preponderance of Single-Commodity/Menu encodings. This may be explained by the fact that the services are constrained by financial transactions (the source of the data), rather than a broader selection of government services. The result also arises from the high proportion of retail transactions differentiated by transaction value or product characteristic (further detail is presented in Annex A).

Table 17: Cross-tabulation of *Template-construct* Values in 'Service' Coding (Source: project data)

Reliance on Gov't: None	**Differentiation**		
	Tailored	**Commodity /Menu**	
Multiple/ Repetitive	9	6	**15**
Single	7	124	**131**
	16	**130**	

Reliance on Gov't: Complete	**Differentiation**		
	Tailored	**Commodity /Menu**	
Multiple/ Repetitive	17	6	**23**
Single	19	46	**65**
	36	**52**	

Table 17 indicates that the allocation of services to segments would be virtually identical if either *template-construct* were used alone when the measure on the Reliance on Government *template-construct* is set to 'None' (row totals closely approximate column totals) because of the huge majority of Single-Commodity/Menu items. When the Reliance on Government *template-construct* value is set to 'Complete', there is a difference in the allocation of the transaction to segment (row totals are not closely approximate to column totals). When building the Market Segmentation Filter Rules (Ruleset RS 5) based on the *e-Government Service Characteristics Template* (Ruleset RS 4) I have chosen to rely on measurements on either the Interactions or the Differentiation *template-constructs* depending upon the 'measurement' on the Reliance on Government *template-construct*. Reviewing Table 17 in this light reveals that, in fact, the Differentiation *template-construct* is not influential in segment determination because it does not significantly affect segment identification when there is No Reliance on Government, and it is not considered (according to earlier discussion) when there is Reliance on Government. Hence, the Differentiations *template-construct* is not necessary for the Market Segmentation Rules Filter to operate as proposed. Consequently, Proposition 3 is not upheld as stated and is re-framed as:

P3' The combination of 'measurements' on two template-constructs (Interaction and Reliance on Government) within the e-Government Service Characteristics Template presented in the filter is necessary to uniquely determine a segment for each e-government service.

These findings also mean that

Table 16 is reframed as Table 18. Importantly, the values shown for the Interactions *template-construct* against *Customer* and *Client* are drawn from the corresponding settings of the (now found to be unnecessary for segment filtering) Differentiation *template-construct*.

Table 18: Market Segmentation Filter Rules as template-construct measurements (Revised)

Narrow Segment	Interactions		Reliance on Government	
	Single	Multiple/ Repetitive	None	Complete
Customer	1	0	1	0
Client	0	1	1	0
Citizen	1	0	0	1
Subject	0	1	0	1

With these amendments, the coding of the data from the ACT Government supports Proposition 3' and the Market Segmentation Filter Rules are implemented as presented in Table 18.

5.4.3.2 Market Segmentation Filter Rules – Sufficiency of Template-Constructs

The same argument can be made when considering Proposition 4. The minimum number of *template-constructs* needed to identify all four segments is two (Interactions and Reliance on Government). As the *template-constructs* are binary concepts (i.e. two-ended dimensions), this also represents the minimum number of *template-constructs* that could suffice to identify four segments. Consequently, Proposition 4 is also re-written as:

P4' The combination of 'measurements' on two template-constructs (Interaction and Reliance on Government) within the e-Government Service Characteristics Template presented in the filter is sufficient to uniquely determine a segment for each e-government service.

The application of the Market Segmentation Filter Rules post-hoc to ACT Government transaction data has helped to refine those Filter Rules. Although four *template-constructs* are proposed in the e-Government Service Characteristics Template, only two are needed to filter government services into the four proposed market segments. This does not invalidate the other two *template-constructs*; they

remain useful in e-government service design, as will be illustrated in Chapter 6. There are necessary amendments to two rules (R 5.1 and R 5.2) within Ruleset 5. The whole Ruleset with modifications is repeated here for clarity.

RS 5 Market Segmentation Filter Rules

R 5.1 A customer service is identified by the combination of service characteristics of 'Single' level of Interactivity and 'No' Reliance on Government for service efficacy.

R 5.2 A client service is identified by the combination of service characteristics of 'Multiple/Repetitive' level of Interactivity and 'No' Reliance on Government for service efficacy.

R 5.3 A citizen service is identified by the combination of 'Single' level of Interactivity and 'Complete' Reliance on Government for service efficacy.

R 5.4 A subject service is identified by the combination of 'Multiple/Repetitive' level of Interactivity and 'Complete' Reliance on Government for service efficacy.

Having refined the Market Segmentation Filter Rules and segmented the ACT Government transactions into the proposed market segments, we now turn to validating that such segmentation is useful in the manner of market segments generally; i.e. in separating constituents into (more) homogenous groups to allow more accurate targeting of services to them.

5.4.4 Identifying Relationship Style in the Segments

The analysis of the *template-constructs* above has resulted in the re-casting of Propositions 3 and 4 to reflect the need for only two *template-constructs* to underpin the Market Segmentation Filter Rules. The dimensions of the Frequency of Interaction *template-construct* can also identify whether a segment is of a Transactional or Relational nature (Li *et al.*, 2006). Interactions that occur in a single instance imply a Transactional relationship; there is no interest in remembering earlier interactions and so no relationship is needed, nor has it time to form. This is supported by the coincidence of 'Single' Frequency of Interaction and 'Commodity/Menu' Differentiation that has now been established. These characteristics are definitive for the *Customer* and *Citizen* segments. In contrast, interactions that frequently involve multiple and/or repeated interaction to achieve the objective imply Relational relationships; characteristic of the *Client* and *Subject* segments. Again, the coincidence of 'Multiple/Repetitive' Frequency of Interaction

and 'Individually Tailored' Differentiation is supportive of a Relational relationship. The necessity of the involvement of the government in the interaction continues to be definitive for identifying segments. Table 19 presents a coalescing of this information as an alternate view of the revised Market Segmentation Filter Rules.

Table 19: Translation of e-Government Service Characteristics *Template-Constructs* to Relationship Style

			Reliance on Government	
Frequency of Interaction	**Differentiation**	**Relationship Style**	**None**	**Complete**
Single	None	**Transactional**	Customer	Citizen
Multiple/Repetitive	Indiv'ly Tailored	**Relational**	Client	Subject

Re-defining the segments into this form provides a useful alternative view for the purposes of considering the interactions between constituents and government. The use of this perspective is discussed in more detail in the next chapter.

5.5 Homogeneity Within, and Disparity Between, Segments

I have now established that the segmentation has validity in the marketing literature and that two *template-constructs* in the *e-Government Service Characteristics Template* are necessary and sufficient to distinguish between the segments. The next propositions to test are those that demonstrate a usefulness of the segmentation:

P5. e-Government services identified as belonging to a particular segment using the filter have similar usage patterns to other services in the same segment

P6. e-Government services identified as belonging to a particular segment using the filter have different usage patterns than services belonging to a different segment

Testing these propositions will draw on the same experimental data and analysis described above; however, the focus will narrow to only the data and analysis of 'services' aimed at the broad 'Citizen' segment. That is, analysis will now focus within one of the 'classic' e-Government market segments (Rule R 3.1 refers) and investigate the segments proposed as a refinement of that broader group (Rule R 3.2). Figure 16 shows the segmentation results from this second step (Number of 'Services' [n] = 234).

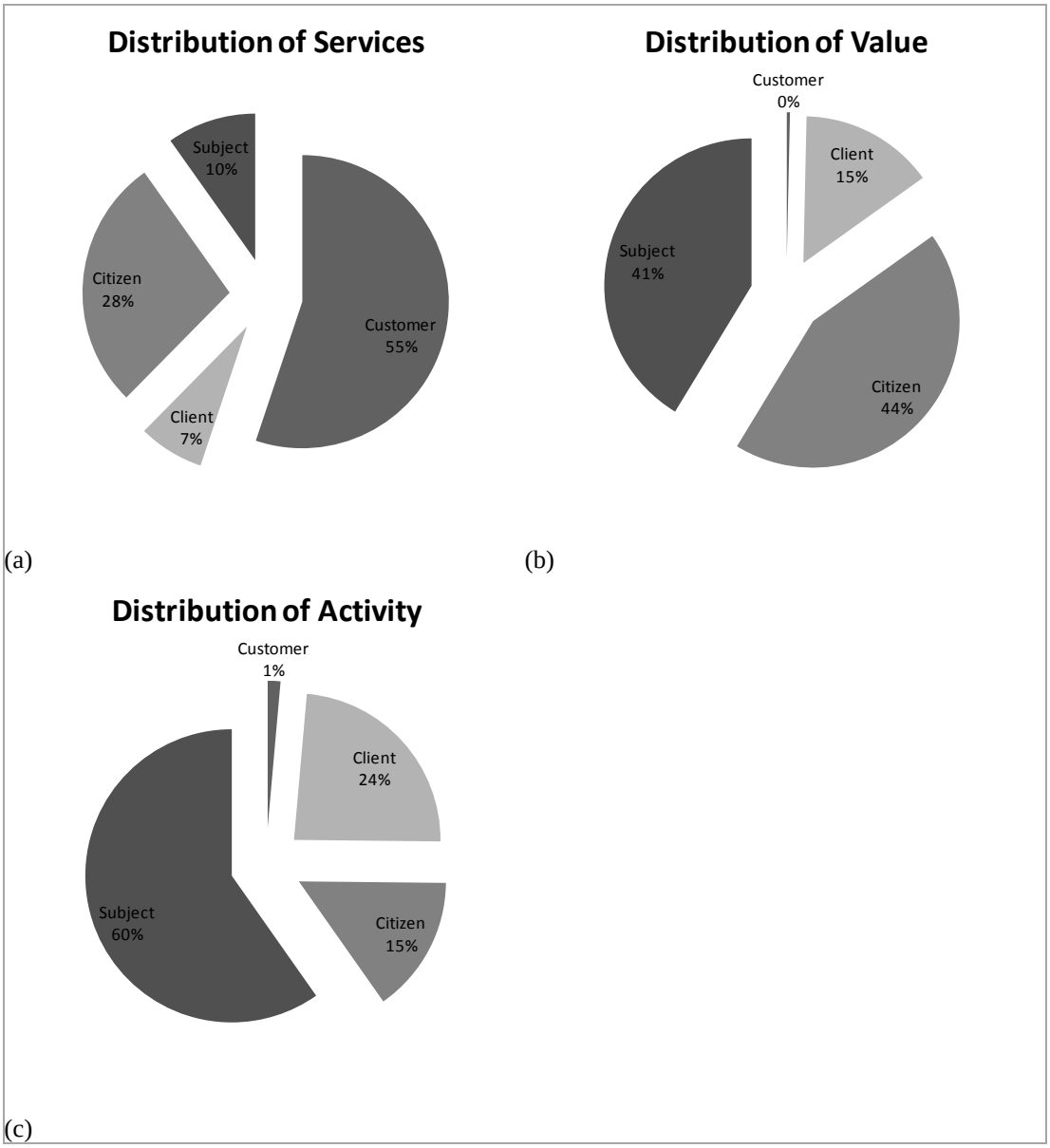


Figure 16: Distribution of Financial Transactions over 'Narrow' Segments (Source: project data)

Figure 16 reveals some interesting characteristics in the data distributions across the narrower segments. Firstly, the distribution of 'services' (Figure 16a) indicates that a high proportion of services are aimed at the *Customer* segment. The high number of codes associated with *Customers* results from a high-level of refinement of various 'commercial-like' transactions (e.g. sales of different sizes of aerial photograph, individual codes for each national park entry, retail activity and other items), whereas codes assigned to other segments tend to be more general. However, the distributions of value and activity (Figure 16b, c) indicate that *Subject* transactions are dominant. This is probably not surprising as *Subject* transactions are obligatory and include

payment of rates, fees and other government imposts and the data records only financial transactions.

5.5.1 Analysing Behaviour in Transaction Activity Patterns

Proposition 5 is based on one of the principles of market segmentation (Haley, 1981; Rossiter, 1985; Smith, 1972); that characteristics of members of the segment are more homogenous than characteristics of members in different segments. To investigate this proposition, we will consider only the data that is encoded within the four narrower segments and look at the record of activities against services over the period for which data is available (July 2000 – June 2004). (Recall from Figure 13, page 129, that the ACT has a generally higher level of computer access and Internet usage than any other area in Australia.) The accumulated activity (number of transactions) in each segment for each month of that period (regardless of which channel) is shown in Figure 17.

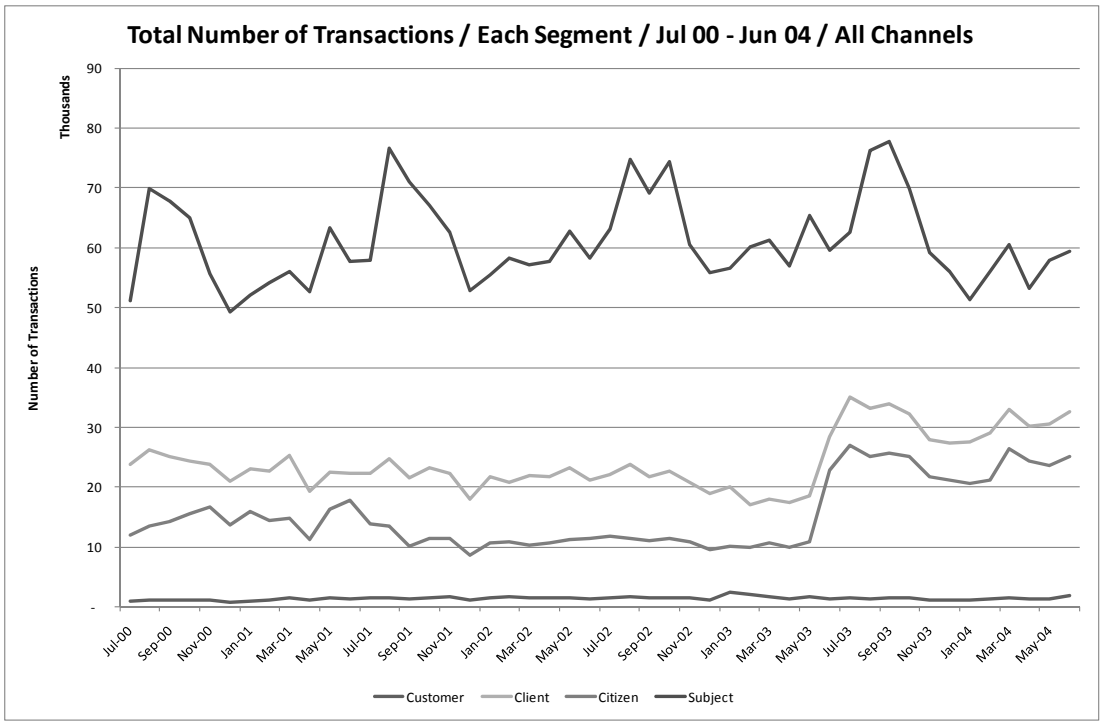


Figure 17: Total Transaction Activity of each 'Citizen' Segment, by Month, Jul 2000 – Jun 2004 (Source: project data)

The recording of transactions on a monthly basis over several years leads inevitably to a time-series collection of data. Figure 17 uses transaction activity to illustrate the time-series nature of the data available. The dominance of activity in *Subject* transactions was described above. The regular (seasonal) shape of the *Subject* graph,

particularly the peak immediately following the end of each financial year, is indicative of the types of transactions *Subjects* undertake.

Inspection of Figure 17 shows that there are clearly differences in activity levels between the segments and that the *Subject* segment is dominant. Visually there are some indications that the segments have different activity profiles over time (a first indication of support for Proposition 6, discussed further below). The sudden climb in transaction activity in June 2003 warrants a special note. Inspecting the data at a transaction code level across the time periods when these 'drifts' occurred in the *Client* and *Citizen* segments revealed that new transactions were introduced with substantial activity. The new transactions in each segment were related to new road levies or payments required from legislation that took effect in June 2003. At this level of accumulation, though, nothing can be said of the homogeneity of services within a segment.

Turning our attention to the differences between the proposed segments, there is some clear evidence that the segments are worth investigating. If the segments represent different statistical populations, then incidental correlations of activity by different segments would not automatically negate claims of differential responsiveness; some larger 'force' might bring correlation among disparate (statistical) populations. The emphasis on *statistical* populations is important; there is no question that all activities recorded came from the same human population. As we are using a benefit segmentation based on 'expectations at time of interacting', separate statistical populations are expected to exist within a single actual populace.

The *Client* and *Citizen* segments' activity levels, which are otherwise relatively stable over time, increase sharply in June and July 2003. A similar graph of total transaction value (dollar amount) does not display this same 'drift'. This reflects that in June 2003 the nature of transactions in these segments changed resulting in a lower average transaction value. The *Customer* graph also shows a small 'drift' in January 2003. This is discussed in more detail later.

My segmentation involves the intent in the mind of the user at the time of interaction. Consequently, homogeneity would be expected in reactions to stimuli (response to design approaches) and in behaviour or use of services adopted. In this post-hoc application of the segmentation to ACT Government financial transactions data, the

only means available of testing for the homogeneity of behaviour implied by homogeneity of intent is to consider the pattern of transaction activity. That is, does the pattern of use of services within segments demonstrate homogeneity when compared with the pattern of use of service across segments?

Statistical analyses for homogeneity generally work better on larger samples of data (Lee, 1996; Mason & Lind, 1993). The size of the data sample raises an important limitation. When the 'services' coded for the narrow market segments are grouped by segment and filtered for 'services' with activity over the entire time-span (48 months), the data becomes sparse, illustrated in Table 20. Some very unusual characteristics are then found in this sparse data; for example, only 13 *Subject* 'services' account for the bulk of the 70,000 transactions each month (Figure 17). In fact, inspecting this data more closely reveals that the vast bulk of those transactions fall to two 'services': RAP Code 41000 – General Rates, and RAP Code 21000 – Dog Renewals(!) (see Figure 39, page A15, in Annex A). Furthermore, this data represents transactions across all channels. If the data were further refined for only the online channel, virtually no 'services' would be 'continuous' over the period for any of the segments (refer to Figure 18, page 150).

The transaction activity data for each 'service' that had continuous activity recorded was extracted for further analysis. Continuous activity was interpreted to mean some number of transactions was coded in each month of the data across the entire 48-month period. This removed some 'services' that had relatively high levels of activity but were introduced during, or ceased during the time considered. It also included some 'services' where transaction activity was rarely or never more than 10 transactions during a month and included some months where no activity was recorded. In these cases, no activity in a month was not considered anomalous or a termination of the offering of or interest in that 'service'.

Table 20: Number of 'Services' in Each Segment with Certain Activity Characteristics (Source: project data)

Segment	Total	With Continuous Activity in Period*	Less than 100 Transactions in Period	No Activity Recorded
Customer	130	27 (21%)	85 (65%)	26 (20%)
Client	16	7 (44%)	7 (44%)	4 (25%)
Citizen	65	27 (42%)	29 (45%)	11 (17%)
Subject	23	8 (35%)	10 (43%)	7 (30%)

* Includes 'services' with such low numbers of transactions per month (i.e. under 10) that single months of no activity occasionally are not anomalous.

The analysis of the data looking for homogeneity with segments proceeded along the following lines: visual inspection of the transaction levels for all 'services' in each segment; adjustment of data to seasonal indexes and re-inspection of relative transaction levels; and calculation of the level of seasonality of 'services' within each segment and comparison of that measure within and across segments. Refer to Annex A for a detailed discussion of the analysis.

Visual inspection (Figure 39 to Figure 42, Annex A) indicated that, although some interesting patterns of transactions occur in the different segments, no segment demonstrates a particular or over-riding pattern that might imply a strong behavioural predisposition of constituents when acting in that segment. Part of this lack of visual commonality is the wide distinction between the levels of activity in different 'services'; some 'services' record thousands, and even tens of thousands, of transactions each month, where others might record a mere handful. Consequently, further analysis was undertaken to investigate if re-basing the data to a common range would reveal common patterns.

The 'services' that had continuous activity in each segment were then treated to create a 12-month seasonal index for each segment following the procedure recommended by Mason and Lind (1993). Seasonal indexes offer the opportunity to compare transaction levels across 'services' regardless of their actual transaction level. Again, visual inspection (Figure 43 to Figure 46, Annex A) suggests that there are some interesting activity levels but little can be said about a level of consistency in the seasonal characteristics of transaction activity among 'services' in a segment.

A final analysis was applied to the data in an effort to determine homogeneity among 'services' within a segment and disparity between segments. Using Lee's (1996)

approach, the seasonal indexes for each 'service' were ordered from smallest to largest and a Lorenz curve plotted. In this analysis, the Lorenz curve was demonstrating the extent to which the transaction activity for the service was affected by seasonal factors; i.e. the extent to which activity levels varied according to the time of year; the more bowed (concave) the Lorenz curve (i.e. the further from a straight-line diagonal), the more seasonally-affected the transaction activity for the 'service'. The plotting of multiple Lorenz curves on a single chart does not offer significant visual assistance. However, Lee (1996) also describes the Gini index, which is a measure of the 'bowedness' of the Lorenz curve. This offers a single statistic to represent the extent to which any given 'service' demonstrates seasonal effects. Lee (1996) shows this statistic to be quite powerful and at least equivalent to the best seasonal statistical identifiers.

So, the Gini index for each service was calculated. Table 21 reports the descriptive statistics (to four significant digits) for the resulting data calculated using SPSS v13.0.

Table 21: Descriptive Statistics for Gini Index Data for 'Continuous' Services in Segments (Source: project data)

Segment	N	Mean	Std. Dev.	Variance
Customer	27	0.1668	0.1136	0.013
Client	7	0.1396	0.0960	0.009
Citizen	27	0.1137	0.0808	0.007
Subject	8	0.0879	0.0606	0.004
Total	**69**	**0.1341**	**0.0973**	**0.009**

A one-way ANOVA was conducted using SPSS v13.0 to test whether the Gini indexes within segments were more similar than between segments. Table 22 shows the results of this test.

Table 22: One-way ANOVA results for Gini Indexes of Seasonal Indexes of 'Services' (Source: project data)

Gini * Segment	Sum of Squares	df	Mean Square	F	Sig.
Between Groups (Combined)	0.060	3	0.020	2.145	0.103
Within Groups	0.610	65	0.009		

Clearly, with an F-statistic only significant at the 0.1 level, there can be no statistically-significant correlation found between a 'service' appearing in a segment and its Gini index. SPSS also reports an Eta-squared value of 0.090. This common

effect size indicator suggests that the segment explains only 9% of the variance in Gini value.

Lee (1996) warns that the power of the Gini index is reduced when the sample size that creates the Lorenz curve is small. Reflecting on the activity levels of many of the 'services' included in the analysis, and the frequently wild seasonal index fluctuations of 'services' with low levels of activity, the one-way ANOVA test was repeated on a subset of the Gini indexes. The subset was determined by selecting 'services' that had transaction levels in each month in at least the hundreds of transactions. This removed some 42 'services' from the ANOVA calculations. The second ANOVA test produced an F-statistic of 0.178 with a significance level of 0.911. Clearly, the data was essentially uniform across the segments by this stage.

Thus far, the data available is not able to substantiate Propositions 5 or 6. There are, however, serious weaknesses in the data set for testing these propositions; the most problematic is that financial transaction data is standing-in for data on user behaviour. Also, the number of 'services' for which a robust set of data can be identified (i.e. spanning the 48-month period) is very limited (only 69 of 234 in the overall dataset).

The assumption that expectations of interactions would translate to identifiable homogeneity in the seasonality of 'service' use is also problematic. Some government services are rigidly seasonal (e.g. rent payments, rate payment, tax returns) where others have no such rigid schedules. Indeed, the seasonality of service use is more likely to be a characteristic of the service than of the expectations of the constituent using the service. Consequently, the failure of this analysis to establish homogeneity of interaction use within segments cannot be attributed to the idea underlying the segmentation; i.e. constituent expectations. In light of these weaknesses in this analysis, a consideration of the secondary demonstration of behaviour in the transaction data is warranted.

5.5.2 Analysing Behaviour in Adoption of Interaction Channels

A key aspect of the data made available was the ability to distinguish transactions through different government channels. The data was classified by channel and the differences in activity across channels of the different segments were considered.

As described above, the ACT Government data was encoded to include the channel through which the financial transaction took place. This offers a secondary opportunity to investigate indications of behavioural patterns in the financial data, the use of different channels to conduct transactions. This is particularly relevant in the context of e-Government as indications of different rates of adoption of online services in different segments would be a powerful reason for implementing the segment in e-Government service design. The different Location Codes were classified according to which broad channel they represented (Table 23).

Table 23: Classification of Location Codes into Channels (Source: project data)

Location Code	Translation Provided	Channel
1	TSF	Shopfront
2	CSF	Shopfront
3	BSF	Shopfront
4	PALM/ACTIC	Shopfront
5	PALM/SF	Shopfront
6	REVENUE CSC	Shopfront
8	PALM/DICKSON	Shopfront
9	PALM/MITCHELL	Shopfront
10	Publications	Shopfront
11	WSF	Shopfront
24	Internet	Online
26	Australia Post	Shopfront
27	AUSTRAPAY	Post
28	Austouch	Online
29	BPAY	Online

The activity for each ‘service’ was consolidated by channel; however, this straightforward analysis did not offer meaningful insights (refer to Annex A for more detail). The only definitive finding that can be described is that the use of the postal service to send cheques to the government for payment diminished substantially over the time considered; *Subjects* continue to use this channel though. The Shopfront was the dominant channel in all segments and overall.

In an effort to overcome the limitations of the data, the previously identified ‘continuous’ services in each segment were extracted with their corresponding levels

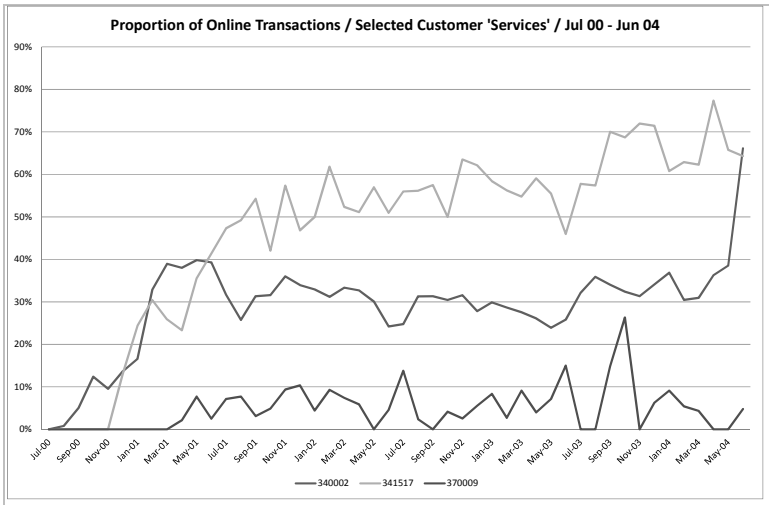
of activity in the online channel. Table 24 shows the extent to which those 'continuous' services had online channel activity.

Table 24: Number of 'Services' in Each Segment with Online Channel Activity (Source: project data)

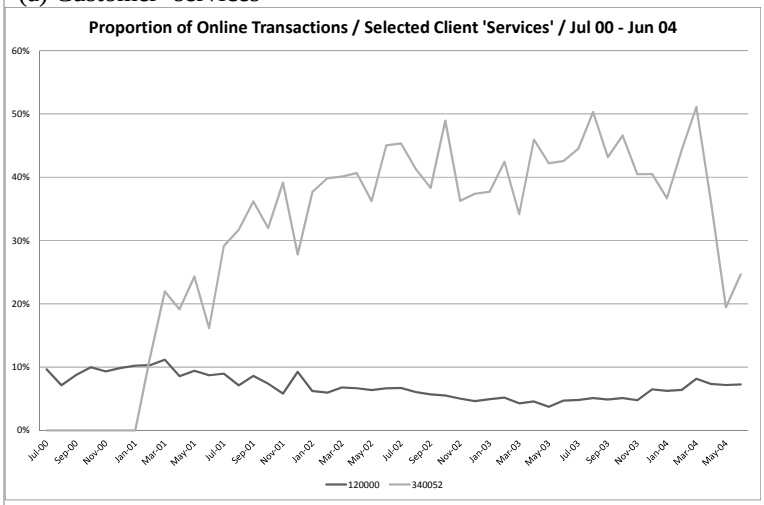
Segment	Total	With Continuous Activity in Period	With Online Channel Activity in Period
Customer	130	27 (21%)	3*
Client	16	7 (44%)	2
Citizen	65	27 (42%)	5*
Subject	23	8 (35%)	3

* Each of these segments had one other 'service' with some online channel activity but the number of transactions was so low and infrequent that they were dropped from this analysis.

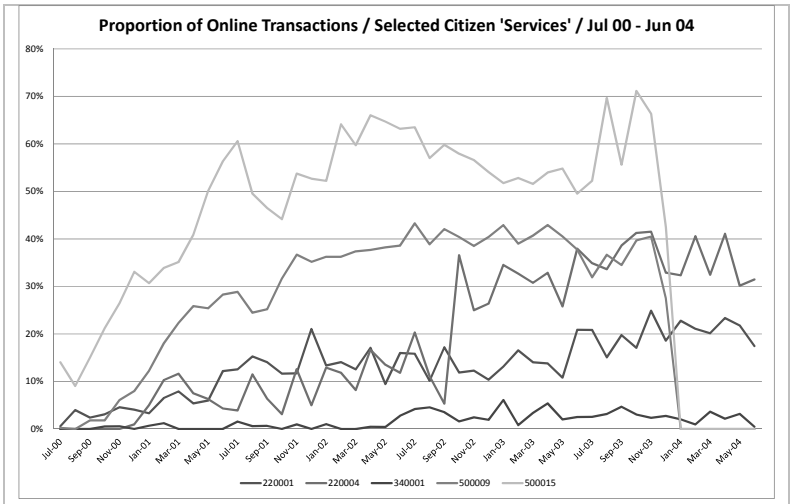
Figure 18 presents the results of plotting the proportion of online channel use for these 'continuous' 'services'.



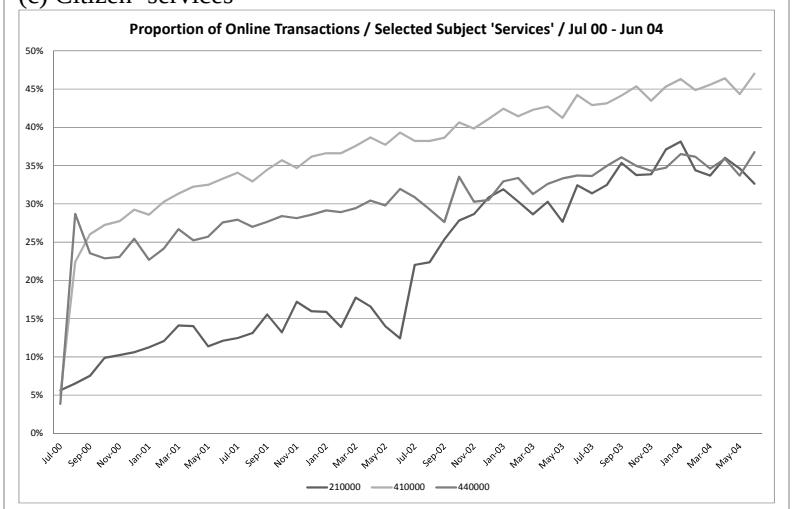
(a) Customer 'services'



(b) Client 'services'



(c) Citizen ‘services’



(d) Subject ‘services’

Figure 18: Proportion of Online Transactions for 'Continuous' 'Services' in each Segment (Source: project data)

Figure 18 displays some unexpected visual artefacts of the data underlying the graphs. Larger versions of these graphs are presented in Annex A, Figure 51 to Figure 54 along with more detailed discussion. In short, the apparent anomalies are data artefacts rather than useful indications of adoption changes. Overall, inspection of these sparse samples indicates that there is a general trend to adopt the online channel over time. That trend is strongest in the *Subject* segment.

5.5.3 Summary of Analysis of Behaviour

The data provided by the ACT Government involved the aggregate records of financial transactions on a monthly basis. This data is inherently limited for the use to analyse behaviour of users of e-Government services. However, the data was sufficiently granular to allow two inspections seeking evidence of patterns in the

transaction activity that might reflect differences in patterns of behaviour of different segment users.

The first inspection was simply whether the patterns of activity of 'services' in each segment were more similar to each other than they were to the patterns of 'services' in other segments. A number of alternative approaches were used to ensure that a careful inspection of the data was made. In that analysis, the number of 'services' over time changed sufficiently often in each segment that no overall analysis could be seen as reliable. When only those services in each segment that were active for the entire period were identified and analysed separately, two further weaknesses emerged: the number of such services in all segments was small (inhibiting analytical power) and the difference in transaction activity levels in different 'services' in each segment (orders of magnitude differences) made comparisons difficult. Re-basing the relevant data to seasonal indexes continued to reflect the difficulties of widely ranging transaction activity levels. Isolating only those with sufficiently high levels of transaction activity reduced the sample sizes even further. Ultimately, nothing certain could be determined from the data using this analysis approach.

The second inspection relied on the coding of transactions being through a particular channel of interaction. Using this classification, the 'services' were again inspected seeking patterns that might be common within segments and different across segments. The data was captured during the period July 2000 and June 2004. At that time, there were only limited online service offerings from the ACT Government. Consequently, not all 'services' reflected adoption of channels other than the shopfront. By the time the transaction data for 'services' with continuous activity over the period under consideration with channel activity beyond the shopfront were extracted, sample sizes were very small and the analytical power consequently very limited. Again, nothing certain could be determined from the data using this analysis approach.

5.5.4 Conclusions on Propositions 5 and 6

With the very limited power of the analysis available because of the nature of the data available, there is no evidence to support Propositions 5 or 6; nor is there sufficient evidence to refute them. Data sources that provide insights into use of web sites, such as repeat visits, length of stay, and other activity-based data (e.g. from

Google Analytics [www.google.com/analytics/]) might have offered more directly useful behavioural data but were unavailable at the time of data collection and analysis. Demonstrating the correctness of Propositions 5 and 6 must, then, pass into further research work.

There are lessons that can be drawn from this analysis to inform that future work, specifically:

- Using only financial transaction data to analyse user behaviour is unreliable and should really only be a last resort;
- The variety of services that might legitimately fall within each segment may compromise narrow definitions of homogeneity; for example, it may only be possible to say that services in some segments are more cyclical in activity levels (e.g. *Subject*) than others (e.g. *Customer*) rather than to say that services within a segment all follow a certain type of activity pattern; and
- Specific data collection is probably necessary to establish whether there are behavioural similarities within segments and difference across segments.

Future research in this area might be productive seeking to measure the following elements of user interaction with e-government services:

- Cross-channel activity – in spite of there being insufficient data to be conclusive, there were some indications in the very small samples that the *Subject* and *Client* services might have more propensity to adopt online service offerings than the other segments; this should be explored in more detail.
- The directness of navigation to the e-service – i.e. to what extent does the constituent surf around the government website before engaging in the service? – for example, the navigation paths to services for *Subjects* ought be quite direct as they are necessary or mandatory elements of an on-going relationship where those taken to *Customer* services might involve quite a bit of research before the service is engaged.
- Adoption of pre-programmed interactions (e.g. direct debit offerings) – the sense that interactions in the *Subject* and *Client* segments are part of an on-going relationship ought to pre-dispose constituents to signing up for automated payments, and *Subjects* more so than *Clients*; *Citizens* and *Customers* ought to be less likely to commit to such things.

Chapter 6 APPLYING THE SEGMENTATION

6.1 Introduction

A crucial part of establishing that a design theory is useful is evaluation through practice (Peffers, *et al.*, 2008). Ideally, this practice would involve applying the conceptual framework developed here to e-government service design. Unfortunately, the opportunity for direct application has not been available to this researcher, in spite of working on such projects before commencing this research work. Recall, though, that I have socialised the central thrust of this thesis and its application with e-government practitioners with positive responses, as discussed in section 5.3. Nonetheless, I am conscious of Heeks and Bailur's (2006) image of throwing rocks into a pool rather than building cairns of knowledge. So, believing that there are ways of illustrating the power of the framework for guiding design decisions drawing on the academic literature, this chapter presents three examples of the use of the framework to guide design decisions.

First, a small set of specific local government service processes are reviewed in light of the segmentation and the subtlety of the design decisions that the segmentation offers is demonstrated. This offers an example of the framework in direct action, illustrating the basics of its application by practitioners.

Second, the segmentation has two dominant themes that define the segments: the nature of the relationship between the government and the constituent as enacted by the service; and the need for the government to be involved for the interaction to exist. The relationship dimension offers a means to further refine existing thinking on how to encourage adoption of e-government services among constituents. As encouraging adoption was the primary driver of this research, this section represents an important application of the segmentation. It was this theme that dominated my presentations to e-government practitioners in Queensland.

Finally, the necessity of the government for some interactions to exist brings specific requirements into the design of services because of the 'publicness' of the government. These requirements and their implications are also discussed. Exhibit 9

locates the contribution of this chapter in the overall thesis and the development of the artefact.

Exhibit 9: Design Research Elements with Highlighted Current Element (based on \Peffers, *et al.*, 2008, pp. 52-56)

Design Process Element	**Brief description**
Problem identification and motivation	Define the specific research problem and justify the value of a solution.
Objectives of a solution	Infer the objectives of a solution from the problem definition and knowledge of what is possible and feasible. The objectives can be quantitative or qualitative.
Design and development	Create the artefact, which can be any designed object in which a research contribution is embedded in the design. Arguably, there is a theory embedded in the design parameters.
Demonstration	Demonstrate the use of the artefact to solve one or more instances of the problem. This could involve its use in experimentation, simulation, case study, proof, or other appropriate activity.
Evaluation	***Observe and measure how well the artefact supports a solution to the problem; comparing the objectives of a solution to actual observed results from the use of the artefact.***
Communication	Communicate the problem and its importance, the artefact, its utility and novelty, the rigor of its design, and its effectiveness to research and other relevant audiences.

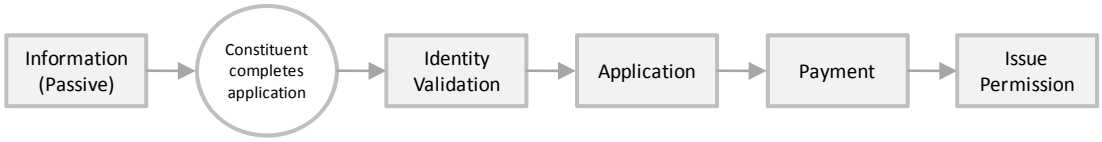
6.2 Example Service Design Decisions Guided by Segments

This design science artefact was developed to influence service design decisions for e-government services, with particular attention to delivery over the Internet. This section demonstrates its application on a small sample of local government services to illustrate its usability. Drawing further on my work with ALGA and LGAT (see page 79), Figure 19 presents high-level process flows for eight typical (local) government processes.[8]

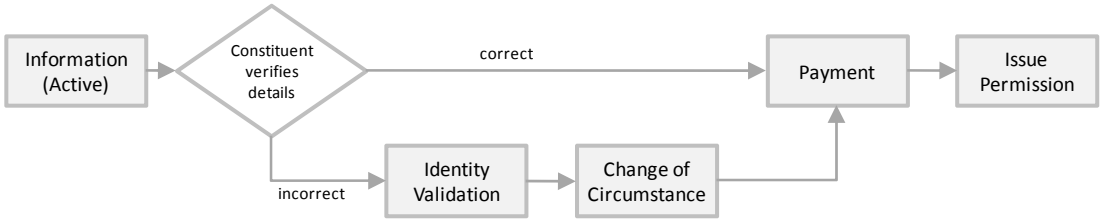
[8] These processes, though drawn from real process maps provided by the Local Government Association of Tasmania (LGAT) to the author in 2004, are only indicative of real government processes in Australian (local) government.

6.2.1 Applying the Model

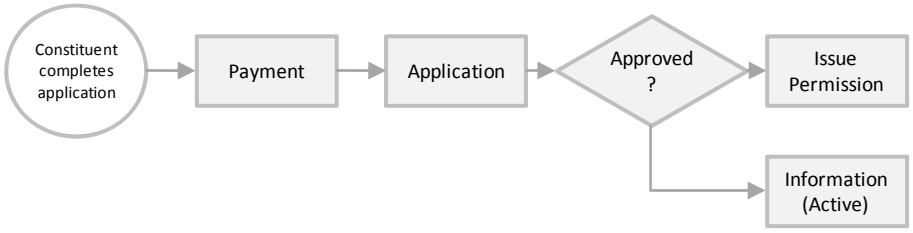
Dog Registration



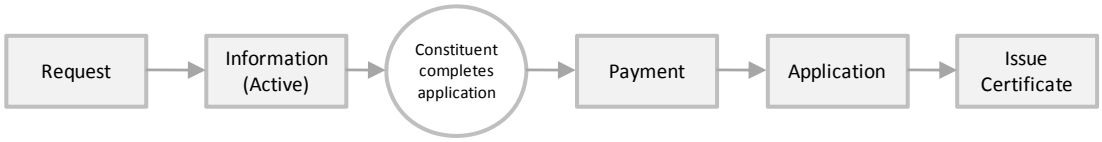
Dog Registration Renewal



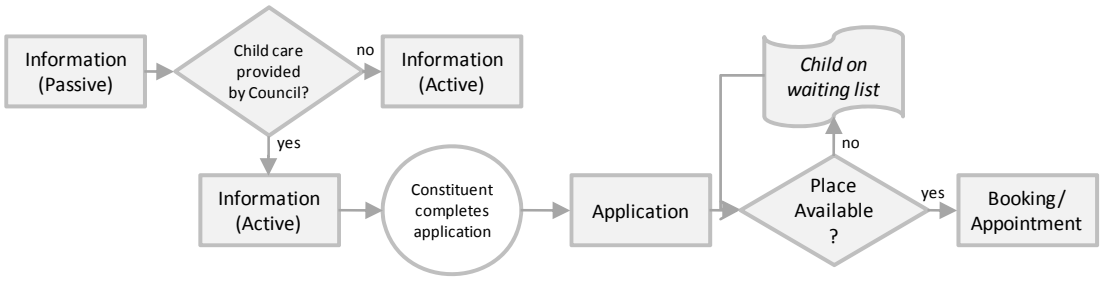
Application for Land Use Certificate



Issue Title Ownership Certificates



Request for Child Care



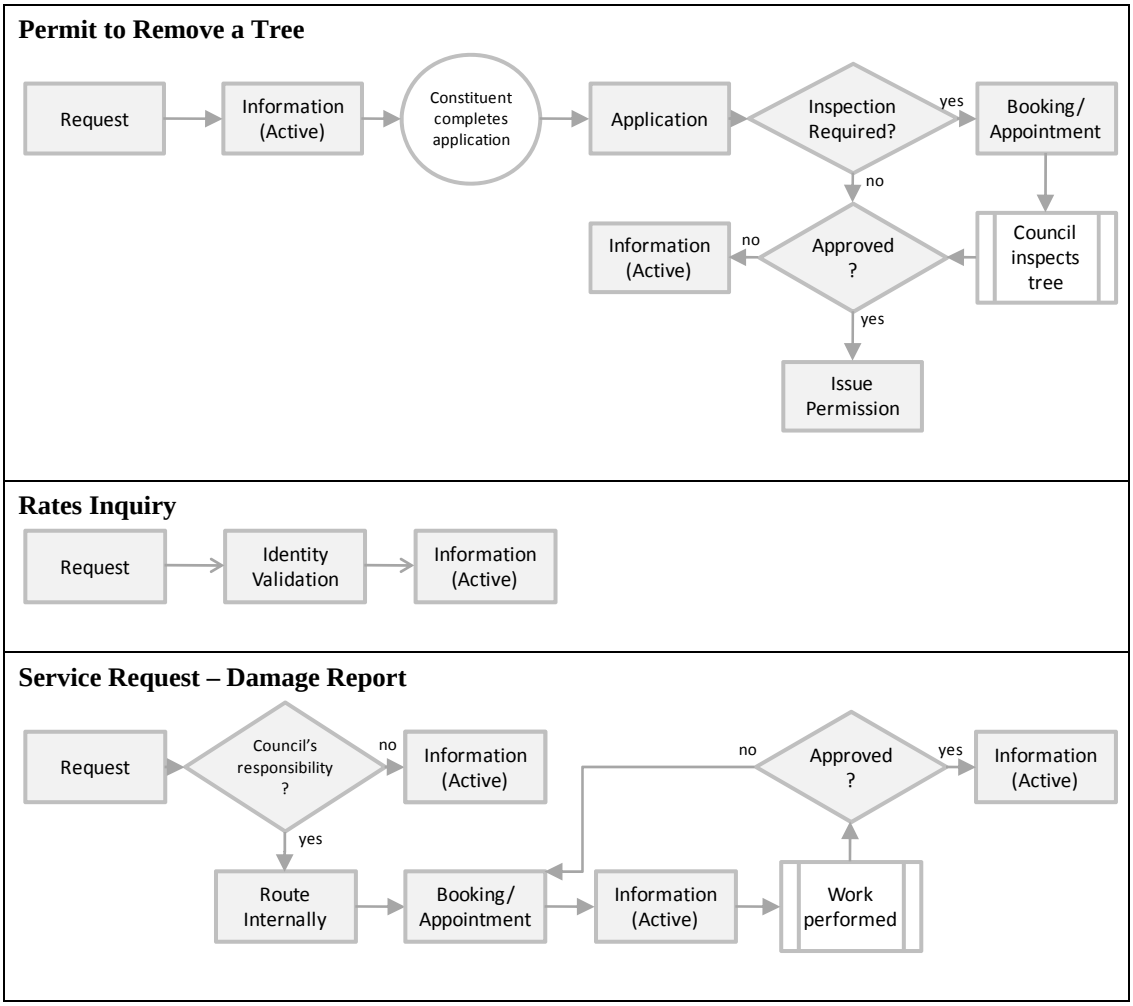


Figure 19: High-Level Process Maps for Eight Typical (Local) Government Services

The first step in applying the artefact is to locate each service on the e-Government Service Characteristics Template and then apply to the Market Segmentation Filter Rules to identify which segment each process is addressing (Table 25).

Table 25: Assessment of Typical Services against e-Government Service Characteristics Template and Market Segmentation Filter Rules

Service	Template Construct		Segment
Dog Registration	Nature of Service Differentiation	Active Commodity/Menu	
	Interactions Reliance on Government	Single Complete	Citizen
Dog Registration Renewal	Nature of Service Differentiation	Active Commodity/Menu	
	Interactions Reliance on Government	Multiple/Repetitive Complete	Subject
Application for Land Use Certificate	Nature of Service Differentiation	Active Individually Tailored	
	Interactions Reliance on Government	Single Complete	Citizen

Service	Template Construct		Segment
Issue Title Ownership Certificate	Nature of Service Differentiation	Active Individually Tailored	
	Interactions Reliance on Government	Single Complete	Citizen
Request for Child Care	Nature of Service Differentiation	Active Commodity/Menu	
	Interactions Reliance on Government	Single None	Customer
Permit to Remove Tree	Nature of Service Differentiation	Active Individually Tailored	
	Interactions Reliance on Government	Single Complete	Citizen
Rates Inquiry	Nature of Service Differentiation	Active Individually Tailored	
	Interactions Reliance on Government	Single Complete	Subject
Service Request – Damage Report	Nature of Service Differentiation	Active Commodity/Menu	
	Interactions Reliance on Government	Single Complete	Citizen

I offer a brief explanation of these segment allocations, for clarity. A Dog Registration is a *Citizen* transaction (single interaction that must involve the government as one party). Although it is the first action in a relationship that will exist as long as the dog does and the person resides in that jurisdiction, which implies a series of interactions over time, the constituent using the service will not feel a part of that relationship until after the dog is registered. Each renewal is a transaction in a *Subject* relationship (multiple/repetitive interactions that must involve the government as one party) and the constituent will expect the government to recognise the relationship accordingly. Similarly, the Application for a Land Use Certificate may be the first interaction in an ongoing relationship with the government (depending on the land use proposed) but as it is the first interaction, the constituent will have the expectations of a *Citizen.*

As the segmentation deals with the intent in the mind of the service recipient, a driver for the use of *Citizen* services is that the constituent intends to display ‘good citizenship’ by voluntarily complying with government requirements for the public good. These elements of intent are present when the constituent seeks a Permit to Remove a Tree or makes a Service Request – Damage Report; singular interactions that must involve the government.

Another driver for constituents is to have their status recognised or ratified by some authority. Such authority routinely resides in the government. Consequently, constituents will request formal recognition of their status from the government; a singular interaction that requires the government. So, the Issue of Title Ownership Certificate is a *Citizen* service.

Making an inquiry about one's rates is a *Subject* transaction. This may be counter-intuitive as such an inquiry requires only a single interaction with the government to complete. However, the answer will depend on the circumstances of the rate-payer inquiring and will likely be one of many interactions by the constituent with the government regarding their rates over time. Consequently, the *Subject* will view it as one of many interactions (multiple/repetitive) and be conscious of the relationship with the government that the rates represent. This service analysis is an example of why the Interaction *template-construct* ought to be considered in its relationship context (see Table 19, page 140).

Finally, a Request for Child Care is a *Customer* transaction for the same reasons that Dog Registration is a *Citizen* transaction. Although there is an obvious connection to establishing a professional relationship, the first interaction will not be in the context of that relationship. There is no reliance on the government here as there are many non-government child care providers and constituent expectations will be set by the knowledge of that; i.e. they will expect 'customer service' equivalent to that expected from a commercial enterprise. Similarly, future interactions in that child care arrangement would be *Client* services.

6.2.2 Some Further Design Rules

As indicated in the earlier discussion about the dog registration and renewal processes (page 81), there are e-government 'regulatory rules' that can be suggested. Their application becomes more applicable when those rules are made within the context of the market segments. Those rules are repeated here for convenience:

> The *e-government* regulatory rules that might apply to this service might include: delivering dog registration requirement information through the government's website; creating an electronic version of the application form (either for download, completion and submission, or for direct online submission); reducing the amount of required data on the application form by drawing on other government data using the dog owner's identity as a key (for renewals); changing the form of the register from a book/file to an electronic database; changing the means of notifying the dog owner of the need to renew to e-mail; and receiving payments over the Internet.

So, for example, the proposed rule to use data already held by the government in the dog registration renewal process is actually broadly applicable to all similar *Subject* activities (Information (Active) that involves an application form) because the *Subject* would expect the government to know these details, would accept the use of them 'pro-actively' by the government, and would value the saving in time and effort for both parties that such use would imply. The same argument makes it applicable to *Client* services too. This expectation can be formalised into design guidance for *Subjects* and *Clients* by recommending pre-population of forms containing data about the relationship of the constituent to the government. For convenience, amendment of that pre-populated data should be available in those pre-populated forms. These ideas are captured in Principles P 2.1 and P 2.2.

In contrast, using the same idea to pre-populate data for a permit to remove a tree (for example) would arguably not be recommended as it is unlikely to meet *Citizen* expectations. Each instance is a singular activity so the data would be drawn from unrelated sources (albeit all held by the same government), with which the *Citizen* might be quite uncomfortable. Similarly, the *Citizen* is less likely to value any perceived convenience as this is a singular transaction. Notwithstanding that preference for isolation of *Citizen* and *Customer* transactions from some broader record of all transaction, pre-population of forms can be seen as convenient and providing customer service. It is recommended that the option be given to these

segments (Principles P 2.3 and P 2.4). So, we can formalise these as further e-government regulatory rules[9]:

PS 2 Further Design Principles from Segmentation

P 2.1 e-Government services for *subjects* and *clients* should pre-populate relationship maintenance (e.g. renewal notifications, payment reminders, 'next stage' entitlement checks, etc) forms with information already held about the constituent.

P 2.2 e-Government services for *subjects* and *clients* using relationship maintenance forms should allow changes to details on the form by the constituent at the same time as completing the actual maintenance activity.

P 2.3 e-Government services for *customers* and *citizens* should only pre-populate forms with details about the constituent already held when expressly directed by the constituent.

P 2.4 e-Government services for *customers* and *citizens* may offer the opportunity for a constituent to use some government-recognised identifier (e.g. e-mail address, rate assessment number) to pre-populate automatically-generated forms on a case-by-case basis.

6.2.3 The Influence of Segments on Service Design

6.2.3.1 How to seek a constituent's identity

One common process element that shows how the different segments influence differently the web design of the same or similar processes is Identity Validation. In the First Design Rules (page 114) we established that in *Citizen* transactions Identity Validation would probably involve collecting demographic information such as name, date of birth, and address. These facts can then be used to verify that the person is a constituent of the government involved. In *Subject* transactions, Identity Validation relies upon some identity number issued by the government to the person (e.g. rate assessment number, dog registration number, etc). The government can expect and require the *Subject* to use this identifier because it is issued by the government. The person, as a *Subject*, would expect to use such an identifier, given the prescriptive or coercive nature of their relationship with the government (more on this later), and for convenience (P 2.1 refers). *Citizens* might baulk at such identifiers as they pre-suppose some longer-standing relationship and the convergence of

[9] Note that these rules do not only apply to services mediated by the Internet, or even only those conducted electronically.

(probably) un-related data held by the government, which still seems too 'Big Brother' (in the Orwellian sense); at least, for most Australians (P 2.3). Of course, if the person in a *Citizen* transaction offers such a government-issued identifier it can and should be used (P 2.4).

These distinctions can translate directly into screen design for an instantiation of Identity Validation in an online process, illustrated with example wire-frames in Figure 20. In Figure 20a, the *Citizen* is asked to provide salient identity details. There is an option for them offer some identifier, but it is not required. This design idea is captured in Principle P 3.1. This option would not be offered in a *Customer* service. In contrast, in Figure 20b, the *Subject* is required to provide a government-issued identifier to explicitly log in to the government's system (Principle P 3.2). The *Subject's* details are then presented while process activity is undertaken and an opportunity to update them is provided (Principle P 3.3). Such design decisions are not newly identified by the presence of this segmentation-based approach. However, the approach offers guidance to support such decision making resulting in designs that will more closely meet the expectations of constituents as they interact with government.

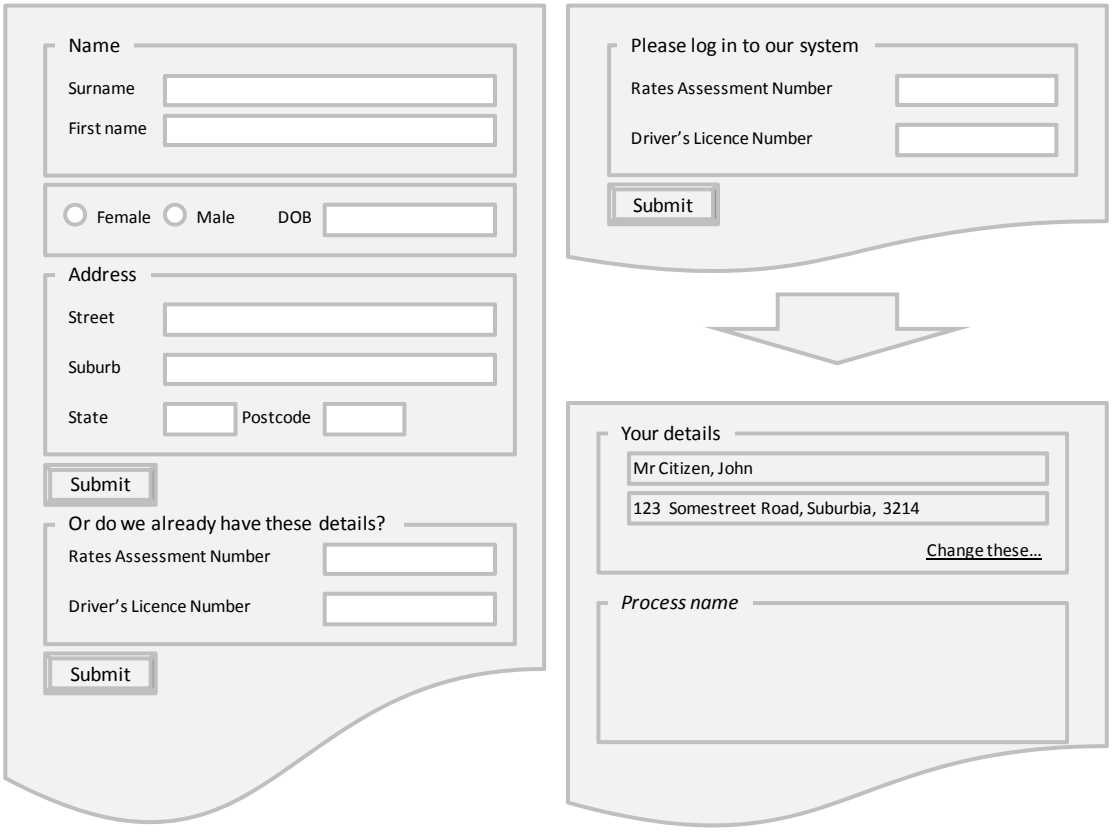
PS 3 Initial Interface Design Principles from Segmentation[10]

P 3.1 **e-Government services that require identity (and other personal) details for *customers* and *citizens* should explicitly collect the relevant details on each occasion.**

P 3.2 **e-Government services for *subjects* and *clients* should ask for the constituent's identity through a useable identifier only as soon as the constituent's identity is needed for service action.**

P 3.3 **e-Government services for *subjects* and *clients* should allow the constituent's recorded details to be amended by the constituent during any service interaction.**

[10] Note also the rules described above regarding: collecting personal details for *customers* and *citizens* (P 1.1 and P 1.7) and the use of identifiers for *subjects* and *clients* (P 1.5 and P 1.6).



(a) Citizen (b) Subject

Figure 20: Example Alternate Screen Design for Identity Validation for *Citizen* and *Subject* Services

6.2.3.2 What level of authority to apply to an application

Another area where the segmentation can provide guidance is the level of authority required for application processes, outlined by way of example in Table 26.

Table 26: Example 'Application' Services and Proposed Level of Authority Required According to Segment

Segment	Example 'Application'	Level of Authority
Customer	Subscription to some information service (say, environmental news bulletins)	**None.** The system need only validate relevant details (particularly delivery address and payment source, if any) and the application is finalised. The concept of 'authority' is not really meaningful here.
Client	Request for Child Care Place	**Delegated (professional) authority.** The system must validate the data collected, but the application can only be finalised (approved or not) by a delegated authority; a person. In this case, that authority will likely either consult or have relevant child care professional qualifications too. The delegate's decision and identity should be stored with the application details.
Citizen	Request to Remove a Tree	**Embedded.** The system must validate the data collected then, depending on tree size and/or location rules and possibly a register of protected trees, the application is finalised (approved or not) on the basis of formal business rules embedded within the system.

Segment	Example 'Application'	Level of Authority
Subject	Application to enter into a payment arrangement	**(Delegated) fiduciary authority.** The system must validate the data collected, but the application can only be finalised (approved or not) by a delegated authority; a person. In this case, the decision maker must have (delegated) fiduciary responsibility to accept alternate payment arrangements on behalf of the government. The delegate's decision and identity should be stored with the application details.

Of course, the exercise of authority and its delegation are matters for each authority and usually a matter of policy in each government agency. The intent of the table is to illustrate the difference in the authority that equates to the expectations of segmented constituents. *Customers* are buying something; they do not see it as a matter of requiring approval provided they can pay (if a fee is charged). One does not seek approval to buy milk! This is expressed formally in Principle P 4.1.

Clients expect that there will be some authority who decides the course of the relationship that is established. They would expect to be able to verify the making of that decision; i.e. to find out who made the decision and when (Principle P 4.2). They would further expect that authority to be informed by professional knowledge in the relevant discipline area (Principle P 4.3). These expectations recognise that the services must be tailored and that a range of decisions must be made by the service provider to determine how that will happen.

A *Citizen* is usually bringing him/herself within the force of the law when he/she interacts through an application. However, the decision making required to finalise such applications usually involves well-understood rules that can be successfully codified within computer systems. Consequently, the authority for the approval (or not) of such applications can be embedded (Principle P 4.4). In essence, rules are rules! *Citizens* would expect the rules to be equitably and immediately applied. They would also expect an explanation for being denied (Principle P 4.5).

Finally, *Subjects* rarely 'apply' for service, by definition. They receive services by virtue of their status and their relationship with the government. However, to the extent that applications are made, an appropriate authority would be expected to make the decision on the basis of the facts of each *Subject's* case (Principle P 4.6).

PS 4 Principles for Approval of Applications from Segmentation

P 4.1 e-Government services that require an application from a *customer* should require only the correct completion of necessary information by the constituent to allow 'approval' of the application.

P 4.2 e-Government services that require an application from a *client* should require approval from a relevant (delegated) authority, and that approval (or not) recorded within the supporting system.

P 4.3 e-Government services that require an application from a *client* will likely require formal approval from a relevant professional, which should be recorded within the supporting system.

P 4.4 e-Government services that require an application from a *citizen* should include the relevant rules within the application processing system and compliance with the rules should grant approval for the application.

P 4.5 e-Government services that require an application from a *citizen* should include the ability to automatically explain why the constituent was denied the application (i.e. which rules were not satisfied).

P 4.6 e-Government services that require an application from a *subject* should require approval from a (delegated) fiduciary authority, and that approval (or not) recorded within the supporting system.

6.2.3.3 The form of a permission

Similarly, the expectations of constituents are believed to differ on the form that some 'permission' ought to take depending upon their segment. To the extent that a 'permission' must be manifested in a physical form, *Customers* and *Clients* will expect that physical form to be clear about what permission they have (Principle P 5.2). *Customers* and *Clients* have bought the permission and they want to be able to show that they have done so. They will also be comfortable with the idea of a virtual permission—i.e. no physical manifestation of the permission (Principle P 5.1)—provided that the permission can be readily accessed by any inspecting authority. The expectations of *Subjects* and *Citizens* will focus more on the authority by which the permission is granted (i.e. who issued the permit) as they are frequently more weighty permissions (e.g. land ownership). They will usually expect to get some physical permit or token displaying that authority (Principle P 5.3).

PS 5 Principles for the Form and Emphasis of Permissions from Segmentation

P 5.1 e-Government services that issue a permission to a *customer* or *client* may be solely electronic.

P 5.2 e-Government services that issue a permission to a *customer* or *client* should make explicit on any physical manifestation of that permission what it permits and what limits are placed on the permission.

P 5.3 e-Government services that issue a permission to a *subject* or *citizen* should be manifested physically and should be branded with the authority by which the permission is granted (i.e. the issuing government agency and the legal instrument that authorises the permission).

6.3 Market Segments, Relationship Style, and E-Government Adoption

As discussed in Chapter 1, adoption of e-Government is not all that it might be. Several authors suggest that the broad enthusiasm of e-government was based on a 'build it and they will come' view of attracting constituents (e.g. Accenture, 2002; Stowers, 2001) to use e-government services that were expected to be more useful to the constituent and more cost-effective for the government (Accenture, 2002; Atkinson & Leigh, 2003; Bertot & Jaeger, 2006; Lenk & Traunmüller, 2007). Over time, there has developed a series of explanations for relatively low adoption rates. A consistent message is that governments do not advertise their online services sufficiently (Accenture, 2002; 2004; Cullen & Hernon, 2006b) something that is out of the scope of this research. Other issues such as security, privacy, accessibility, and discoverability have also been identified, although with diminishing impact over time (AGIMO, 2005; 2006a; 2007; 2008). In summary, inhibitors to e-government adoption largely involve matters of trust (Al-adawi *et al.*, 2005; Carter & Bélanger, 2004; 2005; Colesca, 2009; Teo, *et al.*, 2008; Warkentin, *et al.*, 2002).

There is a growing literature on the effect of trust in e-commerce adoption including several attempts to draw the various ideas and experiments in the literature together into a single model of intention drivers for e-commerce adoption (Al-adawi, *et al.*, 2005; Carter & Bélanger, 2005; Chen & Dhillon, 2003; Holsapple & Sasidharan, 2005; Kim *et al.*, 2008; Kim *et al.*, 2004; Kong & Hung, 2006; Li, *et al.*, 2006; Li *et al.*, 2007; Pavlou, 2003; Salo & Karajaluoto, 2007; Serva *et al.*, 2005; Tan & Thoen,

2001; Teo, *et al.*, 2008; Warkentin, *et al.*, 2002). Some are then tested and refined through experiments (Carter & Bélanger, 2005; Kim, *et al.*, 2008; Kim, *et al.*, 2004; Li, *et al.*, 2006; 2007; Pavlou, 2003; Serva, *et al.*, 2005; Teo, *et al.*, 2008); others are simply postulated (Al-adawi, *et al.*, 2005; Chen & Dhillon, 2003; Holsapple & Sasidharan, 2005; Kong & Hung, 2006; Salo & Karajaluoto, 2007; Tan & Thoen, 2001; Warkentin, *et al.*, 2002). This brief review of the literature reveals a field still searching for a single approach to identify what drives a person's intention to interact (usually, to buy something) online. Trust figures in them all (as a defining characteristic) but other concepts appear regularly, including: satisfaction, (e-)loyalty, commitment, perceived risk, the concepts of the Technology Acceptance Model (Davis, 1989) and other ideas; for example, justice.

Growing out of that work is a small literature on trust in e-government adoption (e.g.Al-adawi, *et al.*, 2005; Colesca, 2009; Huang, *et al.*, 2002; Teo, *et al.*, 2008; Warkentin, *et al.*, 2002). Importantly, there is also a small but growing body of work investigating whether e-government is increasing trust in government (e.g.Tolbert & Mossberger, 2006; Welch, *et al.*, 2005). If e-government increases trust in government (Tolbert & Mossberger, 2006), and increased trust in government reinforces satisfaction with, and increases adoption of, e-government (Al-adawi, *et al.*, 2005; Colesca, 2009; Hung, *et al.*, 2006; Teo, *et al.*, 2008; Warkentin, *et al.*, 2002; Welch, *et al.*, 2005), a virtuous circle is built. Clearly, investigating how to increase trust in the context of e-government services is important to increase adoption of those services.

6.3.1 A Model of e-Government Adoption Drivers Involving Trust

To inform the demonstration of how the market segmentation approach can support research into trust in e-government adoption, I have chosen Warkentin et al's (2002) model as a starting point. This work has been widely cited in literature on e-government and e-government adoption and appears to be the only extant model of e-government adoption drivers. (Al-adawi et al (2005) propose a model but it is derivative of Warkentin et al's work and adds nothing to the discussion here.) The major drawback of Warkentin et al's model is that it has not been empirically tested (Warkentin, *et al.*, 2002) or, rather, the empirical testing of it has not been published (yet). Nevertheless, the model draws on several other key, well-established models in

its construction and, as we shall see, it is consistent with a wide-range of models of e-commerce adoption.

My intention is to demonstrate that by using the market segmentation as a lens for inspecting the literature on adoption drivers, a subtely but importantly different perspective on those drivers arises compared to the perspective developed without that lens. Warkentin et al's model is used as the comparative benchmark. I am not attempting to validate Warkentin et al's model, merely to demonstrate that a more complex view of e-government users (constituents) leads to a more refined view of what drives them to adopt e-government services.

The Warkentin et al (2002) model is presented here in Figure 21. The model is based on a number of important theories and models, including the Theory of Reasoned Action (Fishbein & Ajzen, 1975), the Technology Acceptance Model (Davis, 1989), and theories of cultural and relational differences. They note that there is a moderating effect anticipated on some drivers through the difference between initial and repeat use of an e-government service. The rest of this section will demonstrate how the perspectives offered by the market segmentation approach can refine the insights of Warkentin and his colleagues.

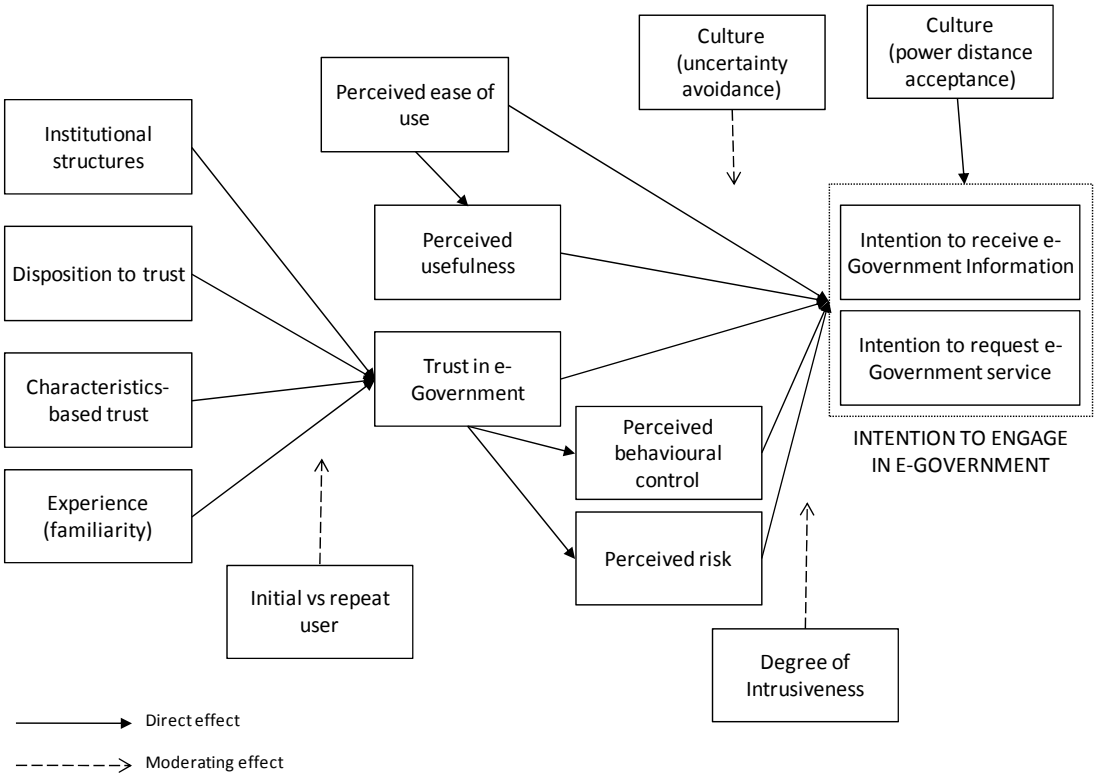


Figure 21: Model of Intention Drivers for e-Government Adoption Proposed by (Warkentin, *et al.*, 2002)

6.3.2 Introducing the Effect of Relationship Style on Adoption Drivers

As we have discussed, the concept of market segmentation is a fundamental idea within marketing (Smith, 1972) and widely used for tailoring approaches to 'the market' to increase sales (Barker, 1985; Claycamp & Massy, 1972; Hütt, *et al.*, 2001; Peltier & Schribrowsky, 1997; Smith, 1972); in the context of e-government services, increased sales is equivalent to increased adoption. Importantly, the concept that different segments demand different approaches online just as they do in traditional marketing is now well-established (Bhatnagar & Ghose, 2004; Changchien, *et al.*, 2004; Dieringer Research Group, 2002a; Forsyth, *et al.*, 2000; Hütt, *et al.*, 2001).

Seeking guidance in the marketing literature for adoption drivers according to segment differences identified a slightly tangential approach. The concept of Relationship Marketing arose in the mid-1980s in recognition of the shifting way that firms within markets work (Morgan & Hunt, 1994). In short, Relationship Marketing recognises the distinction between discrete transactions unrelated over time and relational exchanges which involve a longer process (Gronroos, 1990; Morgan & Hunt, 1994) subjected to "norms of sharing and commitment based on trust"

(Morgan & Hunt, 1994, p. 20). Although originally based on business-to-business interactions, the concept has been extended to individuals interacting with business too (e.g. Cyr, 2008; Garbarino & Johnson, 1999).

In Relationship Marketing, one seeks to establish, maintain, and promote a relationship with the 'customer'. Importantly, different marketing tactics are used for 'customers' with which the vendor has a relationship, and the 'customer' expects different things depending on their perception of the relationship between them and the vendor (Ebbers *et al.*, 2008; Garbarino & Johnson, 1999; Gronroos, 1990; Morgan & Hunt, 1994). Importantly, the positive influence of trust in the relationship is one of the defining characteristics suggested by relationship marketing (Cyr, 2008; Garbarino & Johnson, 1999; Li, *et al.*, 2006; Morgan & Hunt, 1994; Park & Kim, 2006). Several authors (Kim, *et al.*, 2004; Kong & Hung, 2006; Li, *et al.*, 2006) identify a fundamental dichotomy between 'customers' where the interaction is a one-off or intermittent, or part of an on-going relationship, particularly in an online environment. This characteristic is a key dimension for the market segmentation of current interest (refer to page 139).

This insight refines the initial view of drivers of adoption of e-government services. The things that increase trust in an electronic interaction are where advice might most directly lead to increases in adoption, to the extent that trust is a factor, which depends on the type of relationship the user has with the service provider. Importantly, these notions, and the models surveyed below, are based on the Theory of Reasoned Action where "the best predictor of a person's behaviour [adoption of electronic services, in this case] is his intention to perform the behaviour" (Fishbein & Ajzen, 1975, p. 381). The vast majority of the models identify and measure drivers of intention. (The models do tend to move away from Fishbein and Ajzen's (1975) views of what drive intention.) The strong connection to Fishbein and Ajzen's (1975) well-established work is strong justificatory knowledge for this element of my design science research.

As established earlier, using the segmentation approach proposed leads to two different relationship types: transactional and relational. Kim, Xu and Koh (2004) have explicitly tested the idea of alternate models in a parallel for transactional and relational customers and they found important differences. However, their

experiment sought only to explain what built trust, and did not pursue if that would affect intention to adopt. Kong and Hung (2006) elaborate a model of trust drivers that lead to intentions that recognises a distinction between transactional and relational relationships; however, this model was not tested empirically. Encouraged by this research, I decided to synthesise the different models of drivers of adoption within the 'trust in e-commerce' literature. The idea was to, first, see if there were consistent and important differences when this perspective was taken and, second, to then have guidelines to use to re-consider Warkentin et al's (Warkentin, *et al.*, 2002) model. I created two intention driver models by blending, first, the intention driver models for 'consumer B2C' or similar to represent 'one-off' (i.e. non-relational) transactions, and second, the intention models for relationship-driven e-commerce.

6.3.3 Two Models of Drivers of Intentions to Adopt

6.3.3.1 Drivers of adoption in transactional relationships

Figure 22 illustrates the primary elements of the blended model for transactional interactions, based on (Carter & Bélanger, 2005; Garbarino & Johnson, 1999; Holsapple & Sasidharan, 2005; Kim, *et al.*, 2008; Pavlou, 2003).

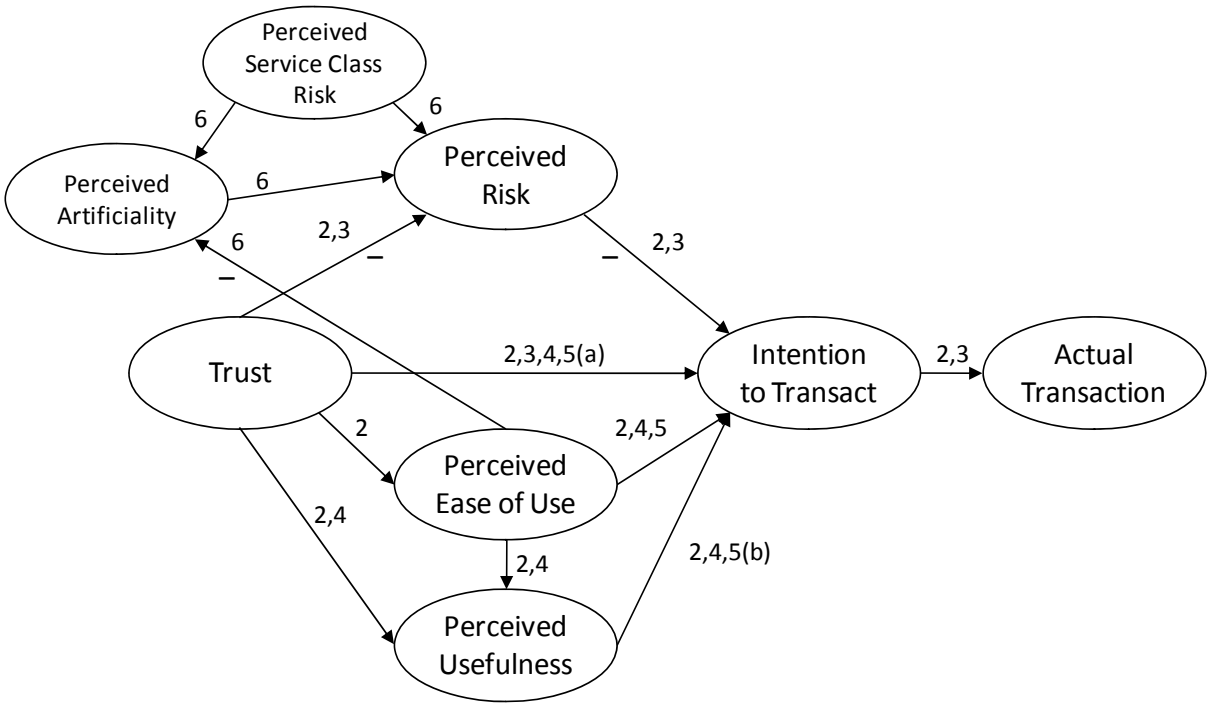


Figure 22: Blended Model of Drivers for Adoption in Transactional Relationships

Table 27: Sources and Notes to Figure 22

Relationships Derived From	**Notes:**
1. (Garbarino & Johnson, 1999) 2. (Pavlou, 2003) 3. (Kim, *et al.*, 2008) 4. (Holsapple & Sasidharan, 2005) 5. (Carter & Bélanger, 2005) 6. (Featherman, *et al.*, 2006)	(a) Treating Trustworthiness as equivalent to Trust – see Serva et al. (2005) (b) Assuming Compatibility is equivalent to Usefulness I would suggest that Perceived Ease of Use and Perceived Usefulness in combination can be seen as equivalent to Satisfaction. Satisfaction drives Trust and Intention, according to (Garbarino & Johnson, 1999) – not shown on the figure.

The relationship between *Intention to Transact* and *Actual Transaction* is validated by Pavlou (2003) and Kim, Ferrin and Rao (2008). Each study found that *Intention to Transact* was a predictor for approximately 40% of *Actual Transaction*. Although not perfect, this is a powerful influencer as theorised by Fishbein and Azjen (1975), and validates an interest in determining the drivers of intention to adopt.

Pavlou (2003), Holsapple and Sasidharan (2005), and Carter and Bélanger (2005) either adopt directly, or consolidate the views of others, that Davis's (1989) Technology Acceptance Model (TAM) is a useful indicator of intention to adopt. Pavlou (2003) and Carter and Bélanger (2005) validate the assertion through experimentation. (Note that Carter and Bélanger (2005) describe a relationship between *Compatibility* and *Intention to Transact* which is assumed as equivalent here

to the relationship between *Perceived Usefulness* and *Intention to Transact*.) As the model indicates, *Perceived Ease of Use* drives *Perceived Usefulness*, and they both drive the *Intention to Transact*.

Pavlou (2003) and Kim, Ferrin and Rao (2008) assert and validate that *Perceived Risk* negatively drives *Intention to Transact*; that is, the greater the perceived risk, the less likely the person will intend to transact. Furthermore, both of these papers assert and validate that *Trust* will negatively drive *Perceived Risk*. So, according to these authors, and intuitively, an increase in *Trust* will reduce a person's *Perceived Risk*, which will increase their *Intention to Transact*. Kong and Hung (2006) frame this slightly differently, saying that a person will interact online only when their level of *Trust* exceeds their level of *Perceived Risk*. They do note that the same drivers that increase *Trust* decrease *Perceived Risk*.

The majority of papers that went into this blended model made a direct connection between *Trust* and *Intention to Transact*. (Carter and Bélanger (2005) use the construct of *Trustworthiness*, but this is instrumentally equivalent (Serva, *et al.*, 2005) for the purposes of this exercise.)

Kong and Hung (2006) identify that transactional 'customers' ("initial customers" in their terminology) develop trust through a "peripheral" route; i.e. one that relies on signals of normality and trustworthiness. Warkentin et al (2002) also note this, as do Reigelsberger, Sasse and McCarthy (2005), discussed later. This would probably be reflected in perceptions of familiarity and ease of use, and lowered perceptions of risk. Such an analysis, while from a different perspective, is broadly supportive of the model blended here.

Some additional insights are available from this collection of research, but are less robustly supported (i.e. the ideas only really appear in one paper in the collection). Pavlou's (2003) investigation indicated that *Trust* drives both elements of the TAM. Holsapple and Sasidharan (2005) also note the relationship between *Trust* and *Perceived Usefulness*, although they also note a relationship from *Perceived Ease of Use* driving *Trust*. (These authors are citing work by David Gefen and his colleagues not considered directly here.) Also, if one accepts momentarily the idea that the TAM components could substitute for 'Satisfaction', there are several papers that

show reinforcing relationships between *Trust* and *Satisfaction* (e.g. Garbarino & Johnson, 1999).

A further insight that appears once is also worthy of note. Featherman et al (2006) investigated the extent to which implementing an existing service in an electronic medium changed the recipients' perception of the service, particularly in terms of its riskiness. They showed that the extent to which a user of an online service perceived that the service was 'artificial' (i.e. unlike their expectations or experience of off-line service) influenced the extent to which they perceived that the online service was risky. Fogg et al (2001) note that connecting with "real world" perceptions is important for site credibility. This could be mitigated by increasing the *Perceived Ease of Use* (Featherman, *et al.*, 2006; Fogg, *et al.*, 2001). Similarly, Featherman et al (2006) found that the user's perception of the riskiness of the generic type of online service (in the research context it was online payments) influenced the user's view of the riskiness of any given implementation of such a service. This finding is in line with Fishbein and Ajzen's (1975) model if one accepts that the generic perception would be equivalent to subject norms that influence perceptions.

These are interesting findings in the context of e-government design on two levels. The first is that the more the public comes to trust government online as a whole, the more they are likely to trust (and, therefore, adopt) the online services. Secondly, there is clearly cautionary advice here too for evangelists who speak of transforming government when moving online. There may be danger, and limitations to adoption, in radically re-designing services in the move to online interaction because of the heightened perception of artificiality or unreality of the online services. However, as this is only one piece of research, the ideas are noted, but not further explored here.

6.3.3.2 Drivers of adoption in relational relationships

The synthesis of a model of factors influence the intention to (re-)use in relational arrangements is slightly more complex and so is presented slightly differently. The first step is straightforward. Figure 23 shows the primary elements of a blended model from (Cyr, 2008; Garbarino & Johnson, 1999; Hocutt, 1998; Li, *et al.*, 2006; Morgan & Hunt, 1994; Park & Kim, 2006; Turel *et al.*, 2008)

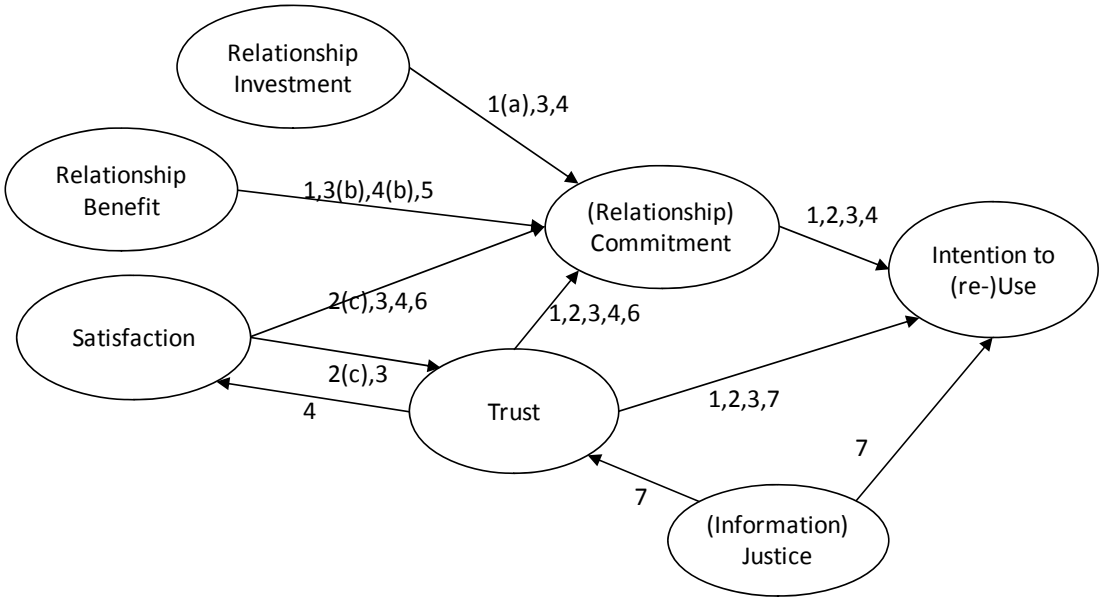


Figure 23: Initial Blended Model of Drivers for Relational Interactions

Table 28: Sources and Notes to Figure 23

Relationships Derived From	**Notes:**
1. (Morgan & Hunt, 1994) 2. (Garbarino & Johnson, 1999) 3. (Li, *et al.*, 2006) 4. (Hocutt, 1998) 5. (Park & Kim, 2006) 6. (Cyr, 2008) 7. (Turel, *et al.*, 2008)	(a) Using Termination Cost as equivalent for Relationship Investment (b) Assuming Relationship Benefit reflects *opposite* of Quality of Alternatives (c) Same antecedents of Satisfaction and Trust and Commitment; also shown in non-relational model by same authors

An important opening comment is that none of the relationship-based investigations actually sought to connect the intention to (re-)use with actual use. However, there is no reason to believe that the Theory of Reasoned Action will fail here and the other group of research investigations indicated support for that connection.

Morgan and Hunt (1994), Garbarino and Johnson (1999) and Li, Browne and Wetherbe (2006) all found that *Trust* drives (relationship) *Commitment* and the *Intention to (re-)Use*. Hocutt (1998) finds support for the relationships between *Trust*, *Commitment* and *Intention to (re-)Use*. Cyr (2008) supports the connection between *Trust* and *Commitment*. Turel, Yuan and Connelly (2008) support the relationship between *Trust* and *Intention to (re-)Use*. This important triangular relationship represents the key difference between the drivers of intention between the two models. Whereas for 'transactors' *Trust* is one of a few drivers and *Commitment* is not relevant, when a relationship is perceived to exist, *Trust* and *Commitment* moderate the effects of other drivers on the *Intention to (re-)Use*. This

is an important finding as it is not reflected in Warkentin et al's (2002) model (discussed more below).

The literature proposes a range of factors that drive *Commitment* in relationships. Not all of them are seen to be supported empirically. Here, the model reflects three major characteristics, which are derived from a blend of concepts in the literature. *Relationship Investment* represents the 'cost' of participating in the relationship to date by the 'customer' (Hocutt, 1998; Li, *et al.*, 2006). Blended here too is the idea of *Termination Cost* (Morgan & Hunt, 1994); although not directly equivalent, the two concepts are closely related. *Relationship Benefit* represents the perceived benefit from being part of the relationship (i.e. that benefit additional to the value of the goods/services acquired in transactions) (Morgan & Hunt, 1994; Park & Kim, 2006). Conceptually, this positive driver is opposite to a negative driver that the *Quality of Alternative* relationships (Hocutt, 1998; Li, *et al.*, 2006) offers and so that concept is blended in here too.

The characteristics of relationships that drive commitment are all accumulated over time; that is, as the relationship develops. These are powerful elements that are not relevant in the 'transactors' model as there is no expectation of on-going interactions. In Figure 24, these concepts have been bundled together under the *Commitment* synonym, *Loyalty*, which is also shown to reflexively drive itself; *Loyalty* breeds *Loyalty*. Combining these factors is not intended to reduce their importance but to offer a simpler representation for further model development.

Satisfaction is seen as a key driver of (relationship) *Commitment* (Cyr, 2008; Hocutt, 1998; Li, *et al.*, 2006; Park & Kim, 2006). Garbarino and Johnson (1999) find that all of the drivers of *Trust* and *Commitment* also drive *Satisfaction* when relational customers are considered. However, they do not show *Trust* or *Commitment* mediating *Satisfaction* in such relationships. Nevertheless, other authors do find this connection. In the literature, *Satisfaction* drives *Trust* (Li, *et al.*, 2006), is driven by *Trust* (Hocutt, 1998) and they have coincident drivers (Garbarino & Johnson, 1999). It seems clear that they are strongly related, but the exact relationship needs further investigation.

One other element of relationship marketing research that is worth noting in passing is the work done by Turel, Yuan and Connelly (2008). They considered whether the

perception of ‘justice’ influenced people’s perceptions of trust in an online environment. They found that elements of justice as they defined it were seen to reinforce *Trust* and the *Intention to (re-)Use*. This is interesting work because in the context of e-Government, justice is a particularly meaningful concept. However, as there is only one piece of research here, and that research involved perceptions of justice derived in part from contact with live agents supporting online interactions, the reliability and generality of this work is uncertain and is not considered further.

Recent empirical (survey-based) research has been published that has investigated the effects of *Web Site Quality* on user trust in relational activities (Kim, *et al.*, 2004; Tan *et al.*, 2007; 2008; Teo, *et al.*, 2008). Such investigations move away from the direct consideration of the effect of the relationship, but do consider other matters in the context of a relationship. Hence, Figure 24 shows the effect of the findings of research that investigates *Web Site Quality* and its effect on relational interactions online and includes findings other research already introduced where the same or equivalent concepts were reported.

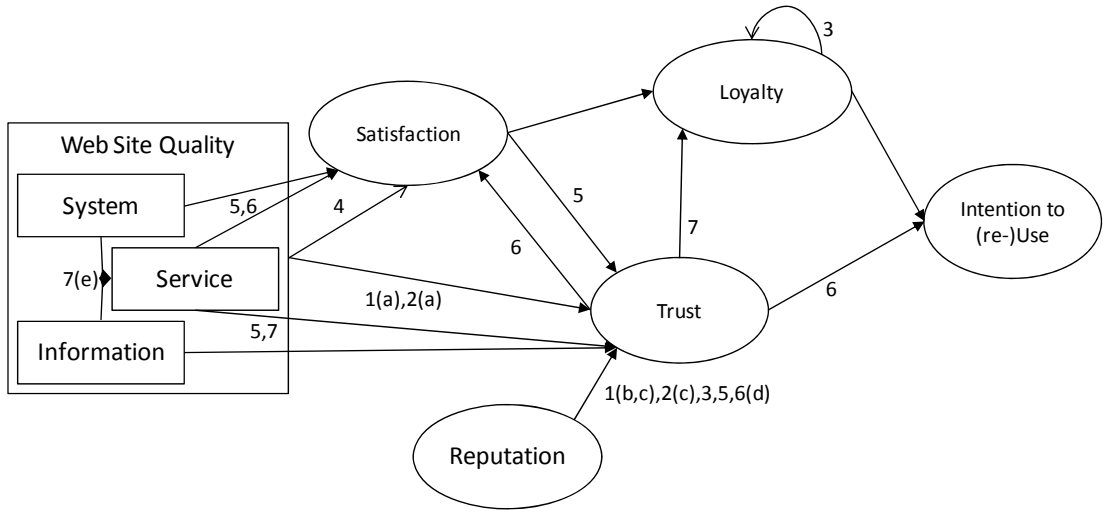


Figure 24: Addition of Web Site Quality to Initial Blended Model of Adoption Drivers for Relational Interactions

Table 29: Sources and Notes to Figure 24

Relationships Derived From	**Notes:**
1. (Morgan & Hunt, 1994) 2. (Li, *et al.*, 2006) 3. (Hocutt, 1998) 4. (Park & Kim, 2006) 5. (Kim, *et al.*, 2004) 6. (Teo, *et al.*, 2008) 7. (Tan, *et al.*, 2007)	(a) Communications Quality encompasses Information Quality and System Quality (b) Shared Values is taken as a synonym for Reputation (c) A belief that Opportunistic Behaviour (by the vendor) will not take place is an indicator of Reputation (d) Using Reputation as a synonym for Trust in Government (e) System Quality = Content Quality; Information Quality = Delivery Quality

The quadrangle of *Satisfaction*, *Trust*, *Loyalty*, and *Intention to (re-)Use* is drawn from Figure 23, where *Loyalty* has been created from the melding of *(Relationship) Commitment*-related elements as explained above. The numbering of the directions of influence in Figure 24 reflects only the further support found by the various papers in Table 29. The inclusion of papers already considered (numbered 1 to 4 in Table 29) allows the inclusion of their findings in support of influence arrows. Morgan and Hunt (1994), and Li, Browne, and Wetherbe (2006) following them, found support for *Communications Quality* to drive *Trust*. In this context, *Communications Quality* is a synonym for *Web Site Quality*. Park and Kim (2006) found *Product Information Quality* and *Service Information Quality* drive *Information Satisfaction*. I have attributed this as support for the concept of *Web Site Quality* (overall) driving satisfaction. Finally, Kong and Hung (2006) reflect the literature to show that *Web Site Quality* is a key driver of 'Trusting Attitudes' in their proposed model.

The concept of *Web Site Quality* is made up of three parts (Kim, *et al.*, 2004; Tan, *et al.*, 2007; Teo, *et al.*, 2008): *Service Quality*, *Information Quality*, and *System Quality*. (Tan, Benbasat and Cenfetelli (2007) use slightly different terms but draw the parallel explicitly.) The papers considered here usually define a research model that expects all three components to act upon *Trust*, or *Satisfaction*, or both. The findings frequently find only sparse connections between the components (illustrated in Figure 24), but are generally supportive of *Web Site Quality* being a driver for *Satisfaction* and *Trust*. Teo, Srivastava, and Jiang (2008) also show that *Information Quality* directly drives *Intention to (re-)Use*, which is not shown in Figure 24 for clarity.

Whether *Web Site Quality* (Tan, *et al.*, 2007; 2008) and web site design (Cyr, 2008) are essentially the same idea differently expressed is difficult to resolve. It is clear that *Web Site Quality* is intended to include and requires good design as well as other elements, but the instruments measuring *Web Site Quality* (e.g. Tan, *et al.*, 2007) investigate different matters to those investigating web site design (e.g. Cyr, 2008). Only Cyr (2008) looks at this matter directly and in isolation. Her results indicate that good web site design (across three factors) drives increased *Satisfaction* and increased *Trust*. Park and Kim (2006) find that *User Interface Quality* drives *Information Satisfaction*, which is supportive of Cyr's findings. Such findings are supportive of this model then (and the underlying argument of the thesis), but are not included in Figure 24 for clarity.

Another driver of *Trust* that arises in the research on relational e-commerce interactions is the concept of *Reputation* (Hocutt, 1998; Kim, *et al.*, 2004). In the context of e-government, this is equivalent to *Trust in Government* (Tan, *et al.*, 2008; Teo, *et al.*, 2008). Research that investigated the connection between *Reputation* and *Trust*, found a positive effect (Hocutt, 1998; Kim, *et al.*, 2004; Tan, *et al.*, 2008; Teo, *et al.*, 2008). Morgan and Hunt (1994), and Li, Browne, and Wetherbe (2006) following them, found a negative effect of *Opportunistic Behaviour* by the vendor on the *Trust* of 'customers'. Such *Opportunistic Behaviour* would speak directly to the *Reputation* of the vendor (or of the government in e-government) and so is seen to support the connection between *Reputation* and *Trust*.

Tan, Benbasat, and Cenfetelli conducted an extensive survey of e-government users and report the results in two separate analyses (Tan, *et al.*, 2007; 2008). The two perspectives with which they investigated their survey results relied upon different means of operationalising *Service Quality*. One involved viewing it as a single factor among others (*Content Quality* and *Delivery Quality*) that I, and others, have consolidated into a single *Web Site Quality* concept (Tan, *et al.*, 2007); the other involved using the SERVQUAL measure (Tan, *et al.*, 2008). In both investigations, the researchers included the TAM as a moderator of *Service Quality*'s effect on *Trust* and *Intention to Re-Use*. Figure 25 reflects the additional findings of this research. (Findings from (Tan, *et al.*, 2007) shown in Figure 24 are not repeated in Figure 25.)

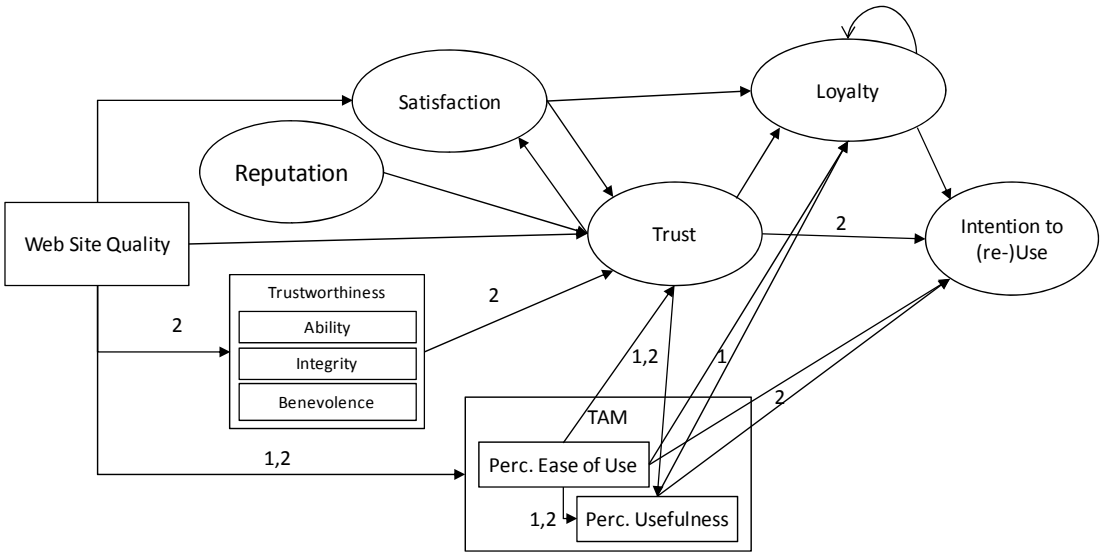


Figure 25: Additional Adoption Drivers Identified by Tan, Benbasat, and Cenfetelli added to the Blended Model of Adoption Drivers for Relational Interactions

Table 30: Sources and Notes to Figure 25

Relationships Derived From	**Notes:**
1. (Tan, *et al.*, 2007) 2. (Tan, *et al.*, 2008)	

Tan, Benbasat and Cenfetelli include the TAM in both data analyses. In both cases, *Service Quality* drove both aspects of the TAM (shown as a single effect arrow in Figure 25). They also found that *Perceived Ease of Use* drove *Perceived Usefulness*, as did *Trust*; findings which are consistent with researchers in other contexts (as indicated in Figure 22). They did offer new findings of the influence of the elements of the TAM on *Trust*, *Loyalty*, and *Intention to (re-)Use*. In the two analyses, not only was the conception of *Service Quality* changed, but so was the ultimate factor.

The different end factor leads to the influence of the TAM being distributed across *Loyalty* and *Intention to (re-)Use* in Figure 25.

In their second analysis, Tan, Benbasat and Cenfetelli (Tan, *et al.*, 2008) found that *Service Quality* was moderated by perceptions of *Ability*, *Integrity*, and *Benevolence*. Kong and Hung (2006) identify that relational 'customers' ("repeat" customers in their terminology) develop trust through a "central" route that relies on ability, benevolence, and integrity (in sum, *Trustworthiness* (Serva, *et al.*, 2005)), which they note can only be developed over time through repeat experiences. So, their model is broadly supportive of Tan, Benbasat, and Cenfetelli's findings.

The findings of Tan, Benbasat and Cenfetelli on the role of *Trustworthiness* and the TAM on relational interactions represent the findings from a single survey source. While they are not inconsistent with similar research, particularly in what I am classifying as 'transactional' interactions, they represent really only a single view. Also, these elements reflect an 'initial impression' view of an online interaction. In an ongoing relationship, these elements might be construed as 'hygiene' factors, rather than 'motivators' to continue the online relationship. Consequently, these last findings are noted, but not included in the final blended model, just as the concept of Information Justice has been omitted. Figure 26 shows the final blended model of drivers for adoption in relational relationships.

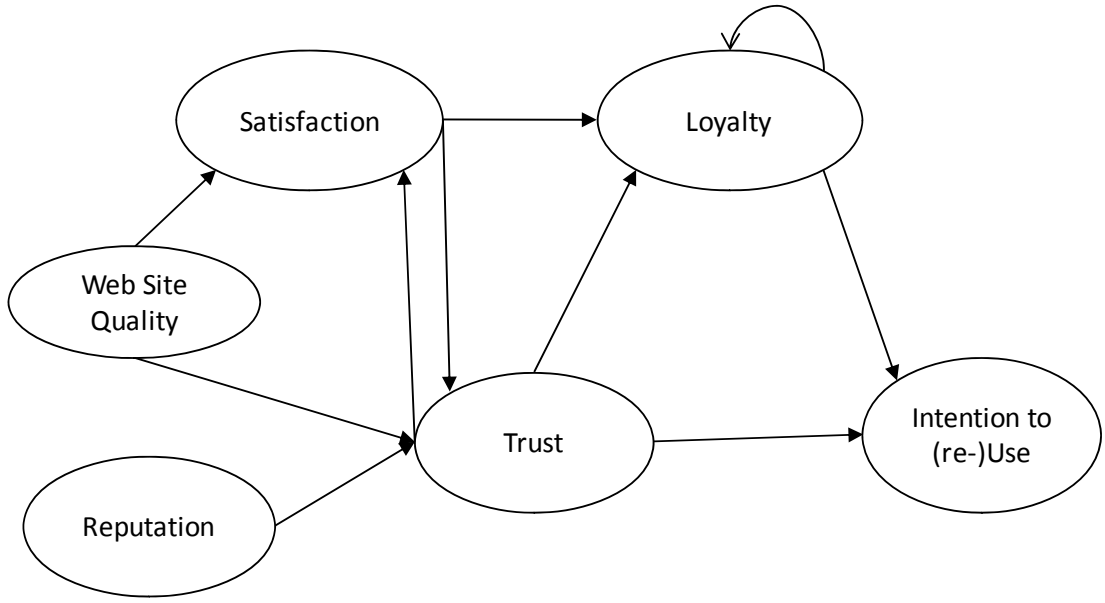


Figure 26: Final Blended Model of Adoption Drivers for Relational Interactions

6.3.4 Refining A Model of e-Government Adoption Drivers

The previous discussion is a necessarily brief review of the 'trust in e-commerce literature'; the field is increasingly active and new work is published regularly in a wide range of public administration and information systems journals and conferences. Nevertheless, two models emerge when considered from the perspective of the type of relationship between the user and the service provider. Comparing these two models with Warkentin et al's (2002) model offers some suggestions for refining Warkentin et al's initial view. Figure 27 informs the following discussion. The original components of the model that are unchanged are shown in grey. The suggested amendments are shown in black.

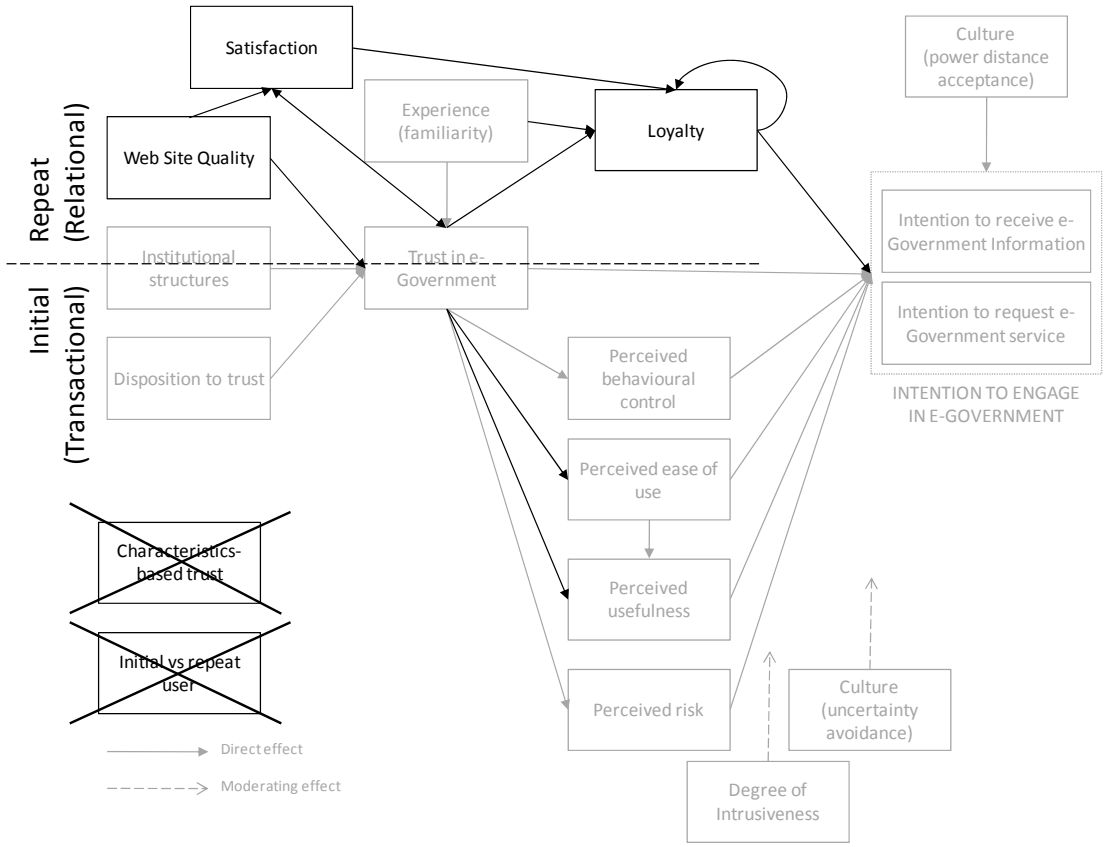


Figure 27: An Amended Model of e-Government Service Adoption Drivers

The first major amendment is to make more explicit the distinction between the drivers of adoption for a transactional user (equivalent to "initial" use in Warkentin et al (2002)) and those for a relational user (equivalent to "repeat" use). Warkentin et al note the distinction in effect of this dichotomy: "For initial trust, dispositions, social norms, characteristics and cognitive processes would mostly apply; for ongoing trust, process-based trust would matter most" (Warkentin, *et al.*, 2002, p.

160). They propose a hypothesis on this basis too: "P2e: The relationship between citizen trust and institution-based structures, disposition to trust, and experience is more prominent for initial users, whereas the relationship between experience and citizen trust is more prominent for repeat users" (Warkentin, *et al.*, 2002, p. 160). Figure 27 reflects the distinction specifically and the 'influencing factor' *Initial vs. Repeat User* is removed. This is possible because of the distinctness of the two models composed from the literature. There is evidence that the effects of the drivers are distinct, not merely differently loaded, when the relational style is taken into account (Kim, *et al.*, 2004).

For transactional (initial) users, there are two further modifications to the model. The literature provides evidence of *Trust* influencing positively both *Perceived Ease of Use* and *Perceived Usefulness* (the factors imported from the Technology Acceptance Model (Davis, 1989)). Furthermore, given the explicit distinction between initial and repeat use, the (meaningless) influence of *Experience* is removed. To the extent that broad experience with e-government might influence a transactional user, the influence would function as the remaining *Institution-based Trust* driver, or it would act through *Perceived Risk* (Featherman, *et al.*, 2006).

It is in the relational (repeat) user drivers that more insight is provided to the original model. Three crucial elements are missing from Warkentin et al's (2002) initial model according to the blended model derived from the literature. (Of course, some of that literature appeared after Warkentin and his colleagues proposed their model.) Probably the most critical for relational circumstances is to acknowledge *Loyalty*, which is made up of a collection of concepts around relationship commitment, relationship benefit, and relationship investment in the blended model. *Trust* drives *Loyalty* and it, in turn, drives *Intention to (re-)Use*.

Next most important is probably *Satisfaction*. This factor is not dissimilar to the concept of *Experience (familiarity)* proposed by Warkentin et al (2002), but is a larger concept that incorporates the user's assessment of their experiences. The influence of *Experience*, which represents process-based trust (Warkentin, *et al.*, 2002), reflects the accumulation of expectations built from past interactions. Such an accumulation of expectations would include the influences of *Relationship Investment* and *Relationship Benefit*. These concepts have been subsumed within

Loyalty, but an additional influence from *Experience* to *Loyalty* is added to the model to reflect this similarity.

The interrelationship between *Trust* and *Satisfaction* is clearly complex and must also be reflected in any over-arching model. Similarly, *Web Site Quality* and its influence on *Trust* and *Satisfaction* are essential elements of considering relational arrangements according to the literature. Finally, the blended model included *Reputation* as an important influence on feelings of *Trust.* In Warkentin et al's model, *Institutional Factors* reflects many of the same attributes of *Reputation* (Warkentin, *et al.*, 2002) and so the existing relationship is preserved and *Reputation* is not shown explicitly.

Finally, I am in agreement with Welch, Hinnant and Moon (2005) that *Characteristics-Based Trust* is not especially relevant in an online environment and so remove it from the model. That is not to say that *Characteristics-Based Trust* is not important, or that it does not have influence on adoption. Rather it is to acknowledge that it is difficult to implement in an impersonal online environment (Welch, *et al.*, 2005) and, as Warkentin et al (2002) point out, may actually be illegal (discriminatory) to attempt to address directly.

It is important to reinforce at this time that simply identifying areas where attention might most powerfully be paid does not preclude maintaining an over-arching concern for good design. One would not, for example, forego tactics that increase the *Perceived Ease of Use* of an online service for a relational transaction simply because it is not explicitly included in that part of the modified model. As illustrated in Figure 25, Tan, Benbasat, and Cenfetelli (Tan, *et al.*, 2007; 2008) found support for these factors specifically. Other research where two alternate models exist is explicit in noting that good website and information quality are essential for all users (Kim, *et al.*, 2004; Kong & Hung, 2006). What the modified model offers are areas of particular focus: higher priority design considerations depending on the type of transaction that is being designed.

6.3.5 Design Principles to Increase Adoption of e-Government Services

On the basis of the creation of a modified model of e-government service adoption drivers (Figure 27), I can now propose further regulatory rules of e-government.

PS 6 Design Principles to Increase Adoption of e-Government Services

P 6.1 e-Government services mediated by the Internet for *customers* and *citizens* should focus on being easy to use, seek to alleviate perceptions of risk, and model the best practices of relevant commercial online services.

P 6.2 e-Government services mediated by the Internet for *customers* and *citizens* should keep the user informed of service progress and offer opportunities for the user to exercise control over the process of the service.

P 6.3 e-Government services mediated by the Internet for *clients* and *subjects* should focus on communications quality using clear terms and tailoring the communication to the circumstances of the user.

P 6.4 e-Government services mediated by the Internet for *clients* and *subjects* should reinforce the nature of the relationship between constituent and government.

P 6.5 e-Government services for *subjects* and *clients* should explicitly describe the overall service process and the current status or progress of that service.

These design principles derive from the relationships postulated and verified in the work of others. Warkentin et al (2002) derived their model (Figure 21) by coalescing such work and I used the same approach through a different theoretical lens (Figure 22 and Figure 26) to then modify their model (Figure 27). Although the scope of application of the relationships has been adjusted, my refinement of the Warkentin et al model does not reduce the validity of the constructs portrayed within the model. Consequently, the major relationships depicted in Figure 27 can reasonably be added to the collection of design principles.

6.3.6 Summary of Market Segments, Relationship Style, and e-Government Adoption

For clarity, I reiterate that this section has not attempted to validate the Warkentin et al (2002) model nor to suggest that the market segmentation approach develops an inherently more valid model. The demonstration is of the theoretical advantage that a more refined view of e-government service users (constituents) offers when investigating adoption drivers.

There are two important contributions from this research to highlight at the conclusion of this section. One is the synthesis of two blended models of adoption drivers that are proposed to offer greater insight into the factors that influence e-

government adoption depending on the measurement on the Interactions *template-construct* and its implication for the type of relationship in existence between the constituent and the government. The contribution here is not the blending in itself (although once tested, these models would represent a contribution too) but the shift of perspective that allows two models to be developed that can be expected to more closely align with expectations of the constituents using the services so designed. This is exactly the insight that the market segmentation is designed to achieve.

The second contribution is the refinement of a significant element of existing theory by the application of the artefact designed by this research. The model of adoption drivers proposed by Warkentin et al (2002) is widely cited (116 citations according to Google Scholar on 6 March 2010), a strong indicator of its significance and impact as a piece of e-government theory (Clarke, 2008). The insights provided by the market segmentation proposed here and crystallised by the blended models presented offer significant and substantial enhancement to that model. This is a contribution in itself, but also demonstrates that the model, as a lever for enhancing existing knowledge, is a contribution too.

6.4 Publicness of Government Services

The insights into e-government adoption drivers drew on one major characteristic of the proposed segmentation. It is time now to consider the extent to which the constitutive rules of e-government—i.e. the nature of government itself—might affect the regulatory rules of e-government. Consequently, I will briefly consider where there are implications on the design of electronic services if the services are to be delivered by public organisations. In simplest terms, it sets the expectations of the transactor regarding with whom to make comparisons when anticipating interaction elements. If the transaction does not require the government as a participant (i.e. *Customer* or *Client* transactions), then expectations will be set by other commercial sites (Welch, *et al.*, 2005). If government is a necessary participant, expectations may be established by other commercial sites (Nielsen, *et al.*, 2001; Welch, *et al.*, 2005) but they will be filtered by the expectations one has of government *per se*. Criteria for commercially-oriented web design might not apply in the government sector (Ebbers, *et al.*, 2008; Fountain, 2001b; Wang, *et al.*, 2005). “How does one make the

site for paying the income tax exciting? Why should a government even try?" (Wang, *et al.*, 2005, p. 3). For the transactions that do not require the government as a participant, the standard is already set high by the world-leading websites and online service offerings. For the transactions that do require government, overcoming the perhaps unflattering expectations of government operations is equally challenging.

This consideration is premised on the idea that e-government is built on the same technologies and principles as e-commerce, but is also quite different. Typical differences (discussed in detail below) are: delivering services to a 'market' larger than any private organisation faces; the absence of simple quantitative measures of effectiveness of service delivery (e.g. profit); and the balance between the roles of provider of services and monitor of compliance in the one organisation.

6.4.1 Differences between Public and Private Sector Organisations

The argument that everything that is good for business (the private sector) is also good for the government (public sector) is regularly promulgated; most notably in the privatization debate (*Contracting out Government services*, 1997; Emmert & Crow, 1988; Fountain, 2001a; 2001b; Haque, 2001; Harris, 1999; Hodge, 1999; Mintzberg, 1996; Officer, 1999; Quiggin, 1999; Ryan, 2000). This view was seen as a major impetus for New Public Management (Ebbers, *et al.*, 2008; Fountain, 2001b; Lane, 2000). The alternative view is that the public sector is different from the private sector, that the difference is important and that it should not be overlooked (Bozeman, 1979; *Contracting out Government services*, 1997; Emmert & Crow, 1988; Fountain, 2001b; Haque, 2001; Hodge, 1999; Mintzberg, 1996; Officer, 1999; Ryan, 2000). As evidence that it is not clear cut, Australian history contains a myriad of examples of government provision of 'commercial' goods and services and similarly a wide range of instances where private sector firms have delivered public goods (Quiggin, 1999). So, if the public and private sectors are really different, what are the differences? This section summarises the differences between the public sector and the private sector. Then, following the emphasis from the last section, an extant model of trust design from e-commerce is used to draw a contrast between the expectations of public versus the private sector web sites in building trust.

But first, a clarification. The distinction between public and private sectors is not a simple dichotomy (Emmert & Crow, 1988; Mintzberg, 1996; Quiggin, 1999; Rainey, 1983; Rainey, *et al.*, 1976). On many dimensions that might be considered for the distinction between the two sectors, no hard-and-fast rules exist for definitively stating 'here public organisations begin and private organisations end', especially when different ownership or organisational models are considered such as quangos and cooperatives (Emmert & Crow, 1988; Mintzberg, 1996; Quiggin, 1999; Wettenhall, 1986). For the purposes of this discussion however, the "common sense" distinction (Rainey, *et al.*, 1976) will suffice; that is, the reader's intuitive understanding of the difference is (presumed) sufficient for the remainder of the discussion.

Table 31 shows a classification of the differences between public and private sector organisations along three main dimensions developed by Rainey, Backoff & Levine (1976) from a comprehensive review of the literature. They categorised the identified areas of difference into three main groups:

- Environmental Factors—the differences that arise in the environment in which public and private organisations operate;
- Organisation-Environment Transactions—the differences that arise in the way that public and private organisations interact with their respective environments; and
- Internal Structures and Processes—the differences that arise in the way that public and private organisations define themselves and operate.

Table 31: Three Dimensions of Difference Between Public and Private Organisations (from Rainey, *et al.*, 1976)

Area of Differences	**Distinguishing Variables**
Environmental Factors	• Degree of Market Exposure (Reliance on Appropriations) • Legal, formal constraints (courts, legislature, hierarchy) • Political Influences
Organization-Environment Transactions	• Coerciveness ("coercive," "monopolistic," unavoidable nature of many government activities) • Breadth of impact • Public scrutiny • Unique public expectations

Area of Differences	Distinguishing Variables
Internal Structures and Processes	• Complexity of objectives, evaluation and decision criteria • Authority relations and the role of the administrator • Organizational performance • Incentives and incentive structures • Personal characteristics of employees

Bozeman & Bretschneider (1986) extended that and other work in the context of information technology use in public and private sectors, building four models of publicness (Table 32). The four models grouped together differences between public and private organisations on the basis of the underlying reason the researchers considered that the studied organisations differed (Bozeman & Bretschneider, 1986).

Table 32: Four Models of Difference Between Public and Private Organisations (from Bozeman & Bretschneider, 1986)

Publicness Model	Distinguishing Variables
Economic Authority Model	• Market Failure • Poor Information • Breakdowns in Competition • Transaction Costs • Externalities and Public Goods • Property Rights • Input of Entrepreneurs and Wealth-sharing Managers • Inability to Transfer Ownership in the Public Sector
Political Authority Model	• Legal and Constitutional Structure • Fragmentation and Inter-dependency • Representativeness and Electoral Process • Individual Rights • Social Psychological Sources of Authority • Public Expectations, Public Interest • Civic Responsibility of the Individual
Work Context Model	• Time Frame • Political Cycles • Media Attention • Crisis Orientation • Accountability and Monitoring
Personnel Model	• Personnel Systems and Incentives • Motivation, Job Satisfaction • Red Tape and Formalism • Self-selection

These two useful collections of the differences between public and private organisations are orthogonal. Table 31 considers the differences as if from the centre of a typical organisation looking out, categorising issues as internal, boundary or external. Table 32, in contrast, collects together internal, external and boundary issues in groups influenced by the underlying view of what causes the differences. I have developed the simple diagram shown at Figure 28 to illustrate the apparent overlap between the two collections of differences. The figure is representative of the apparent extent of similarity found in the issues in each collection.

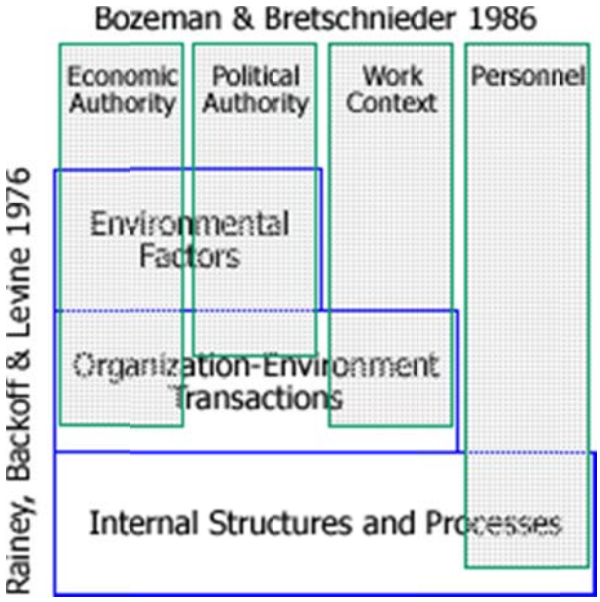


Figure 28: Interaction of Different Approaches to Difference Identification

This research is focused on e-government services, what Rainey, Backoff & Levine (1976) call Organization-Environment Transactions. They suggest four main areas of difference between public and private sector in this area. The following discussion is structured around these four main areas, using ideas from the Economic Authority, Political Authority and Work Context models (Bozeman & Bretschneider, 1986) to expand the discussion. First, I will discuss the closely related issues of the coercive nature of government and the breadth of its impact. Second, I will discuss the issue of public scrutiny. Finally, I will discuss the unique public expectations of government.

6.4.2 Coerciveness or the unavoidable nature of government, and breadth of impact

> "Consumers in a competitive market who are dissatisfied with the quality of service from some particular supplier have the option of exit, that is, of choosing another supplier… By contrast, where unsatisfactory services are provided by a government agency, it is necessary to resort to voice, through complaints to the local member of parliament, [or] the ombudsman" (Quiggin, 1999, p. 47) and ultimately, the polling booth.

Many writers note the coercive characteristic of government services (Bozeman, 1979; Deloitte Research, 2001; Ebbers, *et al.*, 2008; Field, 1996; Fountain, 2001b; Haque, 2001; Mintzberg, 1996; Officer, 1999; Quiggin, 1999; Rainey, *et al.*, 1976; Ryan, 2000; Symonds, 2000). In terms of e-government services it means that the service must be available to all constituents to allow them to comply with their obligations. (The constituent's ability to access e-government services is considered later.) This makes the 'market' for such services larger than any private market. There appear to be four major impacts on processes themselves, in an e-government context:

- **Inability to rely solely on electronic delivery**—constituents will not universally adopt e-government services (Brown, 2005; Burdon, 1998; CITU, 2000a; Deloitte Research, 2000b; 2001; Ebbers, *et al.*, 2008; Fountain, 2001b; POST, 1998; Singh, *et al.*, 2001). Even in 2008, seven years after all appropriate services became available online (Alston, 2002; Howard, 2002), only 61% of Australians interacted with government online at least once in the previous year (AGIMO, 2008). Consequently, any process design for e-government services must incorporate other delivery channels (i.e. some or all of face-to-face counter services, telephone call centres, mail processing, and participation by agents). All these channels might ultimately exercise the e-government process directly (Australia's latest e-government strategy calls for this explicitly (AGIMO, 2006c)), but provision of the service through other channels must still be made (i.e. forms must still be printed, staff must still be trained, etc) (AGIMO, 2006b; Ebbers, *et al.*, 2008).
- **Coordination across delivery channels**

> "An integral part of the citizen-centered model is self-service, in which the 'client' assumes many of the administrative tasks performed by the service provider. … This has given rise to a renewed effort to provide integrated service delivery, bringing together the various 'channels' of interaction between government and the public, including in person, by telephone, by mail and through kiosks as well as on-line" (Brown, 2005, p. 248).

—the progress and decisions made in one channel should be reflected, preferably in (near) real-time, across all delivery channels (AGIMO, 2006b; 2006c). The coordination is simplified if all channels ultimately use the same e-government service for actual processing. Nevertheless, explicit design for this coordination is warranted.

- **Monitoring and managing participation**—Government can end up with two roles: those of both the service provider and a monitor of compliance with entitlements and other policy or legislation (Barrett AM, 2001; Officer, 1999). Some services (for example, voting in some countries) require universal participation. Monitoring that participation and even the proactive encouragement of it, involve special process elements; for example, a definitive register of participants, accurate recording of participation, or appropriate approaches to reminding participants of their obligations. Constituents are required to identify themselves to access the service (in this example, to vote) and are monitored that they have done so.
- **Explicit branding**—Governments too, must concern themselves with identity. Government information and the output of government services (e.g. permits, authorities, decisions) must include the imprimatur of government authority for them to have the value that the constituent seeks and to ensure proper accountability (Brown, 2005).

The support of staff and agents delivering e-government services through other channels will require a set of processes to maintain the knowledge and skills of those people. These processes would not be directly part of the e-government service process design itself, however.

These requirements are not unique to government, indeed they are really little more than an explicit call for good customer service. The fact that government services are (often) inherently coercive makes the focus on these requirements more important.

6.4.3 Public Scrutiny

Public scrutiny is a frequently cited difference between private and public sectors (Barrett AM, 1999; Bozeman & Bretschneider, 1986; Rainey, *et al.*, 1976). This element of difference involves three related ideas:

- **Interdependency**—many government organisations rely upon other organisations either for support, as a 'partner' in delivering services, or as a monitor on activity quality and distribution (Barrett AM, 2001; Rainey, *et al.*, 1976).
- **Accountability**—it is commonly acknowledged that public sector organisations are more often held accountable, even if they are not actually more accountable, than private sector organisations (Bozeman & Bretschneider, 1986). All public sector organisations are required to be transparent, responsive and accountable (Barrett AM, 2001).
- **Bureaucratic Process**—A consequence of the interdependency and likelihood of being scrutinised is that public sector activities tend to be more process-oriented, with greater numbers of checks and authorities imbedded within the process than might otherwise appear (Bozeman & Bretschneider, 1986; Rainey, *et al.*, 1976; Watson & Carte, 2000). "The concept of procedural delay, related to many layers of oversight, can be thought of as a form of red tape" (Bretschneider, 1990, p. 573).

Before proceeding to discuss these issues, an important qualification is warranted. There is a variety of organisational forms that make up government (Wettenhall, 1986) and in the Australian Government they are separated into two broad classes depending upon which statue defines their constitution. Organisations constituted under the *Financial Management Act 1997* (the FMA Act) are under the control of government ministers. Organisations constituted under the *Commonwealth Authorities and Companies Act 1997* (the CAC Act) are independent organisations overseen by boards of directors that make annual reports to a Minister of the

government. Discussion here focuses on FMA Act organisations. The discussion is not irrelevant for CAC Act organisations, but I believe that the public perception of CAC Act organisations equates them more to private sector organisations, for the purposes of this discussion.

6.4.3.1 Interdependency

Public organization theory tells us that public organisations exhibit greater interdependence with other public organizations than private organizations (Bozeman & Bretschneider, 1986). Symonds (2000, p. 4) points out that "one of the basic reasons for public-sector inefficiency—'bureaucracy'—is that, whereas departments are vertically organised, many of the services that they have to deliver require complex collaboration between employees across departments." This interdependence involves responding to the various needs and demands of a wide range of stakeholders, including the legislature, other agencies, ministers, the judiciary, the public, oversight groups and external organisations (Bozeman & Bretschneider, 1986; Bretschneider, 1990; Ryan, 2000; Watson & Carte, 2000). Ultimately, the mission of the public agency is not established within the organization but through the elected representatives by the public (Bozeman, 1979). The authority of public organisations is at least partly derived from legal and constitutional arrangements that demand checks and balances (Bozeman & Bretschneider, 1986; Bretschneider, 1990), which frequently impose demands that conflict with each other and with goals such as operating efficiency, equity and accountability (Ebbers, *et al.*, 2008; Fountain, 2001b; Rainey, 1983).

Added to this inherent interdependence is an increasing desire to implement integrated government services; that is, services that are offered to constituents as a single transaction where several government agencies might be involved, frequently labelled as 'customer-centric' or 'citizen-centric' services (AGIMO, 2006c; Deloitte Research, 2001; Dovey & Helfrich, 2008; Wimmer & Holler, 2003). When adopting this perspective, government services are designed from the starting point of meeting constituents' needs or of helping constituents to meet their civic obligations; "The formal organization of government assumes secondary importance" (Brown, 2005, p. 247). Grönlund and Horan offer an important qualifier on this rhetoric noting that when discussing the impact of "e" on government, "Issues such as integration and

reorganization are typically discussed without reference to the principles and the history that resulted in government becoming precisely what it is today" (Grönlund & Horan, 2004, p. 723). In a similarly cautionary vein, Fountain (2001b) warns that such integrated services may actually disadvantage some constituent groups.

The trend towards integration and constituent-centricity presents some additional challenges, notably:

- cultural conflict between agencies that have developed individual traditions and practices mirroring individual business practices (Burdon, 1998) or legislative burden (Fountain, 2001b);
- political conflict where provision of integrated electronic services from across many jurisdictions but branded as one, may influence the location of economic entities (Deloitte Research, 2000b); and
- technical challenges such as integrating data across agencies or jurisdictions (AGIMO, 2006b; Deloitte Research, 2000b).

6.4.3.2 Accountability

Accountability is the requirement to answer to somebody for something (Barrett AM, 2001). It is important in both private and public organisations, but is generally more important in public organisations (Bozeman & Bretschneider, 1986). "The ability of the public sector external auditor to report in detail to the public domain of Parliament on the efficiency and effectiveness has no similar parallel in the private sector" (Barrett, 1996, p. 5). In the private sector, provided the decision-maker does not break the law, they may choose to do as they wish with no requirement to justify their decisions to others (Bozeman, 1979; Quiggin, 1999). The higher level of scrutiny in public organisations leads to higher levels of accountability mechanisms (Bozeman & Bretschneider, 1986) usually implemented as controls over process and procedures (the means) because of the difficulty in identifying performance and output measures (the ends) to control (Bretschneider, 1990; Rainey, 1983).

Bozeman (1979) maintains that although there are different accountability requirements, the effectiveness of legislative and executive oversight, especially in large, complex organisations, is questionable. This can be further exacerbated if some outsourced, or public-private partnership arrangement, is established to

implement government service delivery as "common citizens 'may simply not be able to determine whether government or its contractors is responsible for a particular service…'" (Haque, 2001, p. 71). (This was covered in some detail earlier; section 4.5.4.) The high levels of accountability can also potentially exacerbate the privacy issue (Privacilla.org, 2000b), discussed in more detail below.

6.4.3.3 Bureaucratic Process

The Economic Authority Model described by Bozeman & Bretschneider (1986) claims a lack of market-based incentives to efficiency through the lack of property rights of public servants within the organisation. Andersen and Henriksen (2005) directly support this, citing research in Singapore. Consequently, to achieve needed efficiency and effectiveness highly structured and formalized rules and procedures are elaborated within the organization (Rainey, 1983). The former Australian Auditor General, Mr Pat Barrett AM, provides some clear explanation of just why bureaucratic process is needed in public organisations. He maintains that information and records are critical to provide a clear evidential trail (Barrett AM, 2001) because there are common expectations that public officials act fairly, responsively, accountably, and honestly (Andersen & Henriksen, 2005). This means keeping detailed and accurate information about processes. Barrett (1996) also notes that provided the evidence is tangible, it can be integrated completely within the processes of the organisation.

> "Transparency is achieved by ensuring that the decision-making process and the reasons for decisions made are adequately documented and communicated to stakeholders. … I would like to stress the importance of implementing effective record-keeping systems in an environment where significant decision-making is taking place through electronic media" (Barrett AM, 1999, pp. 14, 16--emphasis in original).

There are positives to the automation of bureaucratic process. By integrating the data that arises from electronically delivered services, much valuable information can be collected about service use, as well as much more accurate data about constituents as 'customers' (Bellamy & Taylor, 1998). This could lead to "more accurate identification and fulfilment of specific customer needs, assist with demand forecasting and strategic planning as well as aid in the development of better

customer-centric programs" (Deloitte Research, 2001, p. 14). There is always a danger in the collection and aggregation of data in government processing, especially as the government can oblige disclosure of sensitive data, and that is the potential for abuses of personal privacy (Privacilla.org, 2000a), or surveillance of constituents through their electronic activity (Brown, 2005).

In summary, the pressures of public scrutiny lead to several process-specific requirements for electronic government services:

- **Standards**—for processes to be readily reviewed by external scrutineers, and to facilitate interoperability where needed, they must be based upon common standards across (tiers of) government. The nature of the government sector allows for greater cooperation on standards implementation than might exist in other industry sectors, largely because of a lack of competition for organisational success and because of common drivers. Initiatives such as the Australian Government Architecture (AGA) (AGIMO, 2009), the United Kingdom's e-GIF (now in its sixth version) (e-Government Unit, 2005), and the United States' Federal Enterprise Architecture Framework (FEAF) (OMB, 2007), among others, all speak to this idea being adopted in governments world-wide.
- **Explicit, automated, bureaucratic process**—processes must include within them sufficient controls to allow accurate and (relatively) ready scrutiny by external auditors. Automated processes must encode directly more of the legislative, policy, or business rules by which processes are defined (in contrast to simply recording data arising from those processes) and entitlements determined to provide sufficient data for necessary public accountability. The nature of electronic services allows for such record-keeping to be implemented without the usual burdens of time and complexity (if the record-keeping is designed as part of the process), and can provide the necessary evidence to satisfy the scrutiny needs of oversight organisations. Explicit business rules and processes also support modification of the processes as government policies (or governments) change. As noted earlier, e-government often makes explicit unwritten rules and removes opportunities for corruption (Imran, *et al.*, 2008).
- **Careful use of identity**—the collection of personal data, its integration in various processes or across various agencies and jurisdictions, and the relatively

ready access provided to external scrutineers, all call for increased emphasis on maintaining the privacy of personal data. This issue is discussed further below.

6.4.4 Unique Public Expectations

Constituents feel that, by virtue of government agencies' public ownership, they have rights and obligations that they do not have toward private organisations (Rainey, 1983; Singh, *et al.*, 2001). Constituents want to interact with governments on their own terms (CITU, 2000a; Cortada *et al.*, 2008; Cullen & Hernon, 2006a; Thomas & Strieb, 2003). On the same basis, public services must "respond to the needs and expectations of all citizens, not just the affluent customers or clients who 'seem unable to function as a public'" (Haque, 2001, p. 69). Bozeman & Bretschneider's (1986) Political Authority Model reasons that public organizations and public employees work in the public interest; a common view (Fountain, 2001b; Rainey, *et al.*, 1976; Singh, *et al.*, 2001).

The public can be seen to have three main expectations that will influence e-government service processes:

- **Privacy**—the public recognises the need for government to collect personal information but expects it to be used 'appropriately' and not cross-correlated between government agencies (Accenture, 2004; Bellamy, 1998; Eggers, 2005; Hiller & Bélanger, 2001; Legislative Assembly Office, 2001).
- **Equity (of Access)**—in keeping with the general view that government works for the people, the public expects to be able to access government services as they prefer, when they prefer, and to not be discriminated against as a consequence of those choices (Accenture, 2004; CITU, 2000a; Ebbers, *et al.*, 2008; Fountain, 2001b; Haque, 2001; Harris, 1999).
- **Fee-free**—the public does not expect to pay for the provision of government services, as the funding for government is already sourced from them through taxes (Deloitte Research, 2001; Ebbers, *et al.*, 2008; Legislative Assembly Office, 2001).

6.4.4.1 Privacy

A substantial body of evidence exists that the public is concerned about the collection and protection of private confidential information by governments

(AGIMO, 2005; 2006a; 2007; 2008; Bellamy & Taylor, 1998; Deloitte Research, 2001). Although banks and insurance companies hold a great deal of personal data, governments amass a huge range and detail of information on their constituents (Symonds, 2000); usually by force of law (Brown, 2005) and frequently in excess of the specific needs of the process by which it is collected (Privacilla.org, 2000a; 2000b). Privacy is often spoken of in the same breath as security (e.g. Egger, 2001). Indeed, the Australian Government's Privacy Principles include an explicit requirement for data to be kept secure (Principle 4 – Storage and Security of Personal Information) (Privacy Commissioner, 2008). Security in e-government transactions is important. It is not considered in this research as it applies equally across public and private organisations and is seen as an infrastructure, rather than a process, issue.

A key implementation issue for e-government is that of electronic identification and authentication (Akesson, *et al.*, 2008; Caloyannides *et al.*, 2003; CITU, 2000a; POST, 1998). When the government provides services to an individual, it must authenticate the person receiving the service as eligible to receive it (Akesson, *et al.*, 2008; Caloyannides, *et al.*, 2003). This leads to the question: Just how much constituent data do governments need to achieve optimised service fulfilment? It is also important to ensure that distinguishing between constituents for greater specialisation of services and advice—as advocated by this design theory—does not lead to discrimination among constituent groups (Bellamy & Taylor, 1998; Fountain, 2001b; Haque, 2001).

E-government services must incorporate a focus on protecting privacy. Implementing and enforcing privacy legislation is a major first step (Barrett AM, 1999; OTA, 1996; POST, 1998). One technical approach is to 'anonymise' personal data using 'Privacy Enhancing Technologies' (e.g.Gabber, *et al.*, 1999; Goldschlag, *et al.*, 1999). This would allow data pooling and sharing without risking individual privacy (POST, 1998). Privacy advocates point out that "when dealing with government, however, anonymity or pseudonymity is often impossible, illegal, or at the very least, suspicious" (Privacilla.org, 2000b, p. 1).

6.4.4.2 Equity (of Access)

Much of the drive to e-government reflects "the belief that these new capabilities will permit wider, more inclusive access, greater choice, and more flexible, responsive

public services capable of being tailored to the increasingly disparate needs of consumers" (Bellamy & Taylor, 1998, p. 65). Inherently, the public service has an obligation to treat members of the public consistently: it cannot distinguish between members of the public because of criteria that are not relevant to the services (Bellamy & Taylor, 1998; Ebbers, *et al.*, 2008; Fountain, 2001b; Haque, 2001; Harris, 1999). Consequently, online services must be accessible to all including provision for multiple language groups, physical and mental impairments (CITU, 2000a; Ebbers, *et al.*, 2008), not discouraging use just because of "its remote and dehumanizing nature" (Bellamy & Taylor, 1998, p. 66), and not exclusively offered electronically (as discussed earlier).

If electronic service delivery is to achieve its full potential, its users, the public, will need universal, affordable access to telecommunications and computer networking (AGIMO, 2005; 2006a; 2007; 2008; Bellamy & Taylor, 1998; NTIA, 1999; 2000; OTA, 1996). Just having access to the services is not sufficient; citizens must also know that services exist and how to obtain them (Accenture, 2003; 2004; AGIMO, 2007; 2008; Cullen & Hernon, 2006b; OTA, 1996). The actual level of interaction differs among different client groups too, of course. Some access government services by any means only once or twice a year, while others "(predominantly unemployed or otherwise needy citizens) make far more frequent calls upon government. For them, access to government services can become a significant component of their lives" (Singh, *et al.*, 2001, p. 7).

Another crucial influence on access is that, since the 1980s, the primary objectives of public service have changed from the realization of citizen's rights or entitlements to the accomplishment of economic goals based on efficiency and competition (Fountain, 2001b; Haque, 2001). Between this restructuring in the allocation and use of public sector resources and the likely uneven adoption of electronic services through a retreat from universal service principles (Bellamy & Taylor, 1998), underprivileged citizens may potentially be excluded from government provision of services (Ebbers, *et al.*, 2008; Fountain, 2001b). Such a result would be in stark dischord to Singh et al's (2001) claims of such people being the biggest users of government services.

6.4.4.3 Free

A further consequence of the belief that government organisations are inherently owned by the public is the reticence to pay for services provided by government. This reticence differs between countries (Deloitte Research, 2001). From the government perspective, the issue of covering the cost of services is also contentious. There may be services that the government believes should be free (Legislative Assembly Office, 2001). Charging for services may inadvertently discriminate between constituents on the basis of their ability to pay (Fountain, 2001b; Haque, 2001; OTA, 1996). As Lan and Falcone put it: "Information for a fee restricts universal access" (Lan & Falcone, 1997, p. 255). There are, of course, some services that already attract a fee.

Another key issue in implementing e-government services is whether the changed cost base of delivering the service should be reflected in the customer fee (either positively or negatively) (Deloitte Research, 2001). Is offering a cheaper service over the web a form of discrimination on the basis of Internet access? Is profit-taking by holding fees constant over (arguably) cheaper channels in line with constituent expectations of 'low-cost' government? (Deloitte Research, 2001; Lan & Falcone, 1997; Legislative Assembly Office, 2001). These interesting questions are not pursued in this research.

In a devolved budgetary environment, who will meet the cost of providing the service? (POST, 1998; Rimmer, 2001). Even if services do accrue a charge, the return on investment in collecting, storing and disseminating public information remains difficult to measure, especially by the business case methods currently used in government (Accenture, 2004; Bellamy & Taylor, 1998; Deloitte Research, 2001; Dovey & Helfrich, 2008). Finally, in line with Bozeman & Breschneider's (1986) Economic Authority Model, some authors (Officer, 1999; Stiglitz *et al.*, 2000) note that some information is a public good and, consequently, may defy appropriate pricing in common with other public goods (Bozeman, 1979; Rainey, *et al.*, 1976).

In summary, public expectations play a significant role in the development and implementation of e-government services. Specific impacts of public expectations at a process level include:

- **Monitoring and managing participation** (discussed earlier)
- **Explicit use of identity**—as noted in section 4.5.1, constituents require access to services in one of two modes: claiming an identity, and consequently a set of rights, entitlements and obligations; and anonymously. Services must not only use the reliable identification and authentication described above, but must explicitly and reliably **not** use it, at the discretion of the constituent. This will act to reassure the constituent that their privacy is controlled (or at least influenced) by them and that they can interact with government without influencing the government's view of them (for example, by inquiring about matters that might affect an existing entitlement and implying that there has been a change in their circumstances).
- **Inability to rely solely on electronic channels** (discussed earlier)
- **Explicit charging for services**—where the government decides that an electronic service must be paid for directly by the constituent the process will probably need to include payment options, including (possibly) deferment, offset against other entitlements, and waiver of fee according to specific conditions being met. The selection of a level of charge to apply will be a difficult policy matter.

6.4.5 Other Differences

Within the Work Context model proposed by Bozeman & Bretschneider (1986) there is one area that Rainey, Backoff & Levine (1976) did not specifically identify, that of the influence of changes in government and policy because of political cycles. Although it is common for all political parties to support e-government initiatives, it is also common for them to have different agenda and priorities. Consequently, the influence of political cycles must also be considered for its impact on e-government processes.

6.4.5.1 Political Cycles

"There is no private sector counterpart to political control of public organizations" (Bozeman & Bretschneider, 1986, p. 479). Probably the most important difference in the time frame for public and private sector managers is that of regular pressures to re-consider agenda and workplans (Bozeman & Bretschneider, 1986; Caudle *et al.*,

1991; Watson & Carte, 2000). Appropriations financing generally means annual budgeting, governments change regularly, and there is a constant pressure to achieve quick results—results that help the agency claim a larger budget and that can help in re-election (Bozeman & Bretschneider, 1986). Contrarily, the political influence on directions and initiatives can mean that public sector managers have less choice about starting or stopping activities (Rainey, *et al.*, 1976). The regular changes of political masters and politically-established agenda, which are supposed to represent changes in requirement by the public (Bozeman & Bretschneider, 1986; Bretschneider, 1990), can result in changes down to the level of data element definitions (Caudle, *et al.*, 1991). And, in the context of this regular and frequently dramatic change, public sector managers are left with "less decision-making autonomy, less authority over subordinates, greater reluctance to delegate, and a more political role. There is a more frequent turnover of top managers due to elections and political appointments; difficulties in devising incentives for individual performance; and lower work satisfaction and organizational commitment" (Thong et al., 2000 cited by Andersen & Henriksen, 2005, p. 38).

These pressures from the political cycle have a direct effect on potential e-government services, specifically:

- **Standards** (discussed earlier)
- **Explicit, automated, bureaucratic processes** (discussed earlier)
- **Explicit charging for services** (discussed earlier)
- **Processes defined in loosely-coupled, tightly integrated architectures**—by creating processes using small well-defined, internally consistent components, assembled as building blocks to achieve (current) process objectives, changes can be accommodated more efficiently by re-assembling the process from (hopefully unchanged) building blocks, rather than creating whole new processes from scratch. Such an approach would also accommodate the changes in portfolio responsibilities that often accompany a change of government or a re-elected government seeking a 'new broom' appearance.

6.4.6 Summarising the Differences of Government over the Private Sector

In section 6.3, I used an extant model of e-government adoption drivers to show the effect of recognising one dimension of the proposed market segmentation with particular regard to the nature of the relationship between constituent and government; i.e. whether the relationship was transactional (essentially, a one-off interaction on each occasion) or relational (the accumulation of a range of interactions to achieve some larger, usually complex, objective). Here, I use the same approach to illustrate the difference of perspectives described above, albeit with a different model from the literature.

Reigelsberger, Sasse and McCarthy (2005) have proposed a widely-cited framework for researching and designing trust in human-computer interactions. This framework offers the opportunity to understand what (interface) design issues may promote greater trust in the user. Importantly, and different to other models purporting to support the same matters (e.g. Egger & de Groot, 2000; Tan & Thoen, 2001), Reigelsberger, Sasse and McCarthy's framework is based on the idea that "symbols" of trust are not as potent as "symptoms" of trust because the symbols can be imitated by untrustworthy players. They are "not only advocating designing for *well-placed trust*, but also for *trustworthy behaviour*" (Reigelsberger, *et al.*, 2005, p. 384—emphasis in original). Their framework, illustrated in use in Figure 29, takes the perspective of the trusted actor (the trustee) and comprises contextual indicators of trustworthy behaviour (between the consumer and the vendor in Figure 29) classified as temporal, social, and institutional factors, and intrinsic indicators of trustworthy behaviour based on the vendor's perceived ability and motivation. The vendor's motivation is further differentiated to be underpinned by internalized norms and tendency to benevolence. The model is very flexible and applicable in a wide range of interactions that involve trust (for further details see Reigelsberger, *et al.*, 2005). As illustration of its flexibility, the authors collate the conventional wisdom of trust indicators in e-commerce in the framework, repeated here in Figure 29.

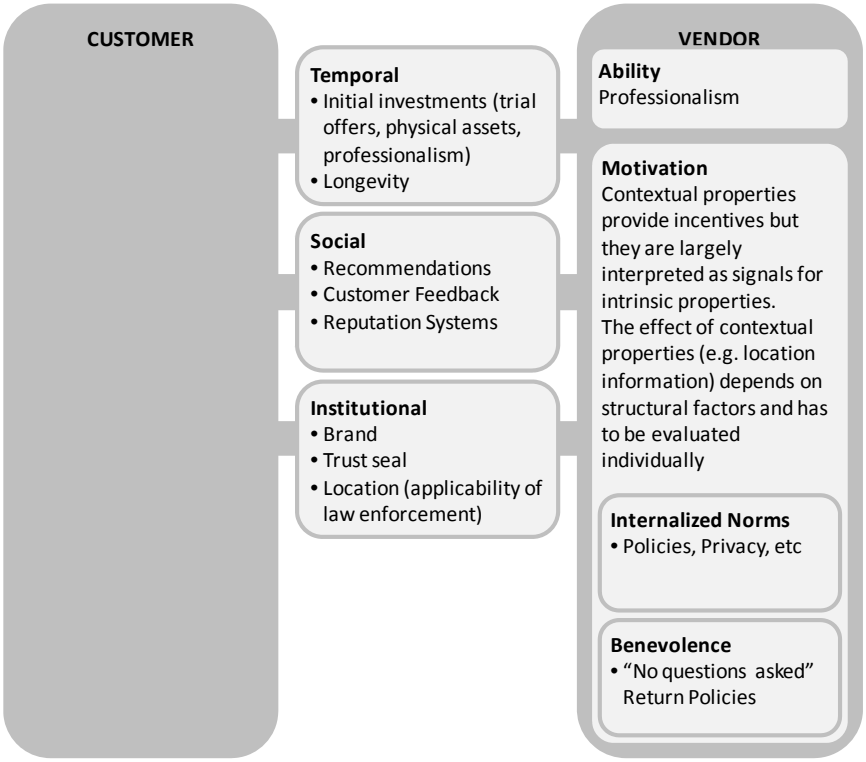


Figure 29: A trust framework applied to trust in e-commerce (from Reigelsberger, *et al.*, 2005)

Figure 29 provides a convenient benchmark against which to build a comparable model of the important trust indicators that my preceding discussion suggests for interactions between constituents and government. For interactions involving *Customers* and *Clients*, the ideas capture in Figure 29 are largely applicable as the fact that the government, a public sector organisation, is part of the interaction is, by definition, not important. However, when considering *Citizen* and, especially, *Subject* interactions, Figure 30 offers guidance for reflecting trustworthy behaviour essentially equivalent to that shown in Figure 29 but recognising the key differences between public sector and private sector interactions.

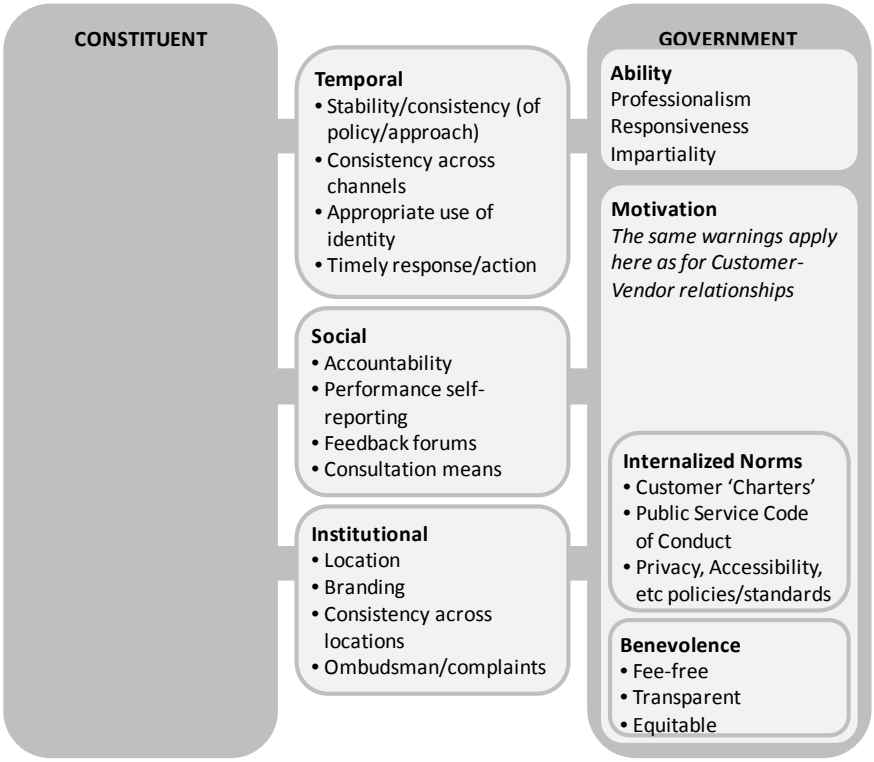


Figure 30: A trust framework applied to trust in e-government (based on Reigelsberger, *et al.*, 2005)

I will explain the concordance and differences between Figure 29 and Figure 30. In commercial transactions, temporal indicators of trustworthiness act to reassure the customer that the vendor is here to stay through indications of longevity and investment in the interaction (Figure 29) (Reigelsberger, *et al.*, 2005). In interactions between constituents and government, the longevity of the government can be taken as read so temporal indicators shift more to the long-term effects of the interaction, hence suggestions for stability and consistency in policy and approach over time and consistency in interactions across all channels. Timeliness of response and an appropriate use of identity reflect the equivalent of professionalism in the commercial interaction. In commercial interactions, social indicators reflect the perceptions of others and provide normative influences on the customer (Reigelsberger, *et al.*, 2005). These ideas apply in a government-based interaction too, but the focus shifts more to accountability and transparency of dealing. In essence, the more that the government is prepared to share of its own performance the more trustworthy it will appear to constituents. Government trustworthiness is also reinforced by the level of consultation and feedback offered to constituents. Institution-based trust indicators in a commercial setting seek to establish the reliability and trustworthiness of the organisation as a whole (Reigelsberger, *et al.*,

2005). In government-based interactions, these matters are equally important. The same factors apply and are supplemented but additional concerns such as consistent interaction behaviour in each office visited (demonstrating a consistency within the organisation) and the opportunity to formally complain to independent authorities.

The intrinsic attributes of the government-as-vendor are not substantially different to those of a commercial vendor proposed by Reigelsberger, Sasse and McCarthy (2005). There are, however, additional properties considered by constituents, as discussed above. The government's intrinsic ability is not only assessed for its professionalism but for its responsiveness and impartiality. Responsiveness demonstrates that the government is not hide-bound in bureaucracy. Impartiality demonstrates that the rules that must exist are applied equitably to all constituents. The intrinsic attributes of a government's internalised norms are where the government must work hardest. The default view of most constituents of government is that it is a bureaucracy that does not care about the individual. Publishing customer service charters and reminding constituents (and staff) of a public service Code of Conduct provide indications of the norms that the government wishes to be held to and can set constituent expectations appropriately. Finally, privacy, accessibility, retention, freedom of information and other data handling and availability policies are critical intrinsic indicators of trustworthiness for government. Finally, it is inherently difficult for the government to be benevolent (i.e. to give things away or to waive penalties) but it can demonstrate the equivalent of benevolence by the setting (or not) of fees for service, by offering insights into how processing happens and why (acting 'transparently'), and by not only acting equitably but being seen to act equitably.

The contrast between Figure 29 and Figure 30 serves to highlight the difference in expectations and appropriate trust indicators between the commercial sector and the public sector. Importantly, these ideas become evident when one adopts the view that there is a fundamental difference between commercial and public sector interactions even when the government is involved in all of them. The ability to distinguish these subtle differences is the power of the market segmentation approach. Recognising the fundamental character of the interactions between constituents and government manifested in the role that the constituent adopts and consequently their expectations

of government refines usefully the approaches to designing and implementing e-government services.

The ideas discussed in this section are summarised in the rule list below.

PS 7 Design Principles from the Publicness of Government

P 7.1 e-Government services aimed at *subjects, citizens,* and *clients* must be offered across all channels.

P 7.2 e-Government services aimed at *subjects* that occur across channels should be coordinated so that interactions in one channel acknowledge any previous related interactions in any other channel.

P 7.3 e-Government services that operate across channels must provide a consistent service experience in all channels.

P 7.4 e-Government services aimed at *customers* may be offered exclusively online.

P 7.5 e-Government services for *subjects* and *citizens* should be made transparent through explanations of processes, rules that apply, and justification of unexpected results.

P 7.6 e-Government services for *subjects* and *citizens* should include information about opportunities for complaint or review, preferably with a direct link to such resources for services mediated by the Internet.

P 7.7 e-Government services for *subjects* and *citizens* should not involve an explicit fee for the service.

P 7.8 The environment in which e-government services are provided to *subjects* and *citizens* should include information about privacy, accessibility, freedom of information, and other data management policies.

P 7.9 The environment in which e-government services are provided to *subjects* and *citizens* should include information about customer service standards and public servant codes of conduct.

Note that some earlier principles (e.g. explicit requirement for identity for *subject* and *client* services [P 1.2, P 1.5 and P 1.6], explicit identification of organisations in multi-party service offerings [P 1.11and P 1.12], branding of *subject* service outputs [P 1.9]) are all reinforced by the 'publicness' of government.

6.5 Summary

This chapter has attempted to demonstrate the usefulness of the market segmentation that sits at the centre of this research. Nearly fifteen years of using the segments as a lens through which to view e-government services and their design has not yet failed me. The discipline of academic research practice and critical analysis has not weakened my conviction of the value of this approach. Lately, promulgating the segmentation and its application to design problems to other e-government practitioners (particularly the Queensland government, as discussed in section 5.3) has supported the usefulness, analytical strength, and acceptability of the approach.

This chapter has illustrated the usefulness of the segmentation in three ways:

- In section 6.2, the direct application of the segments, and particularly the Market Segmentation Filter Rules (Ruleset RS 5), successfully classified the example services and offered insights into specific design issues that would need to be addressed to meet constituent expectations of those services. This simple illustration highlights the economy of the technique and the intuitiveness of the results;
- In section 6.3, the power of the segmentation was turned directly to the topic underlying the problem, constituent adoption of e-government services. By applying the lens of the relationship dimension of the segmentation, existing theory on the drivers of adoption of e-government services was consolidated into two distinct models. Those new perspectives were then applied to a significant and oft-cited overall model of e-government adoption drivers to refine that model in important ways. The refinement highlighted significant short-comings in the original model, particularly for constituents with regular interaction with government; and
- In section 6.4, the other major dimension of the segmentation, the necessary level of involvement of government in the interaction, was used as a lens to identify design principles for e-government services that explicitly acknowledge the 'publicness' of government in the interaction.

The next chapter concludes this thesis, bringing together all of the elements presented over the past six chapters, noting limitations of the work presented, and pointing to future research to further refine and extend the ideas here.

Chapter 7 CONCLUSION

7.1 Introduction

In Chapter 1, I identified the problem of unsatisfactory levels of adoption of e-government services by constituents. This slow adoption rate is inhibiting the realisation of the expected benefits of e-government. In Chapter 2, I set my research on the path to develop a framework in which design principles for e-government services could be categorised to increase the likelihood of those services being adopted. In Chapter 3, I established that I would present that research as an information system design theory in the form recently articulated by Peffers et al (2008). The thesis has been constructed along the lines proposed by them as demonstrated in Table 33, which repeats Table 1.

Table 33: Concordance of Thesis Structure with Design Theory Structure (after Peffers, *et al*., 2008)

Design Process Element	**Brief description**	**Thesis Chapter**
Problem identification and motivation	Define the specific research problem and justify the value of a solution.	Chapter 1 Why Should We Study E-Government?
Objectives of a solution	Infer the objectives of a solution from the problem definition and knowledge of what is possible and feasible. The objectives can be quantitative or qualitative.	Chapter 2 What Do We Know About e-Government? Chapter 3 How Can We Formulate Advice on E-Government
Design and development	Create the artefact, which can be any designed object in which a research contribution is embedded in the design.	Chapter 4 A Novel Market Segmentation
Demonstration	Demonstrate the use of the artefact to solve one or more instances of the problem. This could involve its use in experimentation, simulation, case study, proof, or other appropriate activity.	Chapter 5 Validating and Verifying the Segmentation
Evaluation	Observe and measure how well the artefact supports a solution to the problem; comparing the objectives of a solution to actual observed results from the use of the artefact.	Chapter 6 Applying the Segmentation
Communication	Communicate the problem and its importance, the artefact, its utility and novelty, the rigor of its design, and its effectiveness to research and other relevant audiences.	Chapter 7 Conclusion

7.2 Communicating the Theory

In Chapter 3, I indicated that the framework articulated by Gregor and Jones (2007) would be used as a means of evaluating the completeness of the design theory. Their framework includes eight elements, the first six of which are mandatory (Gregor & Jones, 2007):

- Purpose or scope—what the system is for;
- Constructs—representation of elements of interest;
- Principle of form and function—blueprint or architecture that describes the artefact;
- Artefact mutability—the changes of state in the artefact that the theory anticipates;
- Testable propositions—truth statements about the design theory;
- Justificatory knowledge—the underlying knowledge or theory;
- Principles of implementation—a description of processes for implementing the theory; and
- Expository instantiation—a physical implementation of the theory.

The first part of this conclusion will, then, recount the elements that coincide with these design theory components in the order proposed by Gregor and Jones (2007) as a cross-check against the thesis structure that follows Peffers et al (2008). This will primarily involve repeating the salient elements from earlier in the thesis.

7.2.1 Purpose or Scope

Reiterating the problem from earlier: how do we increase the adoption of complex government transactions online by constituents? If the public is increasingly comfortable purchasing and ordering online, why are they not adopting e-government more vigorously? What guidance can agencies be given so that online services are more appealing, more ‘adoptable’?

The problem can be stated more formally as:

> “How can Australian government agencies deliver services online in a way that promotes the benefits identified for successful e-government?”

Experience and some serendipitous insights lead me to believe that the question might be productively addressed along the following lines:

- Constituents will tend to adopt, and find more usable and useful, online services that meet their expectations about their interaction with government.
- The expectations of constituents about their interactions with government arise from the roles that they and the government play when interacting and that these roles can be classified in a manageably small number of categories.
- Online services should, then, be designed to meet the expectations of constituents given the nature of the service being delivered and its implications for the roles of government and the constituent.
- Consequently, guidance on online service design can be compiled that will assist practitioners to design services that meet the expectations of constituents without compromising other government objectives (e.g. cost efficiencies, equity of access, etc).

That, then, is the purpose of this research: to compile initial guidance on online service design within a framework that draws on the idea that there is a relatively small number of roles that constituents play when interacting with government. The model is expected to guide online service design so that the services will be more readily acceptable and more useful and user-friendly to constituents because they more closely meet constituent expectations.

More formally, the aim of the research is:

> "To provide a framework for online government service design guidance based on constituent roles in online government service interaction."

The model of design guidance limits its attention to guidance on the design of online government services that are targeted at constituents acting on their own behalf (i.e. not as a representative of some business or other entity). The range of services is limited only by what government provides to its constituents. The model focuses on design guidance for services that are delivered online. Although some of that guidance might affect processes that are also used for other delivery channels, e.g. counter-based services, the efficacy of the guidance is only claimed in the online channel.

7.2.2 Constructs

The components of a design theory are those things that the theory seeks to manipulate to some end. Key components of this theory are:

- Government—there may be occasions when e-government service implementations alter the instantiation of government itself (e.g. moving legal registers from paper form into electronic databases) including changes in processes and authority structures.
- Government services—activities undertaken by government that deliver a meaningful output to a constituent (specifically excluding services aimed at business and other organisational entities); the activity may only be a passive provision of information, or it may result in a direct intervention with the constituent such as arrest, or education.
- Constituents—although the theory does not manipulate constituents directly, it seeks to anticipate their expectations by classifying them according to the role that they adopt when interacting with the government.

7.2.3 Principles of form and function

In Chapter 3, I established that social action can be described in the form of rules and that this was a 'natural' form for advice to government. Consequently, the model is described in the form of rule statements proposed in Chapter 4 and repeated here.

First, the environment in which the model exists is defined through the identification of the constitutive rules of e-government.

RS 1 Constitutive Rules of e-Government

R 1.1 A rule that describes government equally describes e-government.

R 1.2 e-Government is the conduct of government using information and communication technologies.

RS 2 A First Regulatory Rule of e-Government

R 2.1 An act of e-government may be mediated by the Internet.

There are three primary rule sets that define the framework:

- **The Segmentation Rules** that establish the conceptual framework of a refined segmentation of the broad 'Citizen' segment in typical segmentations of e-government stakeholders.
- **The e-Government Service Characteristics Template Rules** that define the characteristics of e-government services that influence aspects of design of those services and that are used in combination to identify to which segment a particular service belongs.
- **The Market Segmentation Filter Rules** that define how to use the e-Government Service Characteristics Template to identify the segment to which a service belongs.

7.2.4 Artefact Mutability

The artefact is likely to mutate over time along three equally probable and unpredictable dimensions:

- The expectations of constituents will change; they will still arguably fall into the four roles described, but the specific guidance for each of them may change as people's familiarity with online interactions increases. The current set of 'default' or 'standard' expectations that have informed the artefact to date can be most simply described as those of a middle-aged middle-class white man from a first-world country. Different expectations will arise from cultural differences as well. These mutations should not invalidate the principle behind the segmentation, nor the segments themselves, but would certainly require a re-calibration of the design guidance.
- The nature of the services offered by governments will change, and their availability online will also evolve. Again, this is unlikely to invalidate the segmentation itself, but may tend to shift the expectations within the segments and would certainly require a re-calibration of the design guidance.
- The nature of technology and electronic service delivery will change. These changes will require new design principles to be considered and the influence of the segments on those principles to be determined. Similarly, the new technology approaches may invalidate some current design principles.

7.2.5 Testable Propositions

In the course of articulating the model, I established a series of propositions about it. Those propositions were then subjected to an initial test in Chapter 5 using data made available to me by the ACT Government. The testing possible with that data was not necessarily conclusive as the preliminary manipulations (described in Annex A) were 'back-fitted' to the data available. Those propositions are reiterated here.

P1. The basic market segmentation adopted is a 'good' benefit segmentation of 'the public' (constituents acting on their own behalf)

P2. The template-consensus *for the e-Government Service Characteristics Template is high for e-government service designers*

P3' The combination of 'measurements' on two template-constructs (Interaction and Reliance on Government) within the e-Government Service Characteristics Template presented in the filter is necessary to uniquely determine a segment for each e-government service.

P4' The combination of 'measurements' on two template-constructs (Interaction and Reliance on Government) within the e-Government Service Characteristics Template presented in the filter is sufficient to uniquely determine a segment for each e-government service.

The four propositions above, including those indicated with a 'prime' (') have been tested in this research and have found support.

P5. e-Government services identified as belonging to a particular segment using the filter have similar usage patterns to other services in the same segment

P6. e-Government services identified as belonging to a particular segment using the filter have different usage patterns than services belonging to a different segment

The last two propositions have been tested to the extent that the data available allowed such testing and did not find support. However, the data was inadequate for a robust test of these propositions and so they are left as un-validated and an area for future research.

Importantly, the model and the design guidance that it collates are expressed in the form of rules, each of which can be converted directly into a testable proposition.

The ability to translate rules into testable propositions means that the model is testable at every level; work that is left for future research.

7.2.6 Justificatory Knowledge

There are several underlying "micro-theories" that provide "kernel knowledge" to this thesis (Gregor & Jones, 2007):

- The thesis presents a design science model that is based on the idea of design theory most prominently articulated by Simon (1996).
- The artefact is a collection of 'regulatory' rules (Hollis, 1994) based on the concept of social action as games as proposed by Wittgenstein (1953). These regulatory rules apply to the constitutive rules of government itself, an area with a substantial body of theory.
- The artefact has as a primary structural element the marketing discipline theory of market segmentation as described by Smith (1972) and particularly the variation called Benefit Segmentation described by Haley (1981). Presented here is a careful justification of the adopted segmentation as fitting that theory appropriately.

7.2.7 Principles of Function

Chapter 6, section 6.2.1 (page 157) and particularly Table 25, illustrate how the segmentation can be applied to 'typical' e-government services. Once the segment for a service is identified, the design principles for services in that segment are available to guide service design. The principles that were identified in the course of developing this research are presented in Section 7.2.8.

7.2.8 Expository Instantiation

There is no extant expository instantiation of the artefact in whole or in part, or its effects. The model is entirely analytical. An expository instantiation is clearly an area for future research. For the purposes of clarity, the description of the framework—the artefact of this design science work—is consolidated here by repeating earlier sets of rules and principles.

There are three primary rule sets that define the framework:

- **The Segmentation Rules**—that establish the conceptual framework of a refined segmentation of the broad 'Citizen' segment in typical segmentations of e-government stakeholders.
- **The e-Government Service Characteristics Template Rules**—that define the characteristics of e-government services that influence aspects of design of those services and that are used in combination to identify to which segment a particular service belongs.
- **The Market Segmentation Filter Rules**—that define how to use the e-Government Service Characteristics Template to identify the segment to which a service belongs.

RS 3 Segmentation Rules

R 3.1 **E-government services are addressed at four major segments: constituents, businesses, other government agencies, and employees** (Received wisdom)**.**

R 3.2 **E-government services targeted at constituents are addressed at four (further) segments: *customers*, *clients*, *subjects*, and *citizens.***

R 3.3 **E-government services targeted at *customers* are typically commercial transactions for commodity-like products or services.**

R 3.4 **E-government services targeted at *clients* are typically professional services tailored to the needs or circumstances of the recipient delivered over a period of time.**

R 3.5 **E-government services targeted at *subjects* are typically prescribed services tailored to the circumstances of the recipient usually determined by law or policy and delivered over a period of time.**

R 3.6 **E-government services targeted at *citizens* are typically prescribed services surrounding public goods or interactions involving the constituent in the governance of the jurisdiction.**

RS 4 e-Government Service Characteristics Template Rules

R 4.1 **(*Template-theme*) e-Government services have characteristics that are salient to constituent expectations and behaviour.**

R 4.2 **(*Template-constructs*) e-Government services may be described using four major characteristics: the Nature of Service, the level of Interactivity, the level of Differentiation, and the Reliance on Government for interaction efficacy.**

R 4.3 (*Template-constructs*) The Nature of Service characteristic is defined as a binary construct with polar measurements of 'Passive (Informational)' and 'Active (Transactional)'.

R 4.4 (*Template-constructs*) The Interactivity characteristic is defined as a binary construct with polar measurements of 'Single' and 'Multiple/Repetitive'.

R 4.5 (*Template-constructs*) The Differentiation characteristic is defined as a binary construct with polar measurements of 'Commodity/Menu' and 'Individually Tailored'.

R 4.6 (*Template-constructs*) The Reliance on Government characteristic is defined as a binary construct with polar measurements of 'None' and 'Complete'.

RS 5 Market Segmentation Filter Rules

R 5.1 A *customer* service is identified by the combination of service characteristics of 'Single' level of Interactivity and 'No' Reliance on Government for service efficacy.

R 5.2 A *client* service is identified by the combination of service characteristics of 'Multiple/Repetitive' level of Interactivity and 'No' Reliance on Government for service efficacy.

R 5.3 A *citizen* service is identified by the combination of 'Single' level of Interactivity and 'Complete' Reliance on Government for service efficacy.

R 5.4 A *subject* service is identified by the combination of 'Multiple/Repetitive' level of Interactivity and 'Complete' Reliance on Government for service efficacy.

Once the segment for a service is identified, the design principles for services in that segment are available to guide service design, particularly in world-wide web interface design.

The design principles that were identified in the course of developing this research are presented here in , which groups principles from various parts of this thesis into each of the four segments. Note that where principles apply to more than one segment, the principle is repeated in full for each segment to make each group in complete.

Table 34: Consolidation of Design Principles for e-Government, grouped by Segment

Principle No.	Principle
	Customer
P 1.1	e-Government services should not require the constituent to identify themselves, and if identity is collected, its retention beyond the present interaction must be at the constituent's discretion.

Principle No.	Principle
P 1.3	e-Government services should offer secured interactions for sensitive elements of the interaction (e.g. personal information collection and financial transactions).
P 1.10	e-Government services may be delivered by third parties; service outputs may derive credibility from government 'branding'.
P 2.3	e-Government services should only pre-populate forms with details about the constituent already held when expressly directed by the constituent.
P 2.4	e-Government services may offer the opportunity for a constituent to use some government-recognised identifier (e.g. e-mail address, rate assessment number) to pre-populate automatically-generated forms on a case-by-case basis.
P 3.1	e-Government services that require identity (and other personal) details should explicitly collect the relevant details on each occasion.
P 4.1	e-Government services that require an application should require only the correct completion of necessary information by the constituent to allow 'approval' of the application.
P 5.1	e-Government services that issue a permission may be solely electronic.
P 6.1	e-Government services mediated by the Internet should focus on being easy to use, seek to alleviate perceptions of risk, and model the best practices of relevant commercial online services.
P 6.2	e-Government services mediated by the Internet should keep the user informed of service progress and offer opportunities for the user to exercise control over the process of the service.
P 12.4	e-Government services aimed at customers may be offered exclusively online.
	Client
P 1.2	e-Government services must require the constituent to identify themselves and retain information pertaining to the constituent from one interaction to the next.
P 1.4	e-Government services should be conducted through secure interactions to the maximum extent possible (i.e. from as early in the interaction as possible through to completion).
P 1.5	e-Government services should allow non-government provided identifiers to be used (e.g. e-mail address), should use practical authentication to validate identity (e.g. password or PIN), and must provide credible reassurance about the privacy of the constituent's data.
P 1.8	e-Government services that rely on cross-agency, cross-jurisdictional and/or public-private partnership operations should explicitly identify the organisations involved.
P 1.10	e-Government services may be delivered by third parties; service outputs may derive credibility from government 'branding'.
P 1.12	e-Government services that rely on cross-agency, cross-jurisdictional and/or public-private partnership operations should assert the extent to which personal data is shared between the organisations, and must identify the process for seeking remedy in the event of dissatisfaction with the service.
P 2.1	e-Government services should pre-populate relationship maintenance (e.g. renewal notifications, payment reminders, 'next stage' entitlement checks, etc) forms with information already held about the constituent.
P 2.2	e-Government services using relationship maintenance forms should allow changes to details on the form by the constituent at the same time as completing the actual maintenance activity.
P 3.2	e-Government services should ask for the constituent's identity through a useable

Principle No.	Principle
	identifier only as soon as the constituent's identity is needed for service action.
P 3.3	e-Government services should allow the constituent's recorded details to be amended by the constituent during any service interaction.
P 4.2	e-Government services that require an application should require approval from a relevant (delegated) authority, and that approval (or not) recorded within the supporting system.
P 4.3	e-Government services that require an application will likely require formal approval from a relevant professional, which should be recorded within the supporting system.
P 5.1	e-Government services that issue a permission may be solely electronic.
P 5.2	e-Government services that issue a permission should make explicit on any physical manifestation of that permission what it permits and what limits are placed on the permission.
P 6.3	e-Government services mediated by the Internet should focus on communications quality using clear terms and tailoring the communication to the circumstances of the user.
P 6.4	e-Government services mediated by the Internet should reinforce the nature of the relationship between constituent and government.
P 6.5	e-Government services should explicitly describe the overall service process and the current status or progress of that service.
P 7.1	e-Government services must be offered across all channels.
	Citizen
P 1.1	e-Government services should not require the constituent to identify themselves, and if identity is collected, its retention beyond the present interaction must be at the constituent's discretion.
P 1.3	e-Government services should offer secured interactions for sensitive elements of the interaction (e.g. personal information collection and financial transactions).
P 1.7	e-Government services should offer the option of government-provided identifiers as a means of simplifying constituent identification, but this must not be the only means of the constituent identifying themselves for a service.
P 1.11	e-Government services delivered by third parties must be clearly branded as government services.
P 2.3	e-Government services should only pre-populate forms with details about the constituent already held when expressly directed by the constituent.
P 2.4	e-Government services may offer the opportunity for a constituent to use some government-recognised identifier (e.g. e-mail address, rate assessment number) to pre-populate automatically-generated forms on a case-by-case basis.
P 3.1	e-Government services that require identity (and other personal) details should explicitly collect the relevant details on each occasion.
P 4.4	e-Government services that require an application should include the relevant rules within the application processing system and compliance with the rules should grant approval for the application.
P 4.5	e-Government services that require an application should include the ability to automatically explain why the constituent was denied the application (i.e. which rules were not satisfied).
P 5.3	e-Government services that issue a permission should be manifested physically and should be branded with the authority by which the permission is granted (i.e. the issuing government agency and the legal instrument that authorises the permission).

Principle No.	Principle
P 6.1	e-Government services mediated by the Internet should focus on being easy to use, seek to alleviate perceptions of risk, and model the best practices of relevant commercial online services.
P 6.2	e-Government services mediated by the Internet should keep the user informed of service progress and offer opportunities for the user to exercise control over the process of the service.
P 7.1	e-Government services must be offered across all channels.
P 7.5	e-Government services should be made transparent through explanations of processes, rules that apply, and justification of unexpected results.
P 7.6	e-Government services should include information about opportunities for complaint or review, preferably with a direct link to such resources for services mediated by the Internet.
P 7.7	e-Government services should not involve an explicit fee for the service.
P 7.8	The environment in which e-government services are provided should include information about privacy, accessibility, freedom of information, and other data management policies.
P 7.9	The environment in which e-government services are provided should include information about customer service standards and public servant codes of conduct.
	Subject
P 1.2	e-Government services must require the constituent to identify themselves and retain information pertaining to the constituent from one interaction to the next.
P 1.4	e-Government services should be conducted through secure interactions to the maximum extent possible (i.e. from as early in the interaction as possible through to completion).
P 1.6	e-Government services should use government-provided identifiers, should use as strong authentication as practical and should offer information about how the constituent's personal data is used.
P 1.8	e-Government services that rely on cross-agency, cross-jurisdictional and/or public-private partnership operations should explicitly identify the organisations involved.
P 1.9	e-Government services that rely on cross-agency, cross-jurisdictional and/or public-private partnership operations must explicitly brand service outputs with the authorising government agency.
P 1.11	e-Government services delivered by third parties must be clearly branded as government services.
P 1.12	e-Government services that rely on cross-agency, cross-jurisdictional and/or public-private partnership operations should assert the extent to which personal data is shared between the organisations, and must identify the process for seeking remedy in the event of dissatisfaction with the service.
P 2.1	e-Government services should pre-populate relationship maintenance (e.g. renewal notifications, payment reminders, 'next stage' entitlement checks, etc) forms with information already held about the constituent.
P 2.2	e-Government services using relationship maintenance forms should allow changes to details on the form by the constituent at the same time as completing the actual maintenance activity.
P 3.2	e-Government services should ask for the constituent's identity through a useable identifier only as soon as the constituent's identity is needed for service action.

Principle No.	Principle
P 3.3	e-Government services should allow the constituent's recorded details to be amended by the constituent during any service interaction.
P 4.6	e-Government services that require an application should require approval from a (delegated) fiduciary authority, and that approval (or not) recorded within the supporting system.
P 6.3	e-Government services mediated by the Internet should focus on communications quality using clear terms and tailoring the communication to the circumstances of the user.
P 6.4	e-Government services mediated by the Internet should reinforce the nature of the relationship between constituent and government.
P 6.5	e-Government services should explicitly describe the overall service process and the current status or progress of that service.
P 7.1	e-Government services must be offered across all channels.
P 7.2	e-Government services that occur across channels should be coordinated so that interactions in one channel acknowledge any previous related interactions in any other channel.
P 7.5	e-Government services should be made transparent through explanations of processes, rules that apply, and justification of unexpected results.
P 7.6	e-Government services should include information about opportunities for complaint or review, preferably with a direct link to such resources for services mediated by the Internet.
P 7.7	e-Government services should not involve an explicit fee for the service.
P 7.8	The environment in which e-government services are provided should include information about privacy, accessibility, freedom of information, and other data management policies.
P 7.9	The environment in which e-government services are provided should include information about customer service standards and public servant codes of conduct.

7.3 Limitations

In all research that establishes a new approach to something, there is a range of limitations to the work presented. A constant and primary argument is about the validity of the research. Maxwell (<1992>) defines five types of validity for qualitative research: descriptive validity, interpretive validity, theoretical validity, generalizability, and evaluative validity. He establishes the first three as the most important as not all five are attempted in all research. <table> summarises these five types of validity and describes the extent to which this research is believed to achieve them.

Table 35: Analysis of this Research against Types of Validity for Qualitative Research (<based on \Maxwell 1992>)

Validity Type	This Research
Descriptive Validity "the factual accuracy of [the] account" (p. 285)	The use of rule and principle statements to specify the artefact offers descriptive validity to the model by allowing the assessment of the accuracy of each rule and principle. The claims of the expectations of constituents in each segment are a weakness in this type of validity (discussed below).
Interpretive Validity "concerned with what these objects, events, and behaviours, *mean* to the people engaged in and with them" (p. 288; emphasis in original)	The demonstration of segmentation of e-government services (section 6.2.1) and the demonstration of the use of the model to influence service design (section 6.2.3) offers interpretive validity; i.e. the model can be applied in the way it is meant to be. The lack of a definitive validation of this claim by e-government practitioners is a weakness in the validity here (discussed below).
Theoretical Validity "an account's validity as a *theory* of some phenomenon" (p. 291; emphasis in original)	The grounding of the model's structure and application in Market Segmentation theory and the derivation of rules and principles from a philosophical origin lends theoretical validity to the model. In a related way, the demonstration of how the inherent characteristics of the model offer a theoretical lens through which to investigate relevant theory (i.e. adoption models) fits into this type of validity. The primary shortfall in this type of validity is the lack of evidence that adoption is actually affected by the application of the model to e-government service design (discussed below).
Generalizability "the extent to which on can extend the account of a particular situation or population to other persons, times, or settings" (p. 293)	The research claims general application for the model to all levels of government for all services aimed at constituents acting on their own behalf and not just the services considered in the presentation of this thesis. The research does not claim any further generalizability than that. Some limitations to this type of validity are discussed below.
Evaluative Validity "involves the application of an evaluative framework to the objects in the study, rather than a descriptive, interpretive or explanatory one" (p. 295)	The research makes no claim of this type of validity.

From this summary analysis, there are arguments present to support claims of validity for this research within the context of Maxwell's typology of validity. There are, too, limitations to these claims, which are discussed next.

The primary limitation to the research is a shortage of empirical testing. There are two particular areas where empirical research would strengthen the model:

- **Evidence that the expectations claimed for each segment exist and are distinct**—compiling such evidence would most likely involve surveying a sufficiently large group of constituents about their expectations as they considered a range of (likely hypothetical) e-government services. The construction of such research would have to carefully manage the investigation to ensure that the survey subjects were properly mindful of their own expectations when responding.
- **Evidence that adopting the design guidance does increase adoption**—in this case, parallel implementations of an e-government service both with and without the specific design recommendations suggested by the model might be served at random to constituents and the different responses examined. Metrics such as return use, or the results of a post-service survey might be appropriately applied here.

Underlying the first area identified for empirical research support is the fact that the segmentation was adopted from an outline sketch rather than developed on the basis of 'first principles'. This leaves open the argument that the segmentation is not complete, or otherwise contravenes good Market Segmentation theory. Chapter 5, and in particular section 0, attempts to address this limitation directly by applying in retrospect the rules of a 'good' segmentation. The logical argumentation of the position corresponds to the evaluation pattern of 'Logical Reasoning' described by Vaishnavi and Kuechler (2008). Nevertheless, in the absence of quantifiable characteristics of constituents of e-government services, there may be contention that the segmentation is not proper.

The correspondence between segments, the cluster of expectations that they each represent, and relevant design guidance may also be questioned as incomplete or inappropriate. I make no claim of completeness for the cluster of expectations, or of design guidance. To the extent that more expectations and corresponding design principles are identified and fit within the model, it will evolve and grow, possibly never reaching a 'final' form. A key limitation here, noted in section 7.2.4 above, is that the expectations and corresponding design guidance is developed by and from the perspective of an inhabitant of a first world economy. Clearly, there may be significant differences in expectations and relevant design parameters for

constituents of other cultures. Such potential differences would also need investigation when empirical research is conducted as described above. However, I feel confident that the basic premise that there are four roles that constituents adopt when interacting with government will be sound, that the expectations within each role will reflect the perceived nature of the relationship between the constituent and the government in that role, and that in line with those two framing factors, different design approaches for each segment will increase the adoption of e-government services aimed at those segments.

Finally, it might be argued that much of the design guidance offered here could be classified as simply ‘good design practice’ and applied equally across all segments. It is certain that ‘good design practice’ can usefully be applied across all e-government services. The model is not sufficiently developed here to illustrate in greater detail how distinct the design guidance can become for each segment, although the illustration at section 6.2.3.1 (page 162) is offered as one example of how broad rules of ‘good design’ are further refined by applying the lens of this model. The areas of human-computer interface design, usability, and user experience design, offer guidance on the subtleties of service delivery mediated by the Internet and would provide a useful intersecting research path to combine (in detail) with the model presented here.

7.4 Future Research

In line with the limitations described above, the primary avenue of future research from this work is to develop a more robust, more distinct articulation of the expectations of each segment, tested empirically with constituents of government. On the basis of such work, design guidance can be more closely linked to specific characteristics of constituent expectations when acting in each segment.

Secondarily, but no less importantly, connecting the design guidance already identified with human-computer interaction and user experience research would greatly reinforce and probably refine the guidance provided for e-government service designers. With this more substantial link to specific design theories, more certainty could be attached to the likely improvement in adoption of e-government services, and that adoption tested more rigorously (e.g. in usability laboratory settings).

The issues that the model must be able to adapt to (see section 7.2.4) also offer useful avenues of future research, particularly the sensitivity of the so-called digital generation to adoption cues posed by researchers from within earlier less-inherently-digitally-literate generations. Testing the model for acceptability among e-government service design practitioners using techniques such as Rosemann and Vessey's (2008) "applicability check" is also noted as worthwhile further work.

Testing Propositions 5 and 6 suggests that future research might be productive seeking to measure the following elements of user interaction with e-government services:

- **Cross-channel activity** – in spite of there being insufficient data to be conclusive, there were some indications in the very small samples that the *Subject* and *Client* services might have more propensity to adopt online service offerings than the other segments; this should be explored in more detail.
- **The directness of navigation to the e-service** – i.e. to what extent does the constituent surf around the government website before engaging in the service? – for example, the navigation paths to services for *Subjects* ought be quite direct as they are necessary or mandatory elements of an on-going relationship where those taken to *Customer* services might involve quite a bit of online investigation before the service is engaged.
- **Adoption of pre-programmed interactions (e.g. direct debit offerings)** – the sense that interactions in the *Subject* and *Client* segments are part of an on-going relationship ought to pre-dispose constituents to signing up for automated payments, and *Subjects* more so than *Clients*; *Citizens* and *Customers* ought to be less likely to commit to such things.

Finally, while conducting the literature review for this research, I identified that there was a large body of influential literature that remained under-investigated by the academic research community: the strategies and policies of governments and the research and reports of the consulting firms employed by them. E-Government is widely recognised as an applied, or practitioner-oriented, field. The strategies and policies of government and the reports and recommendations of consulting firms are frequently the only advice or guidance available to, or sought by, practitioners. The

academic research community would be well-served to understand the implications of that influential body of work.

7.5 Contributions

This research offers contributions both to practice and to research.

The output of the research presented here has immediate, practical value for e-government service designers, including:

- An understandable and applicable means of segmenting the public into smaller, more homogenous groups that is directly related to service design;
- A description of those segments in the form of rules that is translatable directly into policy to overarch service design (RS 3 Segmentation Rules);
- A means of identifying the salient characteristics of services in the form of rules (RS 4 e-Government Service Characteristics Template);
- A means of using the salient characteristics of services to identify the segment to which they belong and the corresponding design advice (RS 4 Market Segmentation Filter Rules); and
- An initial collection of design principles, categorised by segment, to apply to e-government service design (Rulesets PS 1 – PS 7).

Practitioners can use the rulesets to identify which segment a government service addresses and in turn apply the related design principles to develop e-government services that are likely to meet constituent expectations.

The e-government research field is also enriched by this work through:

- Locating the concept of e-government as a regulatory ruleset for government and stipulating that formally with rules (Rulesets RS 1 and RS 2) to offer the potential for finalising a definition of e-government;
- Articulating a formal design theory for recognising segments within a previously undifferentiated e-government service design target group to open the opportunity for improving service adoption rates;
- Establishing a framework for classifying design guidance on e-government service design that inherently addresses a key matter for service design—the ‘adoptability’ of the resulting service;

- Creating a lens by which to inspect and manipulate other theory on the adoption of e-government services by individuals with greater analytical power, as illustrated in Chapter 6;
- Creating a tool to guide research and practice through a novel combination of Market Segmentation theory and the philosophy of social action in the context of e-government meeting the call for multi-disciplinary or trans-disciplinary solutions (Scholl, 2007);
- Demonstrating the application of design science to this contemporary issue in e-government; and
- Offering an initial exploration of analysing e-government service adoption through financial transaction data.

This research has also identified a significant weakness in the e-government literature base used by researchers in the absence of thorough reviews of actual government policies and strategies and of guidance and investigations produced by commercial organisations specifically for governments.

7.6 Summary

This thesis presents an information systems design theory that addresses the problem of unsatisfactory e-government service adoption by constituents of government.

Electronic government services are being taken up at a lesser rate than equivalent services in the private sector. Consequently, governments and constituents are not achieving the expected benefits of e-government. Research suggests that a major inhibitor to adoption is that the e-government services being offered are not meeting the expectations of the constituents for whom they are provided.

The design theory presented here articulates a market segmentation of constituents that explicitly acknowledges the different roles that they adopt when interacting with government and, consequently, the expectations they have of those interactions. The market segmentation therefore forms a useful framework for collecting design principles to guide e-government service design. Such a framework, and the initial collection of design principles identified here, represent a solution to the problem of

meeting constituent expectations to remove the barrier to greater adoption of e-government services by those constituents.

7.7 And, finally…

This thesis represents the crystallisation of nearly fifteen years of interest in the conceptual framework proposed by Henry Mintzberg in 1996. It is not, however, its culmination. As the limitations and future research sections above indicate, there is still work to do, not the least of which is for the ideas here to be applied ‘in anger’. Importantly, this contribution is part of my broader interest in making information technology use more acceptable to those who must use it, and these days, that is everyone. There is much to do!

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Annex A FINANCIAL TRANSACTION DATA FROM THE ACT GOVERNMENT

This annex explains the detailed manipulations of the data provided by the ACT Government (described in section 5.4.1.1, page 127). Crucially, it explains how the data was prepared for investigation. It also describes the statistical activities performed to analyse the data.

A.1 Format of Data Received

The data was made available in three main forms:

- A series of spreadsheets of the aggregate transaction data for each financial year in the period of investigation (the primary data source)
- A spreadsheet of reference tables that provided the 'meaning' of transaction codes
- A spreadsheet of aggregated transaction data at Agency level (not used in this analysis).

A.1.1 Transaction Data

The raw transaction data provided by the ACT Government was a standard report output from the government's financial management system (called FinanceOne at the time, now TechnologyOne Financials [www.technologyonecorp.com/Financials]) and provided as a series of Microsoft Excel workbooks (spreadsheets); one for each financial year with each month of the year as a separate worksheet within each file. In spite of being an Excel spreadsheet, the data was entirely composed of literal values; i.e. no formulas were present in the data provided.

The data was presented with one record to consolidate the financial transactions for each agency, for each account code, for all payment channels, for the month, in the form illustrated in Figure 14.

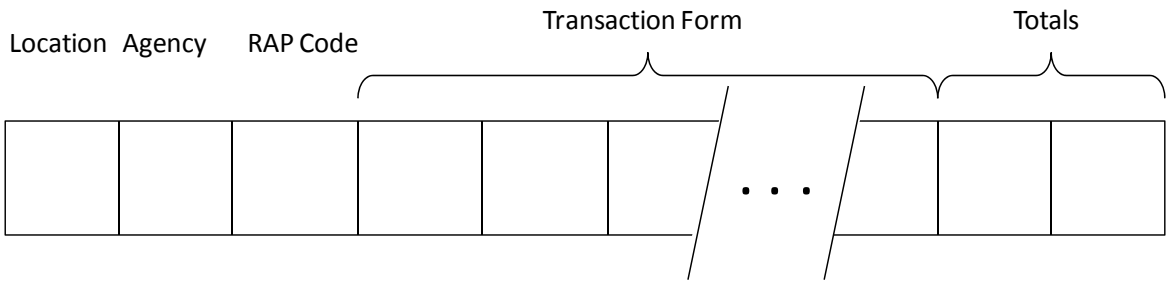

Figure 31: Structure of Transaction Record Provided by ACT Government

The record structure contains 23 columns, the bulk of which are aggregated values, described below:

- **Location:** a two-digit numerical code representing the channel through which the transaction took place, including shopfronts, kiosks, postal mail, and online.
- **Agency:** a three-letter code representing the agency within the government that recorded the transaction.
- **RAP Code:** a six-digit numerical code representing the account to which the transaction was posted in the system. This code was 'translated' by the reference table provided by the ACT Government where each code is correlated with a 30-character description. For the purposes of this analysis, a transaction to an account code was equivalent to a 'Service'—i.e. it was assumed that any transaction represented some part of a service provided by the ACT Government to some entity, including itself (i.e. some other agency with the government).
- **Transaction Forms:** nine different forms of payment are presented with two columns of data for each: one column is the total transactional value for that RAP Code for that month paid in that form through that channel; and the second column is the number of transactions that comprised that value.
- **Totals:** two columns that accumulate the transactional value and number of transactions for all transaction forms for that RAP Code for that month, through that channel.

A.1.2 Reference Tables

The reference tables were presented as a single Microsoft Excel spreadsheet with a series of worksheets representing the complete set of transaction (RAP) codes active at the time. ACT Government representatives explained the irregular timing of the

worksheets as the time at which all codes were changed (equivalent to system releases).

The data were presented with one record to represent each active transaction. There were three formats of the data presented as the data represented different periods of time. The data for active transactions in February 2001 had the format depicted in Figure 32:

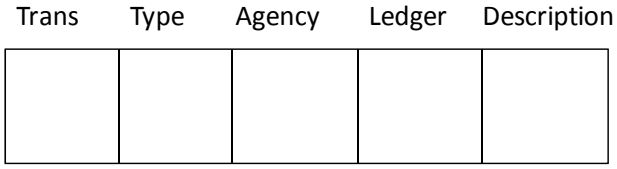

Figure 32: Structure of Transaction Reference Record (February 2001)

The record structure contains 5 columns described below:

- **Trans:** a two-digit numerical code representing a classification of transaction types (otherwise unexplained).
- **Type:** a numerical code of up to four digits representing a particular transaction.
- **Agency:** a three-letter alphabetic code representing the agency that uses that transaction code.
- **Ledger:** the formal system ledger code. This value took a variety of forms, some textual, some structured numeric codes. This field was not used in the data analysis.
- **Description:** a textual description of the transaction represented, limited to 30 characters.

The data for active transactions in September 2001 had a slightly different format, depicted in Figure 33:

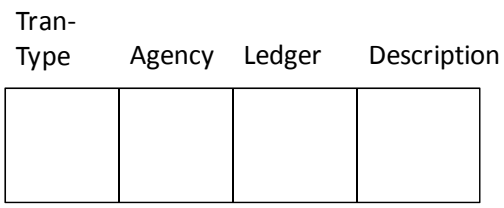

Figure 33: Structure of Transaction Reference Record (September 2001)

The three fields, Agency, Ledger, and Description, are as described above. **Tran-type** is a structured numerical code that comprises the Trans and Type codes described above shown together in the form “99 9999”. Each component of the code translates directly to the two separate codes in February 2001 data; i.e. the combined

codes in September 2001 were seen to represent the same transactions as the separately indicated codes in February 2001 when the numerical values were equivalent. Importantly, the six-digit numerical RAP code shown in the actual transaction data is equivalent to the code in Tran-type without the space. ACT Government representatives confirmed the equivalence.

All other transaction reference tables provided then followed the format in Figure 34:

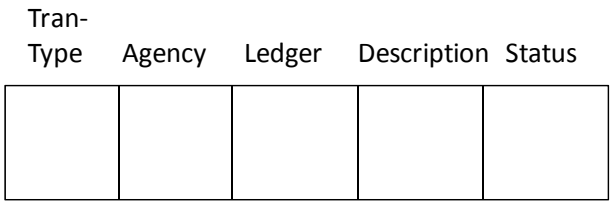

Figure 34: Structure of Transaction Reference Record (all other months)

The first four fields are as described for September 2001. The Status code appears to be an artefact of the reporting process as it only ever showed the value of 'A', presumed to mean 'Active'. This code was ignored in data analysis.

Transaction reference data was provided for each of the periods in Table 36. For the purposes of data analysis, periods between two dates were assumed to use the codes established as active on the earlier date. For periods prior to February 2001, the codes shown at February 2001 were assumed to be active. ACT Government representatives confirmed this interpretation as appropriate. Some codes that were not present in the February 2001 list (or in any subsequent list) were discovered once the transaction data was considered in detail. In the absence of any reference descriptions of these codes, the small number of them (less than 5 in any month), and the low value (less than 0.5% of total dollar value in the month) and low activity (less than 0.5% of all transactions in the month) recorded against these codes, transactions against those codes were ignored.

Table 36: Number of RAP Codes active during each period, including changes from previous month (Source: project data)

Month	Number of Codes	Added Codes	Removed Codes
Feb 2001	369	N/A	N/A
Sep 2001	363	7	13
Nov 2001	370	7	0
Dec 2001	381	11	0
Jan 2002	381	2	2

Month	Number of Codes	Added Codes	Removed Codes
Mar 2002	382	2	1
May 2002	384	3	1
Jun 2002	384	0	0
Nov 2002	353	3	34
Dec 2002	354	1	0
Apr 2003	355	1	0
May 2003	357	2	0
Jul 2003	356	0	1
Nov 2003	358	3	1
Mar 2004	360	4	2
May 2004	361	1	0

A.2 Data Preparation

A.2.1 Transaction Code Reference

The first step was to convert the Transaction Reference tables into a single consistent format for manipulation. To that end, each table was translated so that a table existed for each month originally provided in the form shown in Figure 35:

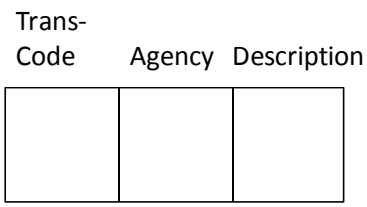

Figure 35: Transaction Code Reference Record ('cleaned' structure)

The codes for Agency and Description were transferred from the relevant columns in the provided data to the new table columns. The Trans-Code values were contrived by either:

- Combining the two-digit Trans value with a zero-padded version of the Type code into a single six-digit value for records from the February 2001 table, and
- Removing the single space in the Tran-type code to create a six-digit value for all other transaction reference records.

The re-formatted codes were then sorted in ascending numerical order. There were some occasions where the description for a Trans-Code within an Agency was

different over time, resulting in duplicates in the overall list. As the majority of these description changes were trivial, some involving the correction of typographical errors, the most recent description was adopted and the duplicates removed. There were a number of occasions where the same Trans-Code was used with different Agency codes. In the majority of such occasions, the Description was identical, indicating that the Trans-Code represented the same transaction in different Agencies. Inspection of the transaction lists over time indicated that this was predominantly a matter of the change of name or relocation of function within the ACT government over time. Where duplicates reflected a change of name or movement of function, the duplicates were removed in favour of the Agency code and description that was most recent.

Once all the duplicate Trans-Codes arising from the movement of functions within the government over time were removed, there remained a single instance where two Agencies used the same Trans-Code for different things, but not at the same time. To address this, the Trans-Code was changed to a unique value for one Agency. Consequently, all uses of that RAP code were changed in the actual Transaction data during its 'clean'.

A.2.2 Transaction Data

The transaction data was presented in the form described above, supplemented by 'header' material that reflected the details of the report that generated the data and offer the translation table for the Location code value, repeated here in Table 37.

Table 37: Location Codes and Their Translation (Source: project data)

Location Code	Translation Provided	Literal Meaning
1	TSF	Canberra Connect Tuggeranong Shopfront
2	CSF	Canberra Connect Civic Shopfront
3	BSF	Canberra Connect Belconnen Shopfront
4	PALM/ACTIC	Planning and Land Management Service Counter (ACT Information Centre)
5	PALM/SF	Planning and Land Management Service Counter (Headquarters Shopfront)
6	REVENUE CSC	ACT Government Revenue Customer Service Centre
8	PALM/DICKSON	Planning and Land Management Service Counter (Dickson shopfront)

Location Code	Translation Provided	Literal Meaning
9	PALM/MITCHELL	Planning and Land Management Service Counter (Mitchell shopfront)
10	Publications	ACT Government Bookshop
11	WSF	Canberra Connect Woden Shopfront
24	Internet	www.canberraconnect.act.gov.au
26	Australia Post	Any Australia Post outlet
27	AUSTRAPAY	Cheque processing (mail payments)
28	Austouch	Electronic kiosks operated by the ACT Government in public places
29	BPAY	Online payment provider, BPay (www.bpay.com.au)

The initial 'cleaning' action was to extract from the data provided only that which would be analysed and to lose the artefacts of the data creation process. This was achieved by extracting into a new spreadsheet the data in the Location, Agency, RAP Code, and Total All Types ($ and No) columns, creating an analysis record that looked like Figure 36. At this time, the RAP Code was amended for that single code value that was duplicated, as discussed above. Also, the majority of data was presented sorted first by Location, then Agency. Where the data was not in this order, it was re-sorted to match that order while being 'cleaned'.

Location	Agency	RAP Code	Total $	Total #

Figure 36: Transaction Data Record ('cleaned' structure)

The result of this process was a single Microsoft Excel spreadsheet document with a worksheet for each month of the analysed period (July 2001 – June 2004) containing data in the format above.

A.3 Initial Data Analysis

The first step of the data analysis was to inspect the description for each transaction in the context of its Agency and determine to which broad market segment it belonged: i.e. 'Customer', 'Business', 'Government', and 'Employee'. Three researchers undertook this task separately. As the categorisation proceeded it was quickly realised that this segmentation would not apply as succinctly as hoped. In

particular, there were a number of services that were likely to be used by both ‘business’ and ‘citizen’ consumers. There were also a large number of transactions that represented internal financial management (e.g. recording GST, adjusting ledgers, etc).

Consequently, the categorisation was rationalised to: ‘Internal’, ‘Business’, ‘Business/Citizen’, and ‘Citizen’. The ‘Business/Citizen’ category represented those transactions that might be conducted either by an individual or by an organisation. Such transactions usually involved seeking permission (e.g. to lop trees), paying fees for certain activities (e.g. retrieving plan copies), or other revenue activities that might be conducted by individuals or businesses (e.g. the sale of publications). A large number of these ‘dual segment’ transactions arise from people being able to build their own homes (unincorporated owner/builder) and builders (incorporated entities) acting on their clients’ behalf. In this case, the initial transactions that grant an individual the license to build their own home were counted as ‘Business/Citizen’ transactions, but all transactions occurring later in the normal process of house-building were coded only as ‘Business’ with the view that the Licensed Owner-Builder takes on the role of a ‘business’ (builder) rather than remaining an individual. The views of the three researchers were consolidated and compared. Discussion between the researchers refined the consolidated list to a single proposed segmentation. This segmentation was then reviewed by experts in the ACT Government who corrected some misinterpretations. The final categorisation of all active transactions over the period across the broad market segments is shown in Table 44 at the end of this annex.

Category	No. of Services	Total $	Total #
Internal	67	$ 242,221,542.60	69,987
Business	114	$ 754,187,363.72	185,486
Business/Citizen	152	$ 1,352,054,551.65	1,947,478
Citizen	82	$ 556,565,319.70	2,956,296
Totals	**415**	**$ 2,905,028,777.67**	**5,159,247**

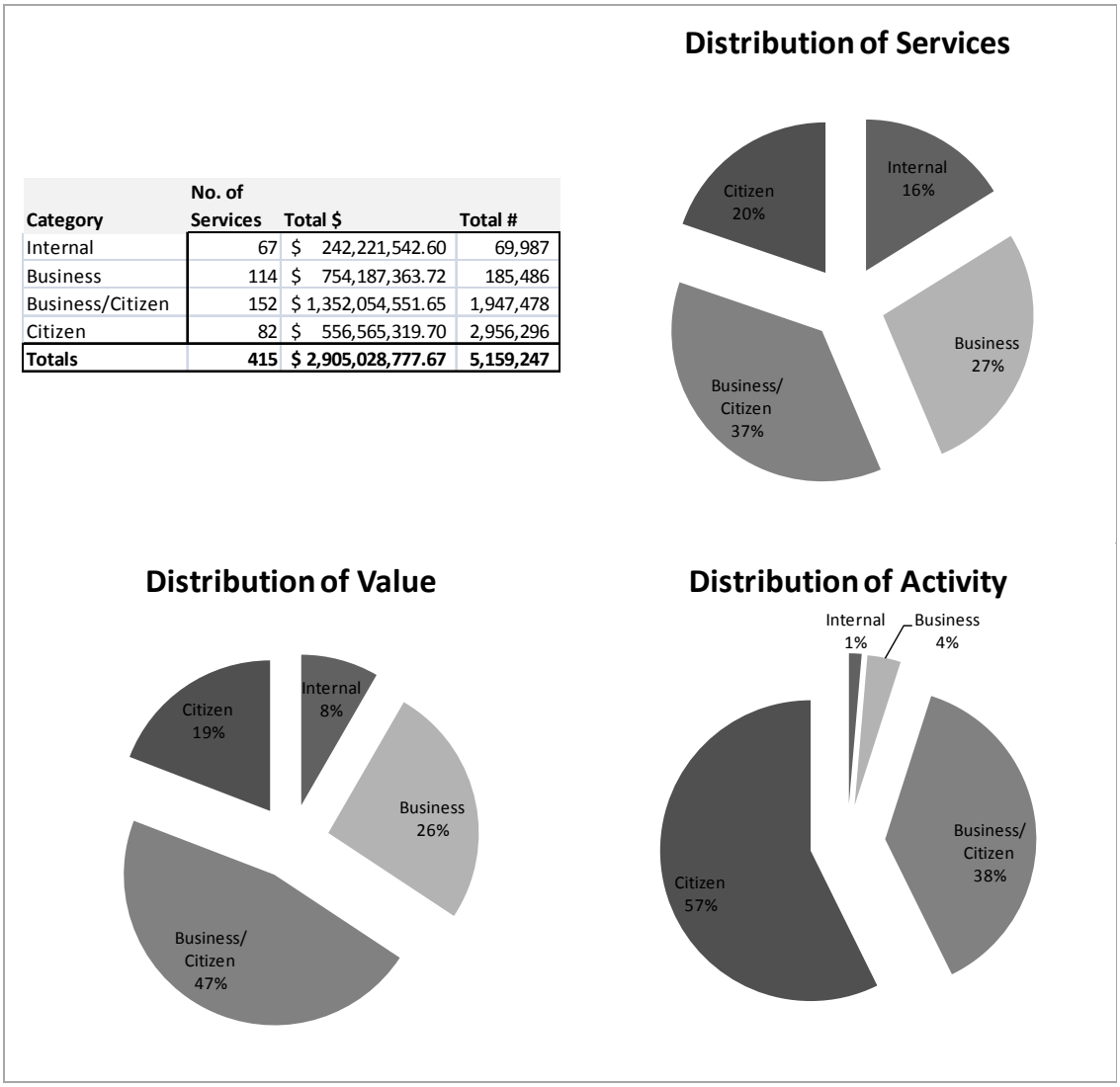

Figure 37: Summary of Initial Transaction Segmentation of ACT Government Data (Source: project data)

A.4 Secondary Data Analysis

Each of the transactions that were coded as either 'Citizen' or 'Business/Citizen' were then further considered against the e-Government Service Characteristics Template. Each transaction was assessed for where it would lie on the dimension represented by each *template-construct*. The analysis was tabulated so that each extreme of each dimension was coded as either '1' or '0' to indicate whether that was the end that the transaction was deemed to appear at ('1') or not ('0'). Such coding allowed the Market Segmentation Filter Rules to be applied, as illustrated in Exhibit 10. The assessment against each *template-construct* was carried out by the author and two student research assistants. As before, differences in the views when the results

were compared were discussed and a consensus view reached. The results of that process are shown in Table 45 at the end of this annex.

Exhibit 10: Market Segmentation Filter Rules implemented as measures on the e-Government Service Characteristics Template *template-constructs*

Narrow Segment	Interactions		Differentiation		Reliance	
	Single	Multiple/ Repetitive	Commodity/ Menu	Tailored	None	Government
Customer	1	0	1	0	1	0
Customer	0	1	1	0	1	0
Client	1	0	0	1	1	0
Client	0	1	0	1	1	0
Citizen	1	0	1	0	0	1
Citizen	1	0	0	1	0	1
Subject	0	1	1	0	0	1
Subject	0	1	0	1	0	1

This coding resulted in the following distribution of services across the market segments Figure 38:

Category	No. of Services	Total $	Total #	Ave. Txn Value
Customer	130	$ 59,615,873.31	335,078	**$ 177.92**
Client	16	$ 229,600,638.45	898,917	**$ 255.42**
Citizen	65	$ 831,129,511.08	739,347	**$ 1,124.14**
Subject	23	$ 788,273,848.51	2,930,432	**$ 269.00**
Totals	**234**	**$ 1,908,619,871.35**	**4,903,774**	

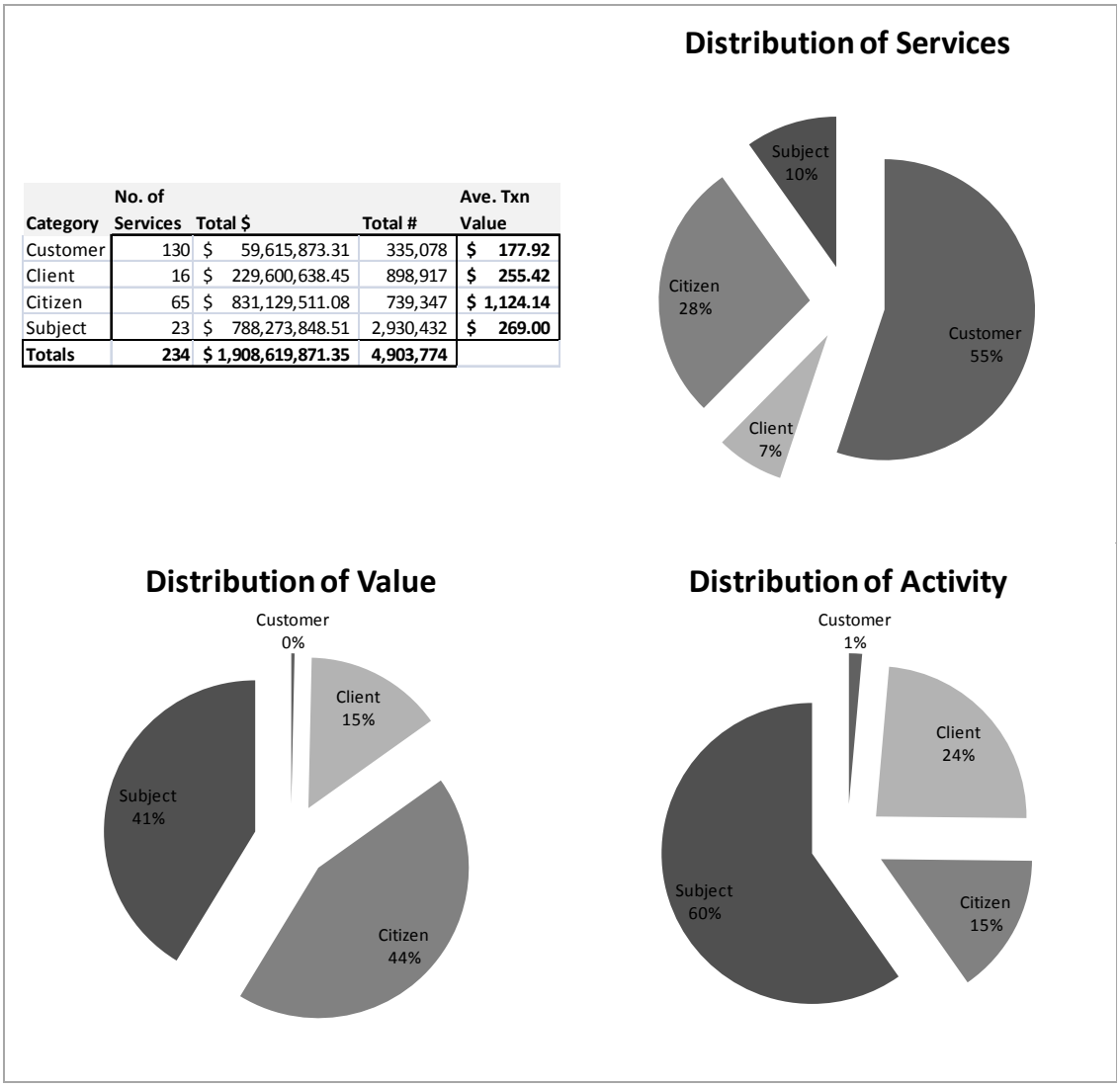

Figure 38: Summary of Refined Transaction Segmentation of ACT Government Data (Source: project data)

The result of the coding for the narrower market segments shows an apparent disproportion of *customer* services (55% of all 'Citizen' and 'Business/Citizen' services). This result arises from the high proportion of retail transactions differentiated by transaction value or product characteristic. (See for example rows 98 – 137 in Table 45.) This characteristic leads to many more services falling into one segment (*customer*) than others. This disproportion does not, however, flow into other ways of looking at the results of the coding. When the overall transaction value (i.e. money received during the period) or the level of activity (i.e. number of individual transactions) are considered, those many different 'services' have a very low representation (By value: 3%; By activity: 7%). Consequently, although such a disproportion is unexpected, it is readily explained and does not appear to otherwise distort the data. In short, the data reflects the messiness of real life.

A.4.1 Testing for Necessity and Sufficiency

The opportunity to test Propositions 3 and 4 arises with the coding of 'real' government services. The test for necessity (P3) is to establish that all three dimensions (*template-constructs*) are needed to identify to which segment services belong. The discussion that described the *template-constructs* established that all three *template-constructs* are used when identifying all four segments, but noted that some *template-constructs* were less important in identifying specific segments. One *template-construct* was used in all segments, that of Reliance on Government. With coded services, statistical analysis can be used to ascertain if the 'less-important' *template-constructs* are actually redundant.

Table 38 shows the cross-tabulation of coding of *template-constructs.* Table 38 is in two-parts: one half represents the cross-tabulation counts when the service is coded as **Not** Reliant upon the Government's Involvement; the other half is the cross-tabulation when the service is coded as Reliant upon the Government's Involvement.

Table 38: Cross-tabulation of *template-construct* values in 'Service' coding (Source: project data)

Reliance on Gov't: None	**Differentiation**		
	Tailored	**Commodity /Menu**	
Multiple/ Repetitive	9	6	**15**
Single	7	124	**131**
	16	**130**	

Reliance on Gov't: Complete	**Differentiation**		
	Tailored	**Commodity /Menu**	
Multiple/ Repetitive	17	6	**23**
Single	19	46	**65**
	36	**52**	

Table 38 details the number of times each end of the Differentiation *template-construct* is coded with each value in the Interactions *template-construct*. Table 38 indicates that there is a preponderance of Single-Commodity/Menu encodings.

Table 38 also indicates that the allocation of services to segments would be virtually identical if either *template-construct* were used alone when the measure on the Reliance on Government *template-construct* is set to 'None' (row totals closely approximate column totals). When the Reliance on Government *template-construct* value is set to 'Complete', there is a difference in the allocation of transaction to segment (row totals are not closely approximate to column totals).

A.4.2 Testing for Homogeneity

Proposition 5 is based on one of the principles of market segmentation: that characteristics of members of the segment are more homogenous than characteristics of members across segments. My segmentation involves the intent in the mind of the user at the time of interaction. Consequently, homogeneity would be expected in reactions to stimuli (response to design approaches) and in behaviour or use of services adopted. In this post-hoc application of the segmentation to ACT Government financial transactions data, the primary means of testing for the homogeneity of behaviour implied by homogeneity of intent is to consider the pattern of transaction activity. That is, does the pattern of use of services within segments demonstrate homogeneity when compared with the pattern of use of service across segments?

A.4.2.1 Seasonal Analysis

Statistical analyses for homogeneity generally work better on larger samples of data (Lee, 1996; Mason & Lind, 1993). This raises an important limitation. When the 'services' coded for the narrow market segments are grouped by segment and filtered for 'services' with activity over the entire time-span (48 months), the data becomes sparse, illustrated in Table 20. The transaction activity data for each 'service' that had continuous activity recorded was extracted for further analysis. Continuous activity was interpreted to mean some number of transactions was coded in each month of the data across the entire 48-month period. This removed some 'services' that had relatively high levels of activity but were introduced during, or ceased during the time considered. It also included some 'services' where transaction activity was rarely or never more than 10 transactions during a month and included some months where no activity was recorded. In these cases, no activity in a month was not considered anomalous or a termination of the offering of or interest in that 'service'.

Table 39: Number of 'Services' in Each Segment with Certain Activity Characteristics (Source: project data)

Segment	Total	With Continuous Activity in Period*	Less than 100 Transactions in Period	No Activity Recorded
Customer	130	27 (21%)	85 (65%)	26 (20%)
Client	16	7 (44%)	7 (44%)	4 (25%)
Citizen	65	27 (42%)	29 (45%)	11 (17%)
Subject	23	8 (35%)	10 (43%)	7 (30%)

* Includes 'services' with such low numbers of transactions per month (i.e. under 10) that single months of no activity occasionally are not anomalous.

A first test for homogeneity is the visual similarity of activity levels over time in each segment. Figure 39 to Figure 42 show the total levels of activity (in thousands of transactions per month) across all channels for the whole period investigated.

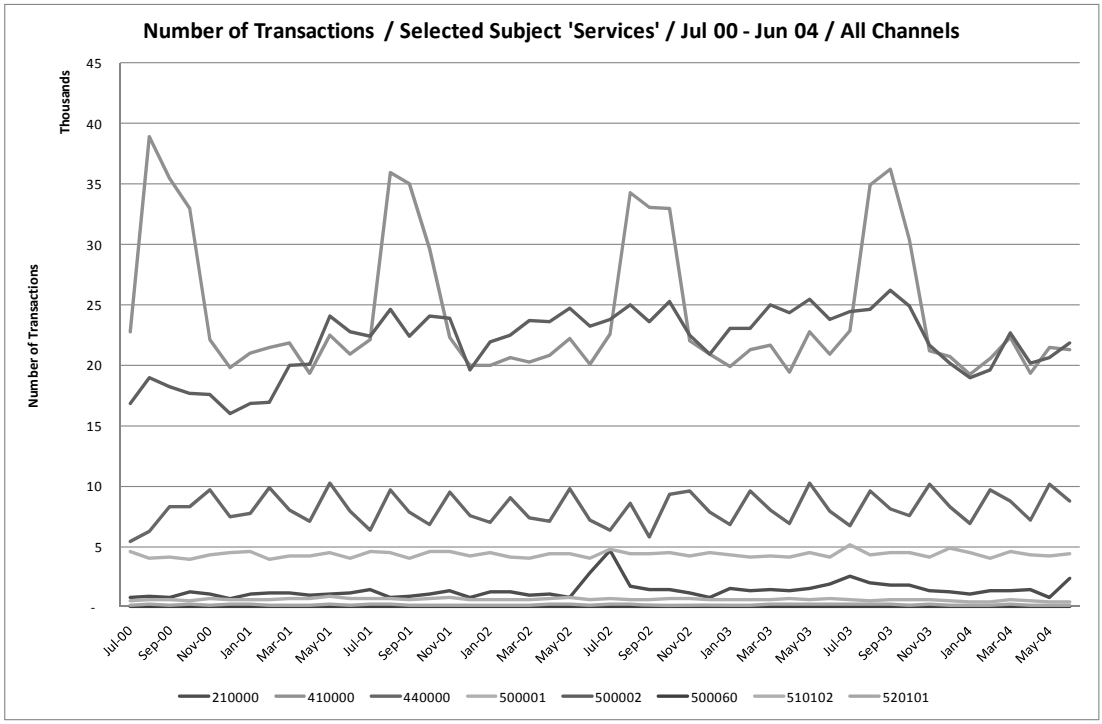

Figure 39: Number of Transactions per Month for Selected Subject 'Services' (Source: project data)

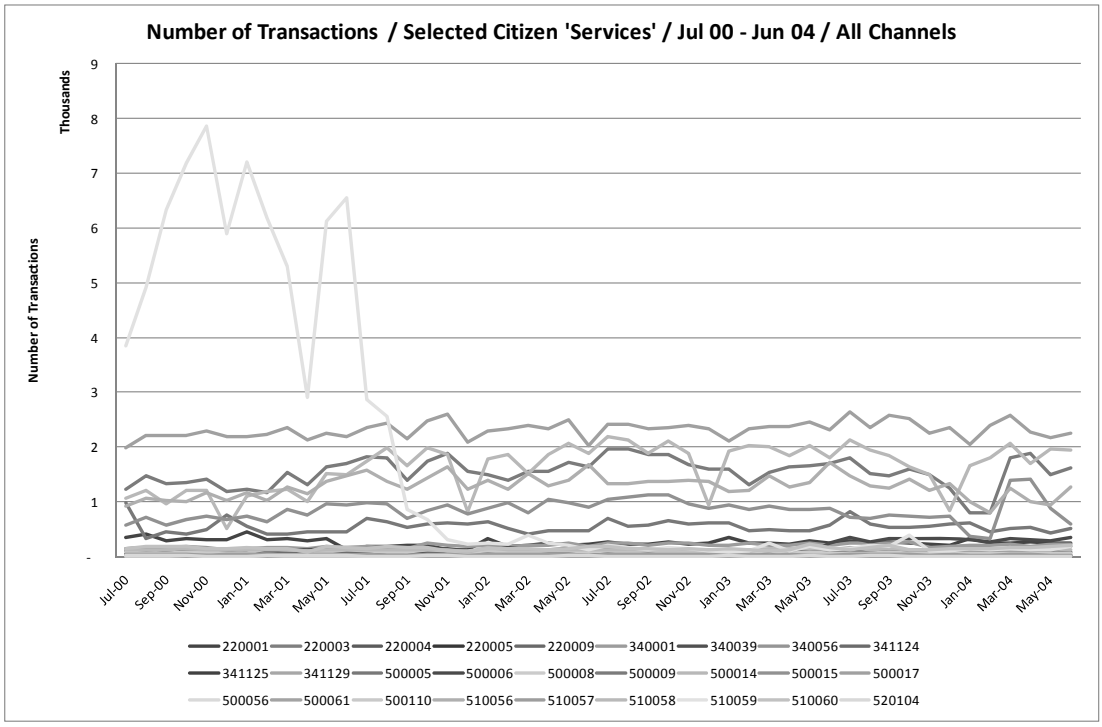

Figure 40: Number of Transactions per Month for Selected Citizen 'Services' (Source: project data)

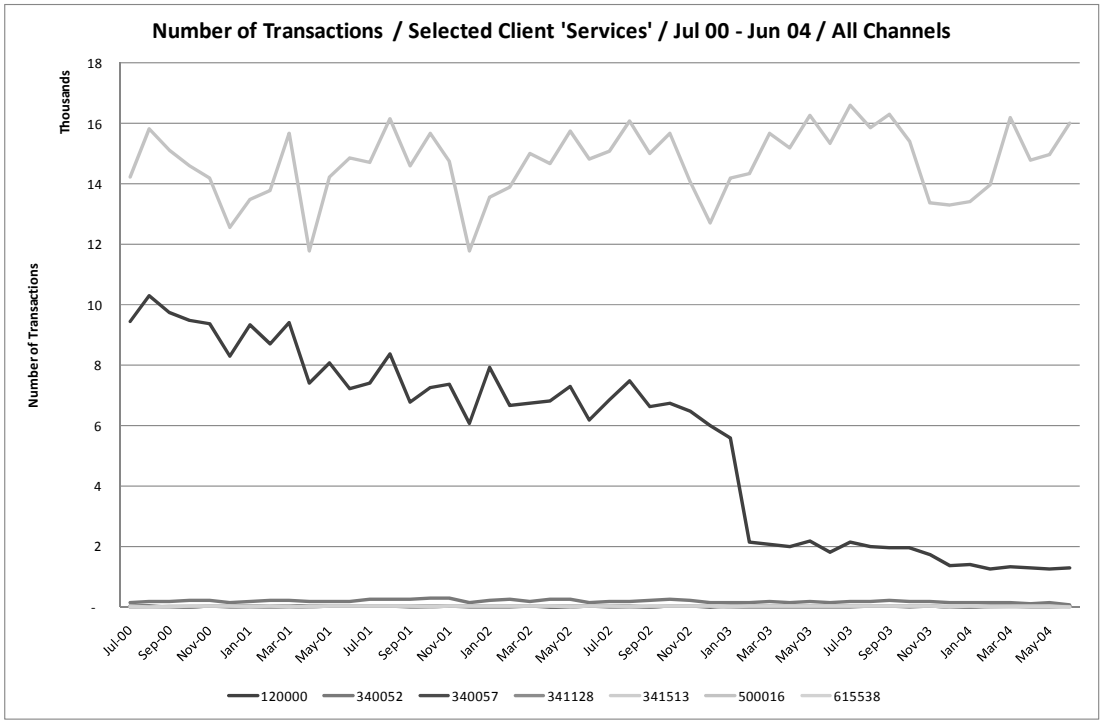

Figure 41: Number of Transactions per Month for Selected Client 'Services' (Source: project data)

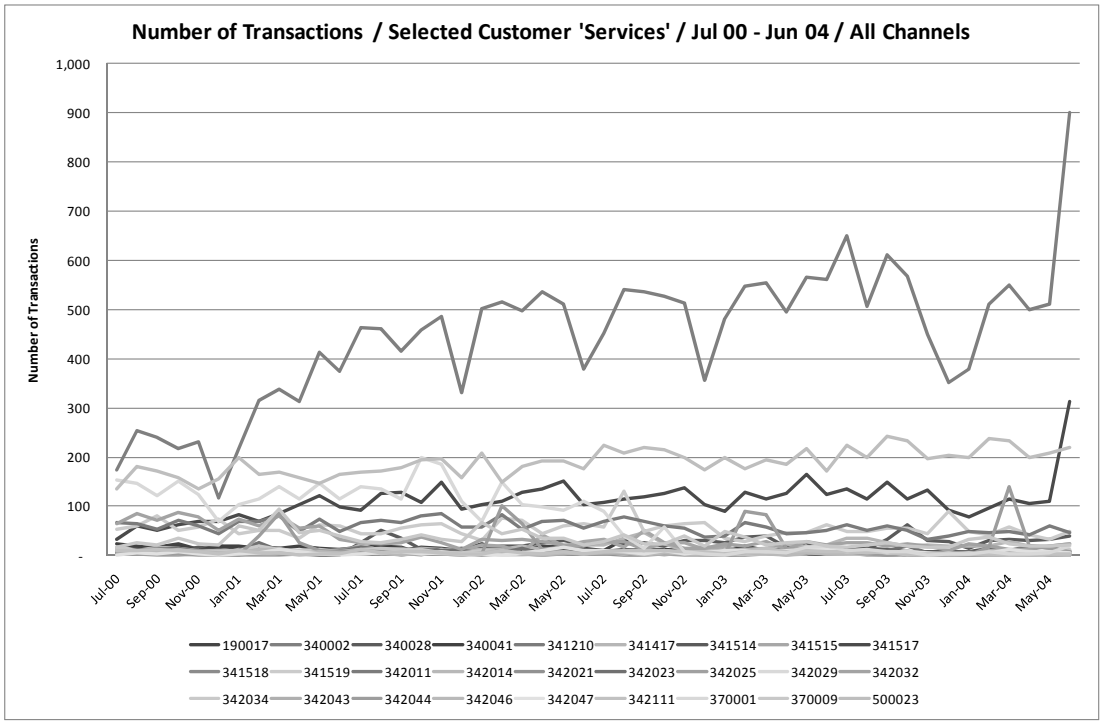

Figure 42: Number of Transactions per Month for Selected Customer 'Services' (Source: project data)

Visual inspection indicates that there are some interesting patterns of transactions occur in the different segments. In Figure 40, the sudden decline of high transaction volume 'service' (RAP Code 510059 – Trfr of Shares & Mrktble Securities) is indicative of the effect of the 'Internet Bubble' bursting. In Figure 41, the sharp decline in activity for one service (RAP Code 120000 – Housing Rent) reflects the devastation of the Canberra bushfires in January 2003 and the consequent reduction in rental demands by the ACT Government. In Figure 42, the sudden increase in activity in two 'services' (RAP Code 340002 – Searches - Plan Copies, and RAP Code 342044 – CBS Updates Renewal $78.00/yr) are indicative of new housing land issues (probably in the Canberra district of Gunghalin) or a change in zoning laws in existing suburban areas. This is also an indicator of a limitation of the data. These codes are classified as 'Business/Citizen' at the broader segmentation level. A sharp increase in activity in these 'services' is probably indicative of businesses increasing their activity (i.e. builders monitoring the opportunities for new (re-)developments) rather than a sudden rush of constituents pursuing personal conveyancing activity. However, overall, the data presented for each segment does not demonstrate a particular or over-riding pattern that might imply a strong behavioural predisposition of constituents when acting in that segment.

Part of this lack of visual commonality is the wide distinction between the levels of activity in different ‘services’; some ‘services’ record thousands, and even tens of thousands, of transactions each month, where others might record a mere handful. Plotting activity levels with different orders of magnitude on the same vertical axis (as above) might hide common patterns in transaction activity, particularly for those services with low numbers of transactions each month (the lines clustered at the base of the charts). Consequently, further analysis was undertaken to investigate if re-basing the data to a common range would reveal common patterns.

The ‘services’ that had continuous activity in each segment were then treated to create a 12-month seasonal index for each segment following the procedure recommended by Mason and Lind (Mason & Lind, 1993) and recounted here. A 12-month moving average of the transaction levels for each ‘service’ was created and then 36 of the 48 data points available were translated into seasonal indexes by subtracting their value from that of the corresponding moving average. Then, a single set of 12 seasonal indexes was created for each ‘service’ by finding the average of the three seasonal indexes for each month of a year. Finally, the sum of the 12 seasonal indexes was compared to 1,200 (the sum of 12 months of the ‘base’ value of 100) and the seasonal indexes were corrected to force their sum to 1,200 by distributing the difference of the sums across the indexes evenly.

Seasonal indexes offer the opportunity to compare transaction levels across ‘services’ regardless of their actual transaction level. Figure 43 to Figure 46 provide the graphs of these seasonal indexes.

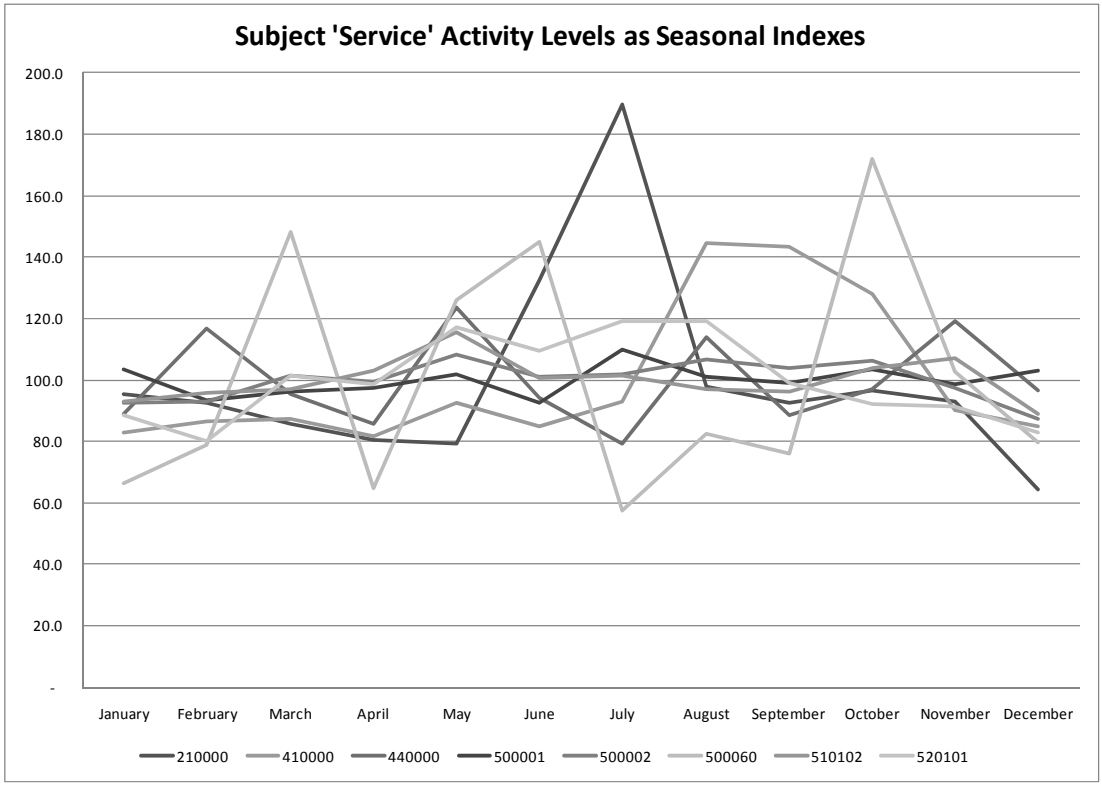

Figure 43: Seasonal Indexes for Selected Subject ‘Services’ (Source: project data)

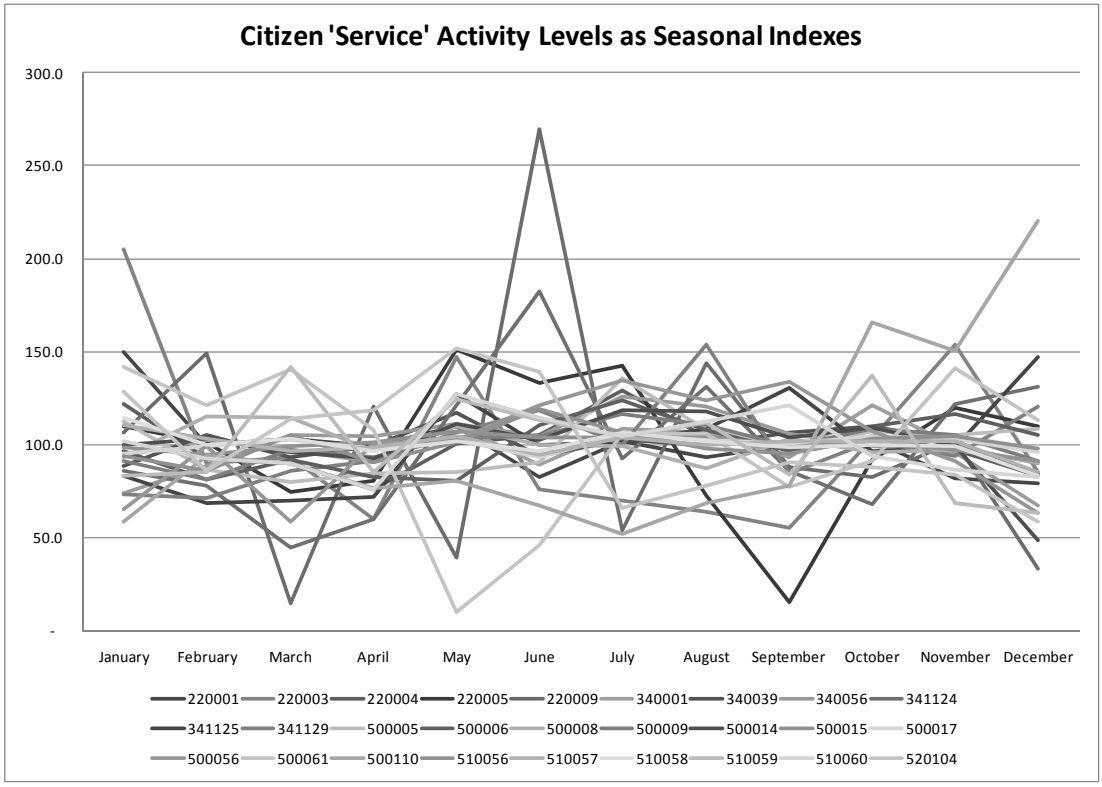

Figure 44: Seasonal Indexes for Selected Citizen 'Services' (Source: project data)

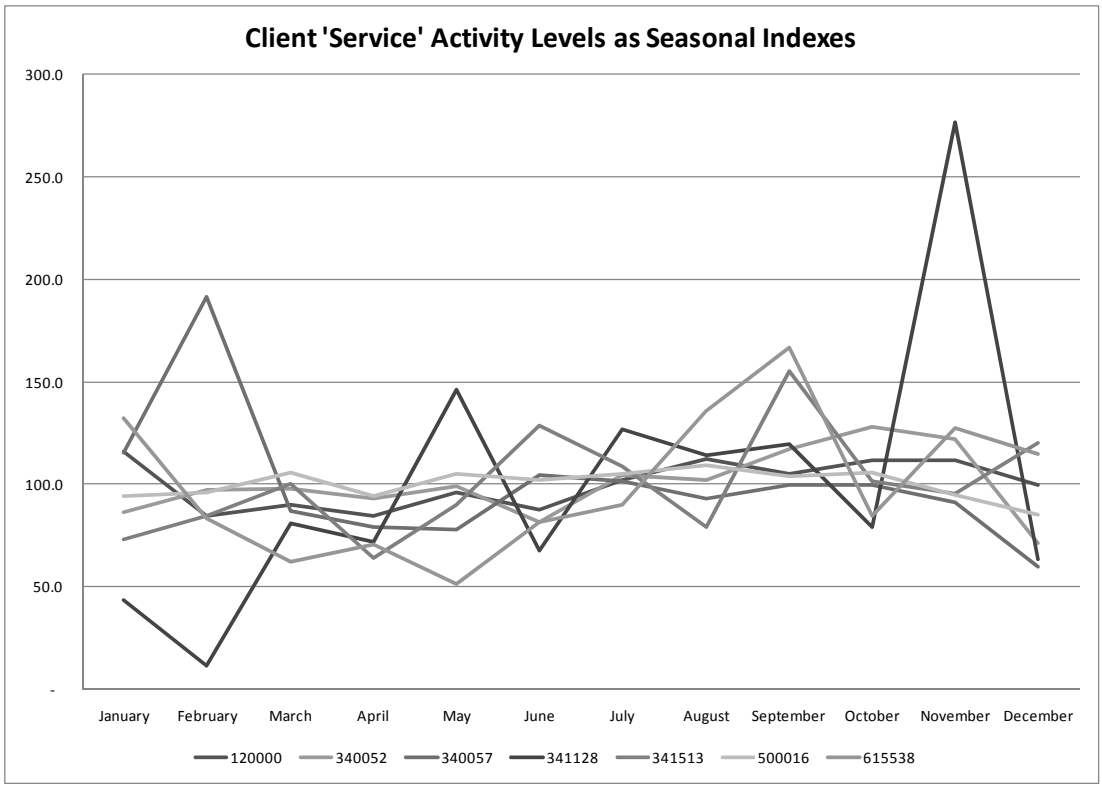

Figure 45: Seasonal Indexes for Selected Client ‘Services’ (Source: project data)

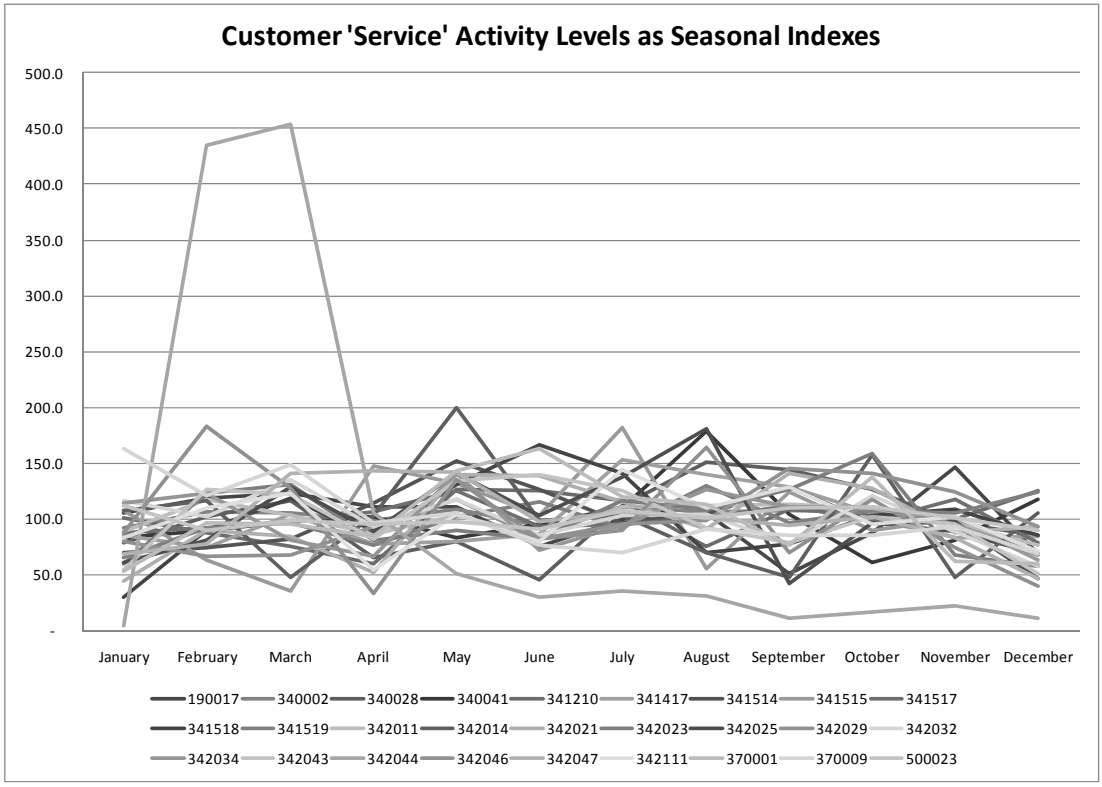

Figure 46: Seasonal Indexes for Selected Customer 'Services' (Source: project data)

Again, visual inspection suggests that there are some interesting activity levels but little can be said about a level of consistency in the seasonal characteristics of transaction activity among ‘services’ in a segment. Also, again, the seasonal indexes for one or two of ‘services’ may be hiding commonality among other ‘services’ by altering the plotting of the graph (in spite of this being the point to moving to seasonal indexes!).

Lee (1996) proposed a means of identifying the seasonality of data that might be disguised by other factors. He adopted the Lorenz curve and Gini index, used widely in economics and demographics, for application in epidemiological data analysis. He provided a method for demonstrating the seasonality of data with significant power, particularly when that seasonality was not a simple sinusoidal curve. The ‘messiness’ of the seasonal indexes created here suggests such a powerful method to determine similarity or not.

A final analysis was applied to the data in an effort to determine homogeneity among ‘services’ within a segment and disparity between segments. Using Lee’s (1996) approach, the seasonal indexes for each ‘service’ were ordered from smallest to largest and a Lorenz curve plotted. In this analysis, the Lorenz curve was

demonstrating the extent to which the transaction activity for the service was affected by seasonal factors; i.e. the extent to which activity levels varied according to the time of year; the more bowed (concave) the Lorenz curve (i.e. the further from a straight-line diagonal), the more seasonally-affected the transaction activity for the 'service'. The plotting of multiple Lorenz curves on a single chart does not offer significant visual assistance. However, Lee (1996) also describes the Gini index, which is a measure of the 'bowedness' of the Lorenz curve. This offers a single statistic to represent the extent to which any given 'service' demonstrates seasonal effects. Lee (1996) shows this statistic to be quite powerful and at least equivalent to the best seasonal statistical identifiers.

So, the Gini index for each service was calculated. . Table 21 reports the descriptive statistics (to four significant digits) for the resulting data calculated using SPSS v13.0.

Table 40: Descriptive Statistics for Gini Index Data for 'Continuous' Services in Segments (Source: project data)

Segment	N	Mean	Std. Dev.	Variance
Customer	27	0.1668	0.1136	0.013
Client	7	0.1396	0.0960	0.009
Citizen	27	0.1137	0.0808	0.007
Subject	8	0.0879	0.0606	0.004
Total	**69**	**0.1341**	**0.0973**	**0.009**

A one-way ANOVA conducted using SPSS v13.0 to test whether the Gini indexes within segments were more similar than between segments. Table 22 shows the results of this test.

Table 41: One-way ANOVA results for Gini Indexes of Seasonal Indexes of 'Services' (Source: project data)

Gini * Segment	Sum of Squares	df	Mean Square	F	Sig.
Between Groups (Combined)	0.057	3	0.019	2.122	0.106
Within Groups	0.586	65	0.009		

Clearly, with an F-statistic only significant at the 0.1 level, there can be no statistically-significant correlation found between a 'service' appearing in a segment and its Gini index. SPSS also reports an Eta-squared value of 0.089 indicating that the segment explains only 9% of the variance in Gini value.

Lee (1996) warns that the power of the Gini index is reduced when the sample size that creates the Lorenz curve is small. Reflecting on the activity levels of many of the 'services' included in the analysis, and the frequently wild seasonal index fluctuations of 'services' with low levels of activity, the one-way ANOVA test was repeated on a subset of the Gini indexes. The subset was determined by selecting 'services' that had transaction levels in each month in at least the hundreds of transactions. This removed some 43 'services' from the ANOVA calculations. The second ANOVA test produced an F-statistic of 0.167 with a significance level of 0.918. Clearly, the data was essentially uniform across the segments with these very small sample sizes.

The assumption that expectations of interactions would translate to identifiable homogeneity in the seasonality of 'service' use is also problematic. Some government services are rigidly seasonal (e.g. rent payments, rate payment, tax returns) where others have no such rigid schedules. Indeed, the seasonality of service use is more likely to be a characteristic of the service than of the expectations of the constituent using the service. Consequently, the failure of this analysis to establish homogeneity of interaction use within segments cannot be attributed to the idea underlying the segmentation; i.e. constituent expectations.

A.4.2.2 Channel-Oriented Analysis

As described above, the ACT Government data was encoded to include the channel through which the financial transaction took place (see Table 37, above). This offers a secondary opportunity to investigate indications of behavioural patterns in the financial data, the use of different channels to conduct transactions. This is particularly relevant in the context of e-Government as indications of different rates of adoption of online services in different segments would be a powerful reason for implementing the segment in e-Government service design.

The different Location Codes were classified according to which broad channel they represented (Table 23). The activity for each 'service' was consolidated by channel.

Table 42: Classification of Location Codes into Channels (Source: project data)

Location Code	Translation Provided	Channel
1	TSF	Shopfront
2	CSF	Shopfront
3	BSF	Shopfront
4	PALM/ACTIC	Shopfront
5	PALM/SF	Shopfront
6	REVENUE CSC	Shopfront
8	PALM/DICKSON	Shopfront
9	PALM/MITCHELL	Shopfront
10	Publications	Shopfront
11	WSF	Shopfront
24	Internet	Online
26	Australia Post	Shopfront
27	AUSTRAPAY	Post
28	Austouch	Online
29	BPAY	Online

The first analysis was the relative proportion of channel use over time for all ‘services’ in each segment. Figure 47 to Figure 50 demonstrate that there is definitely some difference in the proportional use of the different channels (NB: the vertical axes are not consistent in these figures to allow small values in some segments to be portrayed).

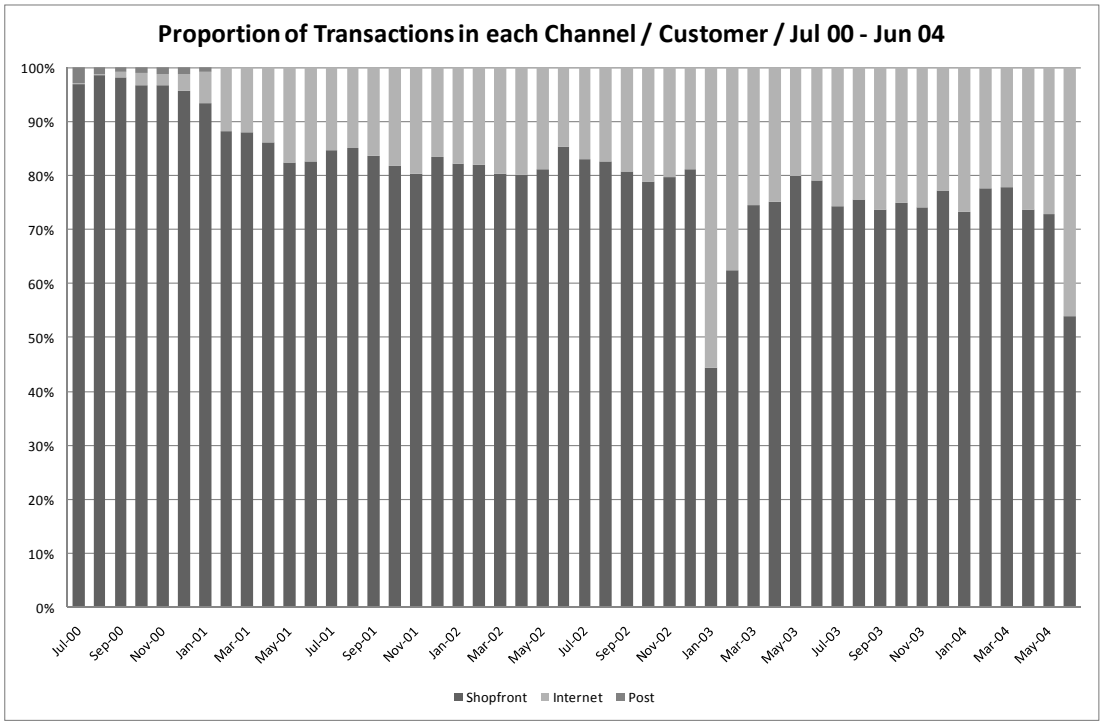

Figure 47: Proportion of Transactions over each Channel for Customer 'Services' (Source: project data)

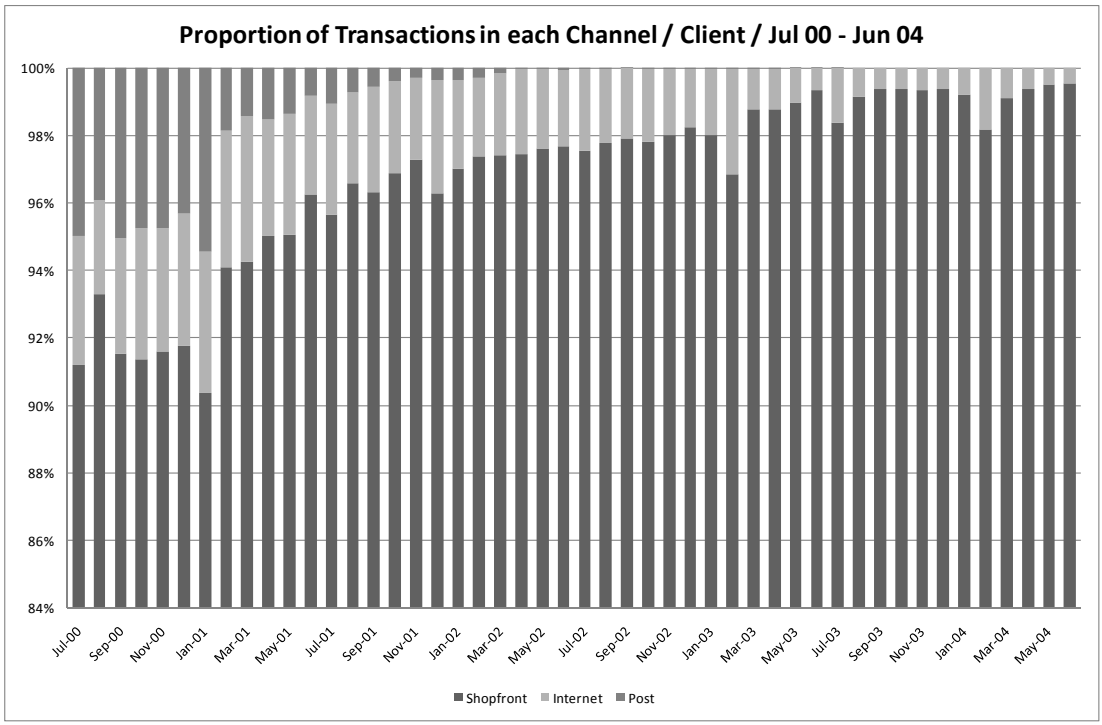

Figure 48: Proportion of Transactions over each Channel for Client 'Services' (Source: project data)

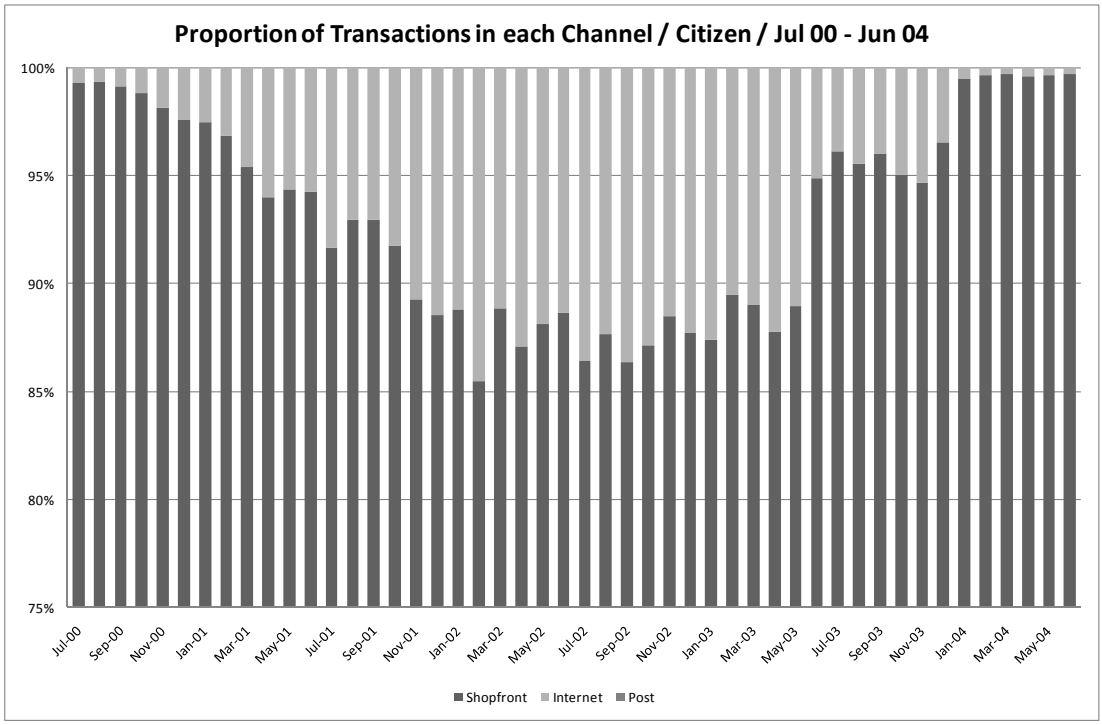

Figure 49: Proportion of Transactions over each Channel for Citizen 'Services' (Source: project data)

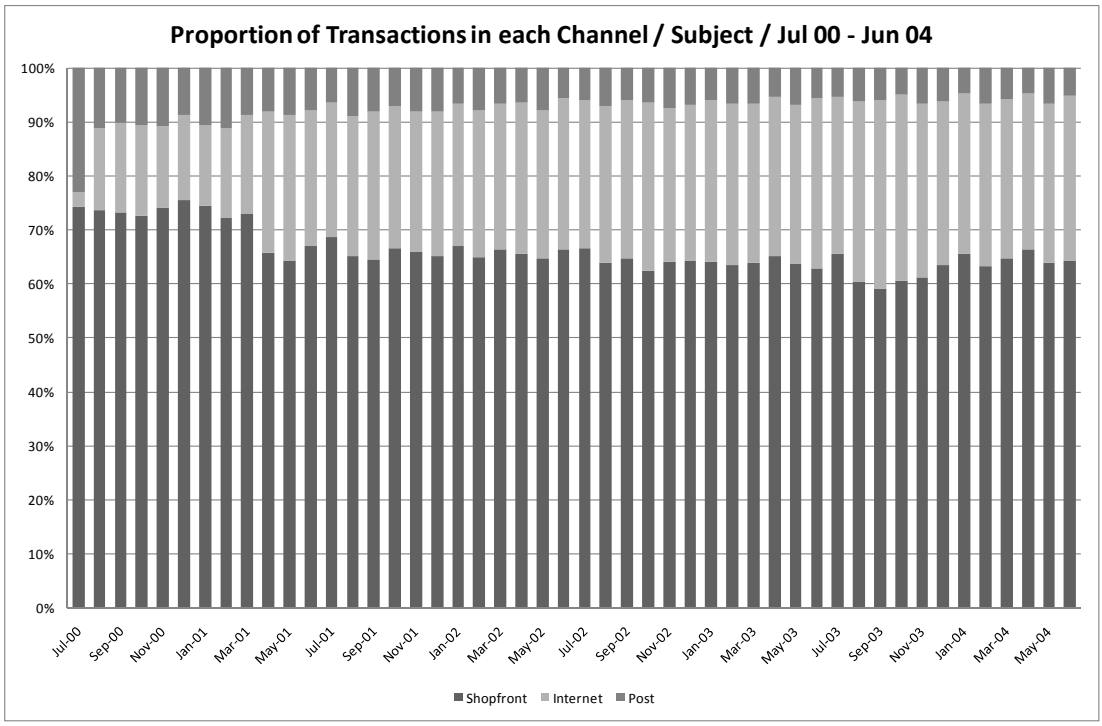

Figure 50: Proportion of Transactions over each Channel for Subject 'Services' (Source: project data)

The only definitive finding that can be described is that the use of the postal service to send cheques to the government for payment has diminished over the time considered; substantially for *Clients* and *Customers*, while *Subjects* continue to use

this channel. The shopfront channel was the dominant channel in all segments and overall.

The different patterns of (apparent) online adoption are difficult to interpret clearly. The big U-shape over time in *Citizen* use of the online channel may be because of the introduction of new services that do not have an online offering, or the cessation of an online offering. In an effort to overcome these limitations of the data, the previously identified 'continuous' services in each segment were extracted with their corresponding levels of activity across each channel. Table 24 shows the extent to which those 'continuous' services had non-shopfront channel activity.

Table 43: Number of 'Services' in Each Segment with Online Channel Activity (Source: project data)

Segment	Total	With Continuous Activity in Period	With Online Channel Activity in Period
Customer	130	27 (21%)	3*
Client	16	7 (44%)	2
Citizen	65	27 (42%)	5*
Subject	23	8 (35%)	3

* Each of these segments had one other 'service' with some online channel activity but the number of transactions was so low and infrequent that they were dropped from this analysis.

Figure 51 to Figure 54 plot the proportion of online channel usage for these small samples of 'services' in each segment. Where the proportion is zero at the beginning or end of the period, this can be interpreted as the service not having an online option during that time. A proportion of zero during the period indicates no use of the online channel for that month.

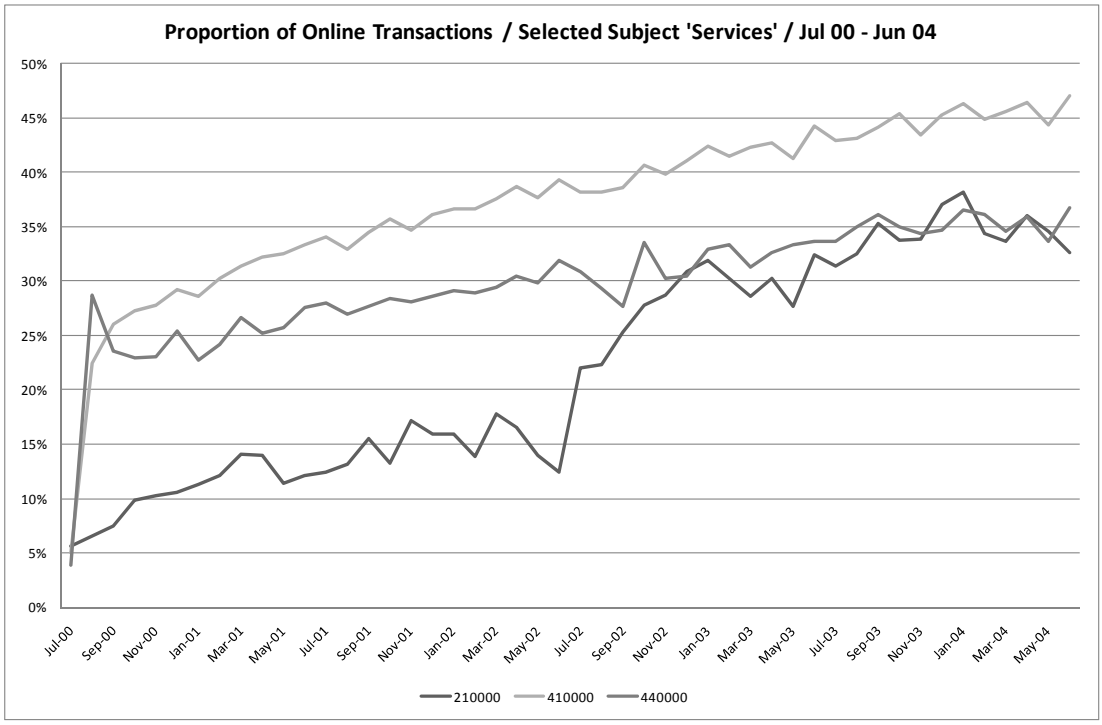

Figure 51: Proportion of Online Transactions for Selected Subject 'Services' (Source: project data)

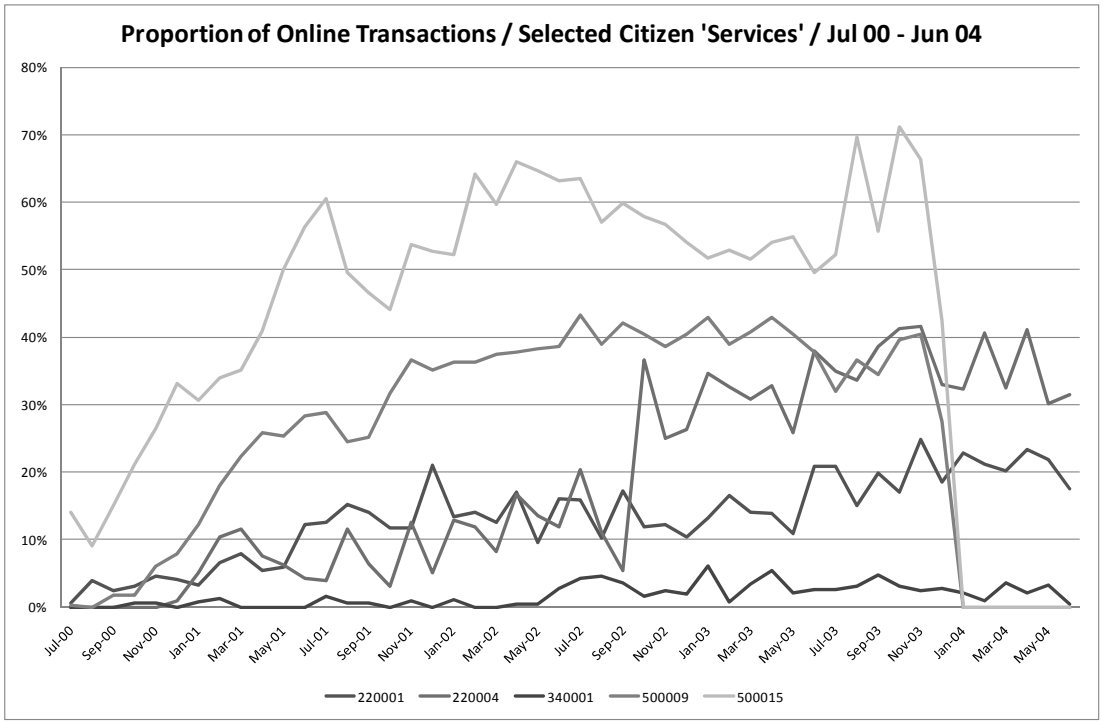

Figure 52: Proportion of Online Transactions for Selected Citizen 'Services' (Source: project data)

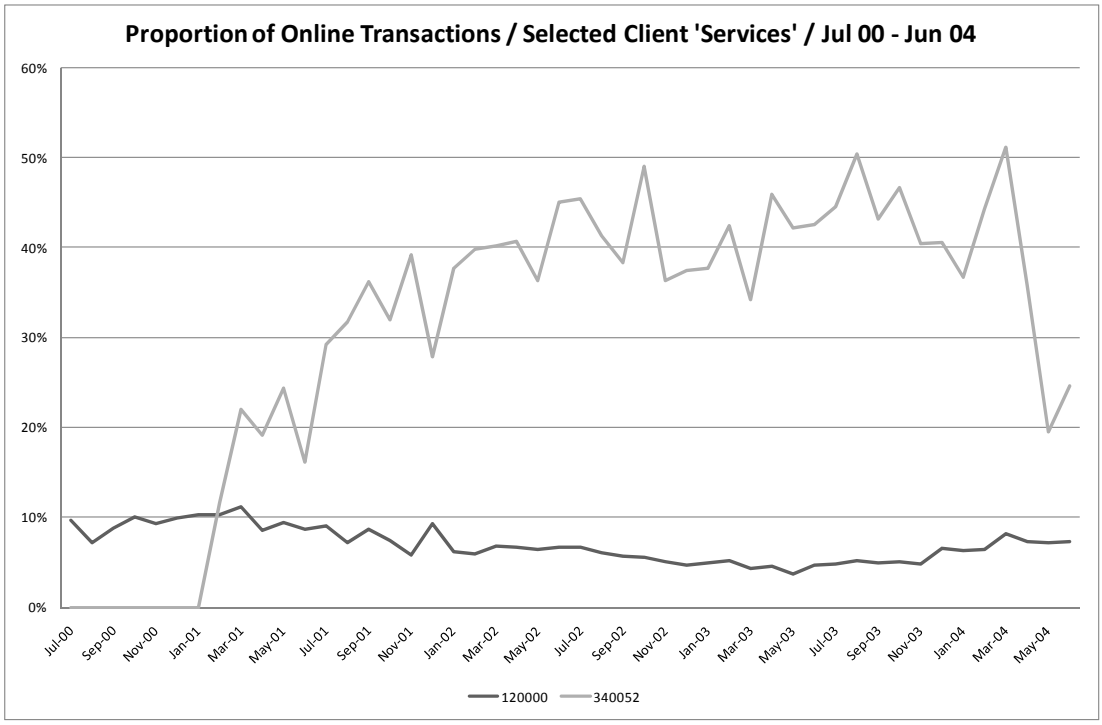

Figure 53: Proportion of Online Transactions for Selected Client 'Services' (Source: project data)

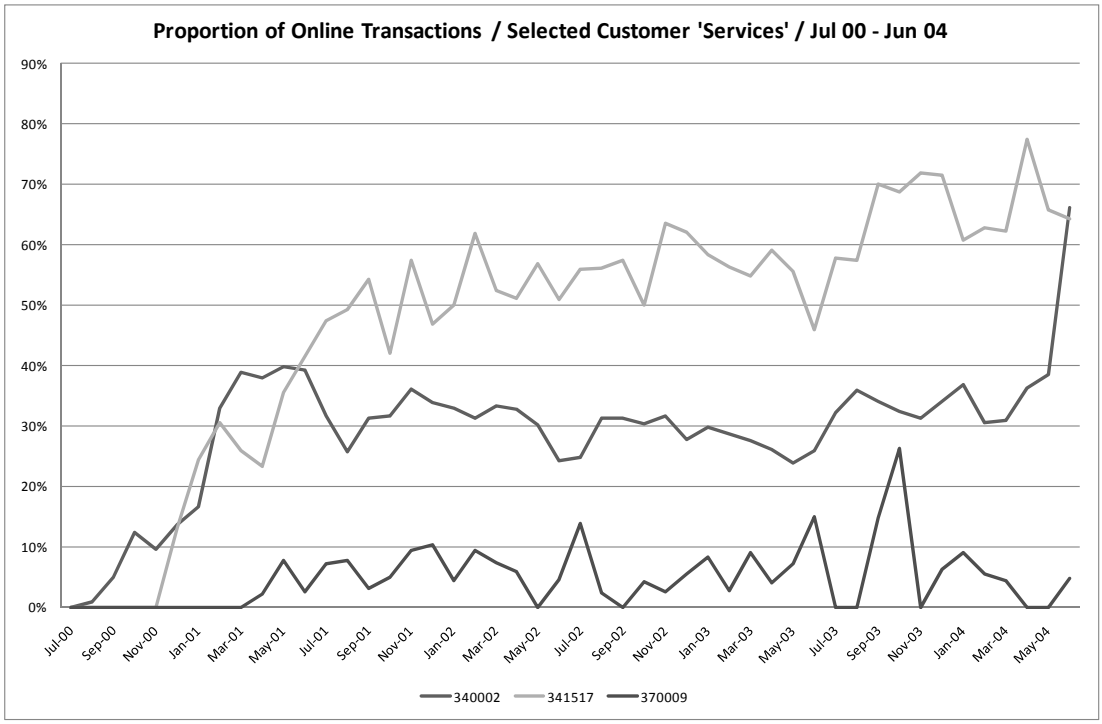

Figure 54: Proportion of Online Transactions for Selected Customer ‘Services’ (Source: project data)

There are several visual elements that need brief explanation. The sudden take-up of some ‘services’ (left-hand end of lines in Figure 51, Figure 53, and Figure 54) are because the ‘service’ was not offered online in those early months. The sudden sharp decline to cessation of ‘services’ in Figure 52 reflects the ‘services’ being subsumed

by other ‘services’ at the time. Three visually obvious adoption level changes warrant brief mention. One ‘service’ in each of Figure 54 (RAP Code 340002 – Sale of Floriade Tickets) and Figure 52 (RAP Code 220004 – [Dog Registration] Replacement Tags) both had sharp up-turns in adoption. Both of these changes reflect a re-vamp of the services offered online. Unfortunately, the specific details of the changes are now lost to time. In Figure 53, one ‘service’ (RAP Code 340052 – Energy Rating) declined sharply. This decline coincides with the passing of the initial ‘backlog’ of properties to be rated after the introduction of the mandatory energy rating scheme in January 2001.

Inspection of these sparse samples indicates that there is a general trend to adopt the online channel over time. That trend is strongest in the *Subject* segment.

A.5 Categorised Transactions from ACT Government Financial Transactions Data

Table 44: All Financial Transaction Codes, Agency and Description with Broad Market Segmentation

Trans-code	Agency	Description	Broad Market Segment
100000	HSG	Sundry Debt - ISIP	X
120000	HSG	Housing Rent	C
130001	AWC	Fireworks Permit	BC
140001	HCC	FOOD BUSINESS LICENCE	B
140011	HCC	Board Housing Activity Lic Ren	B
140012	HCC	Cool Tower & Warm Water Storag	B
140013	HCC	Cooling Tower Proforma	B
140014	HCC	Drinking Water Licence	B
140015	HCC	Hairdressing Activity Lic Rene	B
140016	HCC	Infection Control Activity L R	B
140017	HCC	Smoke-Free Exemption Fees	B
140018	HCC	Retail Tobacconist's Lic Renew	B
140019	HCC	Wholesale Tobacco Merc Lic Ren	B
190001	ENV	MRC Revenue	BC
190002	ENV	MRC Cotter Campground	C
190003	ENV	State of the Environment Repor	BC
190004	ENV	TNR Revenue	BC
190005	ENV	Fines-Environ Protection Act	BC
190006	ENV	GF Revenue	BC
190007	ENV	Tree Damaging Activity in ACT	BC
190008	ENV	TNR Retail Only	BC
190009	ENV	NNP Revenue	BC
190010	ENV	Tress and Shrubs in Canberra	BC
190011	ENV	CNP Lock Permits	C
190012	ENV	NCS Recoveries	X
190015	ENV	Fines (on the Spot) - Administ	BC
190016	ENV	Wildlife Permits	BC
190017	ENV	BDM -Posters	BC
190018	ENV	BDM _ Publications	BC
190019	ENV	BDM - Debtors	X
190021	ENV	CIRCUS PERMIT	B
200001	ENV	Sale of Publication - Water	BC
200006	COR	Freedom of Info Application Fe	BC

Trans-code	Agency	Description	Broad Market Segment
200025	ENV	CNP Revenue	BC
200028	ENV	Parks and Cons - Sale of Pub	BC
200031	ENV	NNP Retail Only	BC
200033	COP	Nature Strips - Revenue	BC
200115	ENV	Old Canberra Brickworks	X
200141	INP	Sale of Publications	BC
210000	INP	Dog Renewals	C
220001	INP	New Dog Registrations	C
220002	ENV	Dog Poundage	C
220003	INP	Dog Licences	C
220004	INP	Replacement Tags	C
220005	INP	Infringement Notices - Dogs	C
220006	INP	Court Fines - Dogs	C
220007	ENV	Sale of Dogs	C
220008	ENV	Transport - Dog Control	C
220009	INP	Dog Control - Other	C
220010	INP	Sexually Entire Permit	C
230002	ENV	Timber Permits - AG	B
230003	ENV	Release Impounded Stock	B
230004	ENV	Stockbrands Tags	B
230006	ENV	Emergency Tail Tags	B
230007	ENV	Permit for Sand/Gravel	B
230008	ENV	Research ,Teaching&/Breeding	B
230010	ENV	Tidbinbilla Entry Pass	C
230011	ENV	Stock Rates	B
230013	ENV	Power Boat Fee Molonglo River	BC
230014	ENV	Hire of Cuppa Shearing Sheds	BC
230015	ENV	National Landcare	X
236855	ENV	Land Agistment	C
250001	INP	Additional bin -NoWaste	BC
250002	INP	Rent W Belc Est Recov -NoWaste	B
250003	INP	Landfill credit acc -NoWaste	B
250004	INP	Landfill cr acc -NoWaste Belco	B
250005	INP	Landfill cr acc -NoWaste Mitch	B
270004	PLM	Monitoring River Health Initia	X
280000	DTI	Monthly Repayment Loans	X

Trans-code	Agency	Description	Broad Market Segment
290000	DTI	Monthly Repayment Loans	X
310007	FOR	ACT Forest - Softwood Permits	BC
320000	CIT	CIT Student Fee	C
320001	CTE	Floriade Souvenir Books	C
320002	CTE	Sale of Floriade Tickets	C
340001	PLM	Builders/Owners Licence Fees	BC
340002	PLM	Searches - Plan Copies	BC
340003	PLM	Training Levy	X
340005	PLM	Residential Approvals	B
340006	PLM	Commercial Approvals	B
340007	PLM	Amendment Approvals	B
340011	PLM	Residential Building Permits	BC
340012	PLM	Commercial Building Permits	B
340015	PLM	Inspection Surcharge	B
340017	PLM	Building Statistics	BC
340022	PLM	Betterment	BC
340023	PLM	Lease Sales	BC
340024	PLM	Land Rent - DDE	BC
340028	PLM	Electrical Fees - Other	BC
340030	PLM	Licence Certificate	B
340035	PLM	Account Keeping Fees - BEPCON	X
340036	PLM	Notice of Intentions ACTWORKCO	B
340037	PLM	NOEW Certificate	B
340038	PLM	Reg of Backflow Test Reports	B
340039	PLM	Building Conveyancing Report	BC
340041	PLM	ACTLI - Miscellaneous Sales	BC
340043	PLM	Electrical Licence Fees	B
340044	PLM	Plumbing & Drainage Permits	B
340045	PLM	Plumbers Drainers Gas Licences	B
340046	PLM	Architects Board	B
340047	PLM	Reg as a Building Certifier	B
340048	PLM	Reg as a Plumbing Certifier	B
340049	PLM	Reg of certified plans - Build	B
340050	PLM	Reg of certified plans - plumb	B
340052	PLM	Energy Rating	BC
340053	PLM	Certificate of Regularisation	B

Trans-code	Agency	Description	Broad Market Segment
340054	PLM	Fire Works Permits	BC
340055	PLM	Plumbing & Drainage Permits	B
340056	PLM	Building Conveyancing Reports	BC
340057	PLM	Energy Rating	BC
340058	PLM	Miscellaneous - Non GST	X
340059	PLM	Builders/Owners Licence Fees	BC
340060	PLM	Searches - Plan Copies	BC
340061	PLM	Inspection Surcharge	B
340062	PLM	Electrical Licence Fees	B
340063	PLM	Plumbers Drainers Gas Licences	B
340064	PLM	Architects Board	B
340065	PLM	Registrastion of Backflow Test	B
341010	PLM	Change of use Charge - CHUC	B
341011	PLM	Parking Contributions	B
341110	PLM	Application Fees - General	BC
341111	PLM	ACT Building Control	B
341112	PLM	Agents Certificate	B
341113	PLM	Application for Order	B
341114	PLM	Building Levy	B
341115	PLM	Building Search Fees	BC
341116	PLM	Compliance Certificate	B
341117	PLM	Consolidation	X
341118	PLM	Design & Siting	B
341119	PLM	Direct Grant	BC
341121	PLM	Home Business	B
341122	PLM	Home Business Renewal	B
341123	PLM	Hydraulic Fees	BC
341124	PLM	Grant of a Further Lease	BC
341125	PLM	Lease Variation	BC
341126	PLM	Mining Application	B
341127	PLM	Minister Consent	X
341128	PLM	Preliminary Assessment	BC
341129	PLM	Public Notification	BC
341130	PLM	Scaffolding & Lifts	B
341131	PLM	Sub-Division	B
341132	PLM	Unit Title Application	B

Trans-code	Agency	Description	Broad Market Segment
341133	PLM	Account Keeping Fees - General	X
341134	PLM	Community Title Fees	B
341135	PLM	Grant of a Licence	BC
341136	PLM	Payout Concession	X
341137	PLM	Compliance Fine	B
341210	PLM	Security Deposit	BC
341211	PLM	Trust Receipt	B
341310	PLM	Recoverable Work - Non GST	B
341311	PLM	Recoverable Work - GST Applies	B
341410	PLM	ACTLI Sale	BC
341411	PLM	Canberra By Suburbs - Map Only	BC
341412	PLM	Canberra By Suburbs - Update	BC
341413	PLM	Canberra By Suburbs - Folder	BC
341414	PLM	Canberra By Suburbs - Renewal	BC
341415	PLM	Canberra Cycleways	C
341416	PLM	Canberra Landscape Guidelines	BC
341417	PLM	Photocopies	BC
341418	PLM	Postage and Handling	X
341419	PLM	Suburb & Street Name Booklets	BC
341420	PLM	Detailed Property sales Report	BC
341421	PLM	Monthly Stats Sales Report	BC
341422	PLM	Sales Statistics By Division	BC
341423	PLM	Valuation Listing	BC
341424	PLM	Sales Data Lic Agrmt/Subs	B
341425	PLM	Sales Enquiries	BC
341426	PLM	Valuation Enquiries	BC
341427	PLM	Territory Plan Map	BC
341428	PLM	Territory Plan Statement	BC
341429	PLM	General Publication	BC
341510	PLM	Miscellaneous - Non GST	X
341511	PLM	Miscellaneous -GST Applies	X
341512	PLM	Administration Fee	X
341513	PLM	Bond Preparation Fee	BC
341514	PLM	Certified Copy	BC
341515	PLM	Photocopies - Public Register	BC
341516	PLM	Comcare	X

Trans-code	Agency	Description	Broad Market Segment
341517	PLM	Conveyancing Enquiry	BC
341518	PLM	Conveyancing Stamps	BC
341519	PLM	Dial A Search	BC
341520	PLM	Dishonoured Cheques	X
341521	PLM	Extentd Time to Build	B
341522	PLM	Landscaping Inspection	B
341523	PLM	Leasing Preparation	BC
341524	PLM	Re-Credit Expenditure	X
341525	PLM	Survey Fees	BC
341526	PLM	Training Levy	X
341527	PLM	Sub-div Implment Plan Approval	B
341610	PLM	Land Sales	BC
342011	PLM	DP paper $17.80	BC
342012	PLM	DP film $22.55	BC
342013	PLM	DP Proforma	BC
342014	PLM	Comp sheet paper $17.80	BC
342015	PLM	Comp sheet film $24.00	BC
342016	PLM	Faxed extract DP/CS $22.55	BC
342017	PLM	Cadastral series paper $11.90	BC
342018	PLM	Cadastral series film $24.00	BC
342019	PLM	Orthophoto series paper $11.25	BC
342020	PLM	Orthophoto series film 24.00	BC
342021	PLM	Enlarged Airphoto paper $11.25	BC
342022	PLM	Enlarged Airphoto film $24.00	BC
342023	PLM	Detail series paper $11.25	BC
342024	PLM	Detail series film $24.00	BC
342025	PLM	Planning series paper $8.40	BC
342026	PLM	Planning series printed $8.70	BC
342027	PLM	Planning series film $22.55	BC
342028	PLM	Investigation plan	BC
342029	PLM	Work-as-executed $14.30	BC
342030	PLM	Identification certifica $6.75	BC
342031	PLM	Parish portion plan $7.00	BC
342032	PLM	Gov house plans $13.50	BC
342033	PLM	Irrigation/L'scape Plan $11.90	BC
342034	PLM	Miscellaneous plans	BC

Trans-code	Agency	Description	Broad Market Segment
342035	PLM	Surveyors Board Registration	B
342036	PLM	Digital Orthophoto Plots	BC
342040	PLM	CBS maps only $125.00	BC
342041	PLM	CBS maps, folder $129.25	BC
342042	PLM	CBS maps, updates $168.00	BC
342043	PLM	CBS maps,updates foldr $168.85	BC
342044	PLM	CBS updates renewal $78.00/yr	BC
342045	PLM	CBS post & handling $9.00	BC
342046	PLM	CBS suburb photocopy $5.90	BC
342047	PLM	A4 PCACTMAP plot $6.75	BC
342048	PLM	CBS Folder only $12.70	BC
342111	PLM	Air Photo p'copy paper $16.85	BC
342112	PLM	Air Photo p'cpy lamintd $29.70	BC
342211	PLM	Control mark co-ords $6.75	BC
342212	PLM	BM level first $7.00	BC
342213	PLM	BM level subsequent $2.25	BC
342214	PLM	Field Books $11.90	BC
360001	IPR	ACT Population Forecasts	BC
360025	COR	Recredit To Expenditure	X
370001	CSI	Legislation Sales	BC
370003	CSI	ACT Gazette Sales	BC
370004	COP	Gazette Notice Revenue	X
370005	COP	Budget Papers Sales	BC
370007	CSI	Pocket Phone Book Sales	BC
370008	COP	Adverts Staff Bulletin etc	B
370009	COP	Canberra Bike Map	C
370011	IPS	Dep to Debit Ac (Govt)	X
370012	IPS	Dep to Debit Ac (Non Govt)	X
370013	CSI	Dep to Subscript (Govt)	X
370014	CSI	Dep to Subscript (Non Govt)	X
370015	CSI	Reflections of Canberra CD ROM	C
370016	IPS	ACT Library's Internet Courses	C
370017	IPS	PSMS Manual Sales	C
370018	CSI	Bound Volumes Sales	C
370019	IPS	Bookshop Postage	X
370021	COP	Publishing Sales Other	C

Trans-code	Agency	Description	Broad Market Segment
370023	IPS	IYOP Recipe Book	C
370025	CSI	Library Fines	C
370026	CSI	Library Reservation Fees	C
370027	CSI	Shopfront Uniform Sales	X
370028	CSI	Bushfire Donations	C
380001	A	Cycle Locker Hire	C
380002	A	Bus Book Sales	C
380003	A	Ticket Sales	C
380004	A	Ticket Sales - Shopfronts	C
380005	A	Miscellaneous Revenue	X
380006	A	Repayment of Salaries	X
380007	A	Postage Charge Registered Mail	X
380008	A	Fine Revenue	BC
410000	DTI	General Rates	BC
440000	DTI	Land Tax	BC
470000	DTI	Bushfire Reconstruction Levy	BC
500000	RUM	TRIPS/RAP Interface	X
500001	RUM	Drivers Licence Fees	C
500002	RUM	Registration Fees	C
500003	CSI	Fees-Dimensions & Mass Permits	BC
500004	CSI	Fees-Dimensions & Mass Fines	BC
500005	RUM	Inspection Fees	BC
500006	RUM	Plates of Choice	BC
500007	RUM	Taxi Plate - Transfer Fees	B
500008	RUM	Special Plates	BC
500009	RUM	Parking Penalties	C
500010	RUM	Parking Fees	C
500011	RUM	Unidentified Parking Penalties	C
500012	RUM	Road Rescue Revenue	C
500013	RUM	Boom Gate Parking	C
500014	RUM	Parking Labels	C
500015	RUM	T.I.N. Penalties	C
500016	RUM	N.R.M.A.	C
500017	RUM	MV Rego & Trsfr Stamp Duties	BC
500018	RUM	Stay Upright	C
500019	RUM	F.I.R.S. Charges	C

Trans-code	Agency	Description	Broad Market Segment
500020	RUM	F.I.R.S. Third Party	C
500021	RUM	Jervis Bay Licence	BC
500022	RUM	Jervis Bay Registration Tax	BC
500023	RUM	Pub Card Transport Regulations	C
500024	CSI	Dishonoured Cheque Fees	X
500025	RUM	Speed Camera Infringmnt Notice	C
500026	RUM	Redlight Camera Infring Notice	C
500027	RUM	Infringement Clearing	X
500028	RUM	Phot Viewing Fees	C
500029	RUM	Road Safety Contribution	C
500051	CSI	Cashier Surplus M.V.R.	X
500052	DTI	Duplicates Counterparts & Repl	X
500054	INP	Hawkers Licence fees	B
500055	COP	Illegal Signs	B
500056	INP	Damage to Street Lights	BC
500057	ENV	Wildlife Project for Native	X
500058	COP	Outdoor Cafe Fees	B
500059	INP	Damage to Traffic Lights	BC
500060	COP	Release of Impounded Vehicles	C
500061	INP	Litter Fines	C
500062	ENV	Job Tied Housing	C
500063	COP	Electricity outlets - Civic	B
500078	RUM	Transport Reg Court Cost	C
500101	RUM	Jervis Bay Parking Fines	C
500110	COP	Public Land Use	BC
500120	IPS	Revenue Womens Inf Ref Ctr	C
500121	CSI	Cashier Surplus - Civic S/F	X
500122	CSI	Cashier Surplus - Tuggeranong	X
500123	CSI	Cashier Surplus - Belconnen S/	X
500124	CSI	Cashier Surplus - Woden S/F	X
500125	RUM	Pensioner Licence Reimbursemen	C
510001	DTI	TocTax Sales Tax Equivalent	X
510002	DTI	Hiring Duty	B
510003	DTI	User Chrgs Non ACTGS Ecomomics	X
510004	DTI	Debits Tax	X
510006	DTI	Bookmaker's Standing Licence	B

Trans-code	Agency	Description	Broad Market Segment
510013	DTI	Ambulance Service Levy	C
510014	DTI	Sale of Business Stamp Duty	B
510016	DTI	General Insurers Levy	B
510017	DTI	Deeds of Trust	B
510018	DTI	ACTEW - Dividend	X
510023	DTI	Rates & L/TAX Oject Lodge Fee	BC
510024	DTI	Stamp Duty & Taxes Oject Lodge	BC
510027	DTI	Rates & L/Tax Statement of Acc	BC
510028	DTI	Motor Vehcle Demonst Admin Fee	B
510029	DTI	Penalty First Home Owner Grant	C
510030	DTI	Liquor Business Franchise Fees	B
510031	DTI	Repayment 1st Home Owner Grant	C
510032	DTI	Water Restriction Infringement	BC
510034	DTI	B/Fire Recov Public Liab Cov	X
510035	DTI	Technician/Attendant Certifica	B
510036	DTI	Canberra-Nara 10th Anniver Rev	BC
510037	DTI	Miscellaneous Rev - Old Taxes	X
510053	DTI	Dishonoured Cheque Fees	X
510055	DTI	Tobacco Licence Fees	B
510056	DTI	Conveyancing	BC
510057	DTI	Life Insurance Stamp Duty	C
510058	DTI	General Insurance Stamp Duty	BC
510059	DTI	Trfr of Shares & Mktble Securi	BC
510060	DTI	Lease Stamp Duty	BC
510063	DTI	Raps Round Downs	X
510080	DTI	Dishonour Cheque Admin Fee	X
510081	DTI	A Community Remembers Publicat	C
510087	DTI	Totalisator Turnover Fees	X
510088	DTI	Payroll Tax Equivalents	X
510097	DTI	Petroleum Business Fees	B
510098	DTI	Bookmaker's Turnover Tax	B
510099	DTI	Payroll Tax	B
510100	DTI	Financial Institutions Duty	X
510102	DTI	Rates and Land Tax Enquiry Fee	C
510120	DTI	Gas Turnover Tax	B
510144	DTI	Rebanking Cheques	X

Trans-code	Agency	Description	Broad Market Segment
510183	DTI	C'Wlth Income Tax Equivalent	X
510189	DTI	Jervis Bay Petroleum Licence	B
510190	DTI	Jervis Bay Liquor Renewal Lic	B
510193	DTI	Jervis Bay Tobacco Licence	B
510201	DTI	Business Licence Register Fe	B
520101	JCS	Gun Licence	C
520102	JCS	Ambulance Transport Payments	C
520103	JCS	Failure to vote penalty	C
520104	JCS	Cannibas Expiation Notice	C
520105	JCS	LIQUOR LICENCE OFF	B
520106	JCS	LIQUOR LICENCE ON	B
520107	JCS	LIQUOR LICENCE GENERAL	B
520108	JCS	LIQUOR LICENCE CLUB	B
520109	JCS	LIQUOR LICENCE SPECIAL	BC
520110	JCS	LIQUOR PERMIT	B
520111	JCS	LIQUOR LICENCE TRANSFER	B
520112	JCS	BUSINESS NAME REGISTRATION	B
520113	JCS	LIQUOR LIC.RENEWAL FEES - BLISS	B
520114	JCS	REGISTRATION OF X FILM LIC	B
520115	JCS	MOTOR VEHICLE DEALERS LIC -	B
520116	JCS	REG AS A CRED PROVIDER/FIN BRO	B
520117	JCS	SERV LIC MEASURING INSTRU - TR	B
520118	JCS	PUBLIC WEIGHTBRIDGE LIC	B
520119	JCS	DANGEROUS WEAPONS LICENCE	BC
520120	JCS	DANGEROUS WEAPONS COMPOSITE	BC
520121	JCS	GUN DEALERS LICENCE	B
520122	JCS	AUCTIONEERS LICENCE	B
520123	JCS	SECOND HAND DEALERS LICENCE	B
520124	JCS	COLLECTORS LICENCE	BC
520125	JCS	PAWNBROKERS LICENCE	B
520126	JCS	REG OF BROTHEL AND ESCORT AGEN	B
520127	JCS	MOTOR VEHICLE DEALERS LIC CORP	B
530001	CSI	General Publications - Postage	BC

Trans-code	Agency	Description	Broad Market Segment
610001	HSG	Land Sales to Public	C
610003	HSG	Private Rental Leasing-Agent	B
612100	HSG	Half Cost Fencing	C
612200	HSG	Ex Water Rates Recoverable	C
612300	HSG	Maint Costs Recoverable	C
612400	HSG	Vacant Dwelling Maint Costs	X
612500	HSG	HSGLED - ACT Housing Misc.	X
613100	HSG	Rent Relief-Bonds Repaid	C
613200	HSG	Prosecutions Recoverable	C
613600	HSG	Rent Narrabundah	C
613700	HSG	Narra L/Stay C/P Elect Costs	X
614000	HSG	Mortgage Relief-Client Repay	C
614793	HSG	Repayment of Expenditure	X
614794	HSG	Bad Debt Recovered - HSG	X
615504	HSG	Sale Valuation Fee - Holding A	X
615505	HSG	Proceeds Home Access	C
615511	HSG	Rent - Jerrabomberra	C
615513	HSG	Miscellaneous Revenue	X
615518	HSG	Proceeds from Demolition	X
615523	HSG	Application Fees	BC
615526	HSG	Proceeds from Book Sales	C
615531	DTI	Bad Debts Remittance From Agen	B
615539	HSG	Proceeds Building for Buyers	C

A.6 Narrowly-Segmented Transactions from ACT Government Data

Table 45: Financial Transaction Codes, Agency and Description with Segment Coding for all Narrow Segment Transactions

#	Trans-code	Agency	Description	Broad Market Segment	Narrow Market Segment
1	120000	HSG	Housing Rent	C	Client
2	130001	AWC	Fireworks Permit	BC	Citizen
3	190001	ENV	MRC Revenue	BC	Customer
4	190002	ENV	MRC Cotter Campground	C	Customer
5	190003	ENV	State of the Environment Repor	BC	Customer

#	Trans-code	Agency	Description	Broad Market Segment	Narrow Market Segment
6	190004	ENV	TNR Revenue	BC	Customer
7	190005	ENV	Fines-Environ Protection Act	BC	Citizen
8	190006	ENV	GF Revenue	BC	Customer
9	190007	ENV	Tree Damaging Activity in ACT	BC	Citizen
10	190008	ENV	TNR Retail Only	BC	Customer
11	190009	ENV	NNP Revenue	BC	Customer
12	190010	ENV	Tress and Shrubs in Canberra	BC	Customer
13	190011	ENV	CNP Lock Permits	C	Customer
14	190015	ENV	Fines (on the Spot) - Administ	BC	Citizen
15	190016	ENV	Wildlife Permits	BC	Citizen
16	190017	ENV	BDM -Posters	BC	Customer
17	190018	ENV	BDM _ Publications	BC	Customer
18	200001	ENV	Sale of Publication - Water	BC	Customer
19	200006	COR	Freedom of Info Application Fe	BC	Citizen
20	200025	ENV	CNP Revenue	BC	Customer
21	200028	ENV	Parks and Cons - Sale of Pub	BC	Customer
22	200031	ENV	NNP Retail Only	BC	Customer
23	200033	COP	Nature Strips - Revenue	BC	Citizen
24	200141	INP	Sale of Publications	BC	Customer
25	210000	INP	Dog Renewals	C	Subject
26	220001	INP	New Dog Registrations	C	Citizen
27	220002	ENV	Dog Poundage	C	Citizen
28	220003	INP	Dog Licences	C	Citizen
29	220004	INP	Replacement Tags	C	Citizen
30	220005	INP	Infringement Notices - Dogs	C	Citizen
31	220006	INP	Court Fines - Dogs	C	Citizen
32	220007	ENV	Sale of Dogs	C	Customer
33	220008	ENV	Transport - Dog Control	C	Citizen
34	220009	INP	Dog Control - Other	C	Citizen
35	220010	INP	Sexually Entire Permit	C	Customer
36	230010	ENV	Tidbinbilla Entry Pass	C	Customer
37	230013	ENV	Power Boat Fee Molonglo River	BC	Customer
38	230014	ENV	Hire of Cuppa Shearing Sheds	BC	Customer
39	236855	ENV	Land Agistment	C	Customer
40	250001	INP	Additional bin -NoWaste	BC	Customer
41	310007	FOR	ACT Forest - Softwood Permits	BC	Citizen

#	Trans-code	Agency	Description	Broad Market Segment	Narrow Market Segment
42	320000	CIT	CIT Student Fee	C	Client
43	320001	CTE	Floriade Souvenir Books	C	Customer
44	320002	CTE	Sale of Floriade Tickets	C	Customer
45	340001	PLM	Builders/Owners Licence Fees	BC	Citizen
46	340002	PLM	Searches - Plan Copies	BC	Customer
47	340011	PLM	Residential Building Permits	BC	Citizen
48	340017	PLM	Building Statistics	BC	Customer
49	340022	PLM	Betterment	BC	Subject
50	340023	PLM	Lease Sales	BC	Subject
51	340024	PLM	Land Rent - DDE	BC	Subject
52	340028	PLM	Electrical Fees - Other	BC	Customer
53	340039	PLM	Building Conveyancing Report	BC	Citizen
54	340041	PLM	ACTLI - Miscellaneous Sales	BC	Customer
55	340052	PLM	Energy Rating	BC	Client
56	340054	PLM	Fire Works Permits	BC	Citizen
57	340056	PLM	Building Conveyancing Reports	BC	Citizen
58	340057	PLM	Energy Rating	BC	Client
59	340059	PLM	Builders/Owners Licence Fees	BC	Citizen
60	340060	PLM	Searches - Plan Copies	BC	Customer
61	341110	PLM	Application Fees - General	BC	Client
62	341115	PLM	Building Search Fees	BC	Customer
63	341119	PLM	Direct Grant	BC	Citizen
64	341123	PLM	Hydraulic Fees	BC	Client
65	341124	PLM	Grant of a Further Lease	BC	Citizen
66	341125	PLM	Lease Variation	BC	Citizen
67	341128	PLM	Preliminary Assessment	BC	Client
68	341129	PLM	Public Notification	BC	Citizen
69	341135	PLM	Grant of a Licence	BC	Citizen
70	341210	PLM	Security Deposit	BC	Customer
71	341410	PLM	ACTLI Sale	BC	Customer
72	341411	PLM	Canberra By Suburbs - Map Only	BC	Customer
73	341412	PLM	Canberra By Suburbs - Update	BC	Customer
74	341413	PLM	Canberra By Suburbs - Folder	BC	Customer
75	341414	PLM	Canberra By Suburbs - Renewal	BC	Customer
76	341415	PLM	Canberra Cycleways	C	Customer
77	341416	PLM	Canberra Landscape Guidelines	BC	Customer

#	Trans-code	Agency	Description	Broad Market Segment	Narrow Market Segment
78	341417	PLM	Photocopies	BC	Customer
79	341419	PLM	Suburb & Street Name Booklets	BC	Customer
80	341420	PLM	Detailed Property sales Report	BC	Customer
81	341421	PLM	Monthly Stats Sales Report	BC	Customer
82	341422	PLM	Sales Statistics By Division	BC	Customer
83	341423	PLM	Valuation Listing	BC	Customer
84	341425	PLM	Sales Enquiries	BC	Customer
85	341426	PLM	Valuation Enquiries	BC	Customer
86	341427	PLM	Territory Plan Map	BC	Customer
87	341428	PLM	Territory Plan Statement	BC	Customer
88	341429	PLM	General Publication	BC	Customer
89	341513	PLM	Bond Preparation Fee	BC	Client
90	341514	PLM	Certified Copy	BC	Customer
91	341515	PLM	Photocopies - Public Register	BC	Customer
92	341517	PLM	Conveyancing Enquiry	BC	Customer
93	341518	PLM	Conveyancing Stamps	BC	Customer
94	341519	PLM	Dial A Search	BC	Customer
95	341523	PLM	Leasing Preparation	BC	Citizen
96	341525	PLM	Survey Fees	BC	Customer
97	341610	PLM	Land Sales	BC	Client
98	342011	PLM	DP paper $17.80	BC	Customer
99	342012	PLM	DP film $22.55	BC	Customer
100	342013	PLM	DP Proforma	BC	Customer
101	342014	PLM	Comp sheet paper $17.80	BC	Customer
102	342015	PLM	Comp sheet film $24.00	BC	Customer
103	342016	PLM	Faxed extract DP/CS $22.55	BC	Customer
104	342017	PLM	Cadastral series paper $11.90	BC	Customer
105	342018	PLM	Cadastral series film $24.00	BC	Customer
106	342019	PLM	Orthophoto series paper $11.25	BC	Customer
107	342020	PLM	Orthophoto series film 24.00	BC	Customer
108	342021	PLM	Enlarged Airphoto paper $11.25	BC	Customer
109	342022	PLM	Enlarged Airphoto film $24.00	BC	Customer
110	342023	PLM	Detail series paper $11.25	BC	Customer
111	342024	PLM	Detail series film $24.00	BC	Customer
112	342025	PLM	Planning series paper $8.40	BC	Customer
113	342026	PLM	Planning series printed $8.70	BC	Customer

#	Trans-code	Agency	Description	Broad Market Segment	Narrow Market Segment
114	342027	PLM	Planning series film $22.55	BC	Customer
115	342028	PLM	Investigation plan	BC	Client
116	342029	PLM	Work-as-executed $14.30	BC	Customer
117	342030	PLM	Identification certifica $6.75	BC	Customer
118	342031	PLM	Parish portion plan $7.00	BC	Customer
119	342032	PLM	Gov house plans $13.50	BC	Customer
120	342033	PLM	Irrigation/L'scape Plan $11.90	BC	Customer
121	342034	PLM	Miscellaneous plans	BC	Customer
122	342036	PLM	Digital Orthophoto Plots	BC	Customer
123	342040	PLM	CBS maps only $125.00	BC	Customer
124	342041	PLM	CBS maps, folder $129.25	BC	Customer
125	342042	PLM	CBS maps, updates $168.00	BC	Customer
126	342043	PLM	CBS maps,updates foldr $168.85	BC	Customer
127	342044	PLM	CBS updates renewal $78.00/yr	BC	Customer
128	342045	PLM	CBS post & handling $9.00	BC	Customer
129	342046	PLM	CBS suburb photocopy $5.90	BC	Customer
130	342047	PLM	A4 PCACTMAP plot $6.75	BC	Customer
131	342048	PLM	CBS Folder only $12.70	BC	Customer
132	342111	PLM	Air Photo p'copy paper $16.85	BC	Customer
133	342112	PLM	Air Photo p'cpy lamintd $29.70	BC	Customer
134	342211	PLM	Control mark co-ords $6.75	BC	Customer
135	342212	PLM	BM level first $7.00	BC	Customer
136	342213	PLM	BM level subsequent $2.25	BC	Customer
137	342214	PLM	Field Books $11.90	BC	Customer
138	360001	IPR	ACT Population Forecasts	BC	Customer
139	370001	CSI	Legislation Sales	BC	Customer
140	370003	CSI	ACT Gazette Sales	BC	Customer
141	370005	COP	Budget Papers Sales	BC	Customer
142	370007	CSI	Pocket Phone Book Sales	BC	Customer
143	370009	COP	Canberra Bike Map	C	Customer
144	370015	CSI	Reflections of Canberra CD ROM	C	Customer
145	370016	IPS	ACT Library's Internet Courses	C	Customer
146	370017	IPS	PSMS Manual Sales	C	Customer
147	370018	CSI	Bound Volumes Sales	C	Customer
148	370021	COP	Publishing Sales Other	C	Customer
149	370023	IPS	IYOP Recipe Book	C	Customer

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150	370025	CSI	Library Fines	C	Customer
151	370026	CSI	Library Reservation Fees	C	Customer
152	370028	CSI	Bushfire Donations	C	Customer
153	380001	A	Cycle Locker Hire	C	Customer
154	380002	A	Bus Book Sales	C	Customer
155	380003	A	Ticket Sales	C	Customer
156	380004	A	Ticket Sales - Shopfronts	C	Customer
157	380008	A	Fine Revenue	BC	Citizen
158	410000	DTI	General Rates	BC	Subject
159	440000	DTI	Land Tax	BC	Subject
160	470000	DTI	Bushfire Reconstruction Levy	BC	Citizen
161	500001	RUM	Drivers Licence Fees	C	Subject
162	500002	RUM	Registration Fees	C	Subject
163	500003	CSI	Fees-Dimensions & Mass Permits	BC	Citizen
164	500004	CSI	Fees-Dimensions & Mass Fines	BC	Citizen
165	500005	RUM	Inspection Fees	BC	Citizen
166	500006	RUM	Plates of Choice	BC	Citizen
167	500008	RUM	Special Plates	BC	Citizen
168	500009	RUM	Parking Penalties	C	Citizen
169	500010	RUM	Parking Fees	C	Citizen
170	500011	RUM	Unidentified Parking Penalties	C	Citizen
171	500012	RUM	Road Rescue Revenue	C	Client
172	500013	RUM	Boom Gate Parking	C	Customer
173	500014	RUM	Parking Labels	C	Citizen
174	500015	RUM	T.I.N. Penalties	C	Citizen
175	500016	RUM	N.R.M.A.	C	Client
176	500017	RUM	MV Rego & Trsfr Stamp Duties	BC	Citizen
177	500018	RUM	Stay Upright	C	Customer
178	500019	RUM	F.I.R.S. Charges	C	Citizen
179	500020	RUM	F.I.R.S. Third Party	C	Subject
180	500021	RUM	Jervis Bay Licence	BC	Citizen
181	500022	RUM	Jervis Bay Registration Tax	BC	Citizen
182	500023	RUM	Pub Card Transport Regulations	C	Customer
183	500025	RUM	Speed Camera Infringmnt Notice	C	Citizen
184	500026	RUM	Redlight Camera Infring Notice	C	Citizen
185	500028	RUM	Phot Viewing Fees	C	Customer

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186	500029	RUM	Road Safety Contribution	C	Citizen
187	500056	INP	Damage to Street Lights	BC	Citizen
188	500059	INP	Damage to Traffic Lights	BC	Citizen
189	500060	COP	Release of Impounded Vehicles	C	Subject
190	500061	INP	Litter Fines	C	Citizen
191	500062	ENV	Job Tied Housing	C	Subject
192	500078	RUM	Transport Reg Court Cost	C	Citizen
193	500101	RUM	Jervis Bay Parking Fines	C	Citizen
194	500110	COP	Public Land Use	BC	Citizen
195	500120	IPS	Revenue Womens Inf Ref Ctr	C	Customer
196	500125	RUM	Pensioner Licence Reimbursemen	C	Citizen
197	510013	DTI	Ambulance Service Levy	C	Subject
198	510023	DTI	Rates & L/TAX Oject Lodge Fee	BC	Subject
199	510024	DTI	Stamp Duty & Taxes Oject Lodge	BC	Subject
200	510027	DTI	Rates & L/Tax Statement of Acc	BC	Citizen
201	510029	DTI	Penalty First Home Owner Grant	C	Subject
202	510031	DTI	Repayment 1st Home Owner Grant	C	Subject
203	510032	DTI	Water Restriction Infringement	BC	Citizen
204	510036	DTI	Canberra-Nara 10th Anniver Rev	BC	Customer
205	510056	DTI	Conveyancing	BC	Citizen
206	510057	DTI	Life Insurance Stamp Duty	C	Citizen
207	510058	DTI	General Insurance Stamp Duty	BC	Citizen
208	510059	DTI	Trfr of Shares & Mktble Securi	BC	Citizen
209	510060	DTI	Lease Stamp Duty	BC	Citizen
210	510081	DTI	A Community Remembers Publicat	C	Customer
211	510102	DTI	Rates and Land Tax Enquiry Fee	C	Subject
212	520101	JCS	Gun Licence	C	Subject
213	520102	JCS	Ambulance Transport Payments	C	Customer
214	520103	JCS	Failure to vote penalty	C	Citizen
215	520104	JCS	Cannibas Expiation Notice	C	Citizen
216	520109	JCS	LIQUOR LICENCE SPECIAL	BC	Citizen
217	520119	JCS	DANGEROUS WEAPONS LICENCE	BC	Subject
218	520120	JCS	DANGEROUS WEAPONS COMPOSITE	BC	Subject
219	520124	JCS	COLLECTORS LICENCE	BC	Citizen
220	530001	CSI	General Publications - Postage	BC	Customer
221	610001	HSG	Land Sales to Public	C	Subject

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222	612100	HSG	Half Cost Fencing	C	Client
223	612200	HSG	Ex Water Rates Recoverable	C	Subject
224	612300	HSG	Maint Costs Recoverable	C	Customer
225	613100	HSG	Rent Relief-Bonds Repaid	C	Client
226	613200	HSG	Prosecutions Recoverable	C	Client
227	613600	HSG	Rent Narrabundah	C	Customer
228	614000	HSG	Mortgage Relief-Client Repay	C	Subject
229	615505	HSG	Proceeds Home Access	C	Customer
230	615511	HSG	Rent - Jerrabomberra	C	Customer
231	615523	HSG	Application Fees	BC	Customer
232	615526	HSG	Proceeds from Book Sales	C	Customer
233	615538	HSG	Proceeds from Sale to Tenants	C	Client
234	615539	HSG	Proceeds Building for Buyers	C	Client