

A Preliminary Analysis of an e-Government Market Segmentation

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This paper presents some early results from research in progress investigating whether the use of market segmentation can aid in the design of e-government services. It reviews the formal characteristics of market segmentations and then proposes measurement dimensions to aid in identifying e-government service segments in a previously defined segmentation. Initial findings from analysis of transaction data for e-government services reinforce the belief that the segmentation proposed is mutually exclusive and exhaustive.

Keywords: e-Government; Service Design; Market Segmentation

1 Introduction

In an earlier paper, the customary high-level segmentation of e-government service recipients ('Citizen', 'Business', 'Government', and 'Employee') was identified and a more refined segmentation of 'Citizen'-oriented e-government services was presented (Turner, 2002). Individuals as e-government service recipients were classified into four groups: *customer*, *client*, *subject* and *citizen*; summarised here in Figure 1. The potential benefits of adopting such a segmentation approach when designing e-government services were also discussed.

Segment *Brief description*

Customer	Customers are those constituents of government that purchase commodities from government agencies; for example, utilities, lottery tickets, etc
Client	Clients are constituents that purchase or receive professional services from government over a period of time, possibly over their whole lifetime; for example, health services, education, job location services, etc
Citizen	Citizens are constituents that receive services from the government at a broad level; for example the provision of infrastructure such as sewerage, roads, air traffic control, etc
Subject	Subjects are constituents that receive mandatory service from government, without the opportunity to influence the parameters of service provision; for example, prison inmates, tax payers, and national service conscripts

Figure 1: Summary of 'Citizen' Segmentation (Turner, 2002)

The segmentation was 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 segmentation is to partition the problem of how to design, develop and deploy effective e-government services into narrower focus areas. E-government services are aimed at making interactions with government easier, faster and more convenient. The proposed segmentation will enhance the design of services to this end by helping to organise, analyse, and manipulate ideas, designs and data more efficiently. Identifying market segments is expected to reveal groups of users for whom adoption and use of e-government services is high, and other groups where it is low (Barker, 1985; Changchien, Leeb & Hsu, 2004; Engel, Fiorillo & Cayley, 1972; Forsyth, Lavoie & McGuire, 2000; Kim, Nam & Stimpert, 2005; Peltier &

Schribrowsky, 1997; Pires & Aisbet, 2003; Ryan, 1991; Spratlen, 1981; Wedel, 2001). This additional understanding of narrower, more homogeneous market segments is expected to aid 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, Leeb & Hsu, 2004; Engel, Fiorillo & Cayley, 1972; Forsyth, Lavoie & McGuire, 2000; Kim, Nam & Stimpert, 2005; Peltier & Schribrowsky, 1997; Pires & Aisbet, 2003; Ryan, 1991; Spratlen, 1981; Wedel, 2001). This is a simple extension of the idea already practiced that separates 'Citizen' services from, say, 'Business' and 'Government'-related services.

This paper presents the findings so far of research in progress designed to demonstrate the efficacy of the segmentation. The paper includes a brief synopsis of a review of data from live e-government services that shows that the segmentation is robust. The research presented here does not seek to prove that the segmentation is correct or unique, simply to show that it is viable and practical as a means of investigating e-government services.

The paper presents the research conducted in the following manner. Firstly, a brief review of segmentation theory is used to locate the proposed segmentation approach. Segmentation approaches are then briefly reviewed and the compliance with fundamental characteristics is discussed. Finally, some initial findings from a review of data provided by the Australian Capital Territory government are presented. The paper draws some initial conclusions and points to further research.

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 to, 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 approach as the 'classic' government bureaucratic approach to service delivery: 'You will want what we deliver.'

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, Fiorillo & Cayley, 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, Fiorillo & Cayley, 1972; Hütt, Le Brun & Mannhardt, 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, p34). This sentiment is still true today, nearly 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. 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). As Edwards and Creagh note: "Government agencies tend, because of political and administrative constraints, to treat clients alike even though their needs differ" (1991, p6). That is, governments tend to inherently adopt a product differentiation strategy. But, 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, Lavoie & McGuire, 2000; Peltier & Schribrowsky, 1997; Pires & Aisbet, 2003; Wedel, 2001). Adopting a market segmentation strategy, which considers such characteristics, may permit governments to tailor e-government services to increase adoption of those services (Bhatnagar & Ghose, 2004; Forsyth, Lavoie & McGuire, 2000; Peltier & Schribrowsky, 1997; Pires & Aisbet, 2003; Wedel, 2001). At a technological level, the segments would allow different focuses on security, monetary transactions, the requirements for authentication, etc (Turner, 2002).

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. Rossiter's second best segmentation is benefit segmentation, a broadly accepted 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, p309). 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). 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 proposed groupings (Figure 1) as being a benefit segmentation.

3 Key Characteristics of Market Segmentation

The literature proposes six necessary characteristics of good market segmentation (Barker, 1985; Engel, Fiorillo & Cayley, 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, p82)

We will now verify the proposed segmentation against these characteristics. In this paper, the most important characteristic is that of measurability as real data is examined and some rigorous measurement scheme is needed to analyse the data effectively. This is not to suggest that the other characteristics are not important, they are. Measurability is the focus here because of the nature of this stage of research.

3.1 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. Our 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, we have not yet discovered circumstances where the benefit bundle offered in a government service appears to address needs sought by more than one segment. Greater future integration of government services might alter that perspective.

3.2 Exhaustiveness

The segmentation was adopted on the basis that it appeared exhaustive. So far, there have been no instances where individual-oriented services have been found to not fit into a single segment. The segmentation does not attempt to exhaust all possible government services; the services directed to businesses and other governments are explicitly excluded. 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.

3.3 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). Also, although our research uses this segmentation for e-government services, the approach is applicable for all government services, hence even the alternate definition of accessibility in an information technology sense is not a stumbling block.

3.4 Sustainability

Again, as the segments can and (over time) do contain all individuals in the government's market, the segments are all sustainable. 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 are 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.

3.5 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, Leeb & Hsu, 2004; Hütt, Le Brun & Mannhardt, 2001; Kim, Nam & Stimpert, 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, Leeb & Hsu, 2004; Hütt, Le Brun & Mannhardt, 2001; Kim, Nam & Stimpert, 2005).

3.6 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, Fiorillo & Cayley, 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, Leeb & Hsu, 2004; Hütt, Le Brun & Mannhardt, 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).

We categorise constituents into segments through the lens of their intent as they seek to and do access the service. This approach 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. An exhaustive account of the dimensions of segment measurement should suffice. We will now consider each segment and identify defining characteristics of relevant benefits. These are consolidated into a multi-dimensional measurement scheme. The scheme is then considered as a separate entity for completeness.

3.6.1 Customers

A *customer*, by definition, adopts the approach and attitudes of a typical online shopper (Mintzberg, 1996; Turner, 2002). 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, Leeb & Hsu, 2004; Hütt, Le Brun & Mannhardt, 2001; Kim, Nam & Stimpert, 2005). They will complete the transaction online and usually in one session (Changchien, Leeb & Hsu, 2004; Colet, 1999; Dieringer Research Group, 2002a, 2002b; Hütt, Le Brun & Mannhardt, 2001; Kim, Nam & Stimpert, 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, Leeb & Hsu, 2004; Colet, 1999; Dieringer Research Group, 2002a, 2002b; Hütt, Le Brun & Mannhardt, 2001; Kim, Nam & Stimpert, 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 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 they would not be seeking in a service. *Customers* 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, Leeb & Hsu, 2004; Hütt, Le Brun & Mannhardt, 2001; Kim, Nam & Stimpert, 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.

3.6.2 *Clients*

Clients, by definition, are equivalent to recipients of professional, long-term services (Mintzberg, 1996; Turner, 2002). *Clients* are seeking 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/s 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 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.

3.6.3 *Citizens*

The majority of services that *citizens* receive are in the nature of public goods and are rarely delivered electronically (Mintzberg, 1996; Turner, 2002). 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. These examples point to the characteristics of e-government services that *citizens* might seek:

- Largely informational in nature, although 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.

3.6.4 *Subjects*

Subjects receive services from the government largely without choice (Mintzberg, 1996; Spratlen, 1981; Turner, 2002). 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 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).

3.6.5 Summary

These service characteristics can be formulated into dimensions against which constituent behaviour can be compared to determine a segment. Figure 2 describes the dimensions and where each proposed market segment lies upon it.

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

Figure 2: Summary of Segment Characteristics on Three Dimensions

One dimension that may appear to be missing is the one on which the nature of the service (informational/passive to transactional/active) might appear. However, we believe that this is not a dimension for measuring the 'benefit' of a service and so have not used it. We have included the repetition of a transaction with multiple transactions and 'menu' items with commodities for convenience. Although there is a distinction between these ideas, their effect on the segmentation does not warrant complicating the table. Figure 2 shows only four of the eight (2 x 2 x 2) possible combinations of these dimensions. To reinforce the usefulness of the dimensions, we 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 consumer 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 Figure 2 to form Figure 3:

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

Figure 3: Segment Characteristics on Three Dimensions (All possible combinations)

That we can describe each segment through a unique combination of the typical pattern of interactions, the level of service differentiation, and the reliance on government means that we have a measurable segmentation.

3.7 Summary

The preceding argument establishes that the proposed segmentation is a benefit segmentation and that, to the level considered here, it displays the characteristics of a 'good' segmentation. Of course, as the segmentation is being 'back-fitted' to these criteria, this claim is not absolute. However, we believe that the segmentation is sufficiently convincing to be worthy of further exploration. To that end, we now report our findings of an analysis of adoption and usage data on existing government services.

4 Review of Transaction Data In Light of Market Segmentation

Some data on available government services were provided to us for exploratory research by the Australian Capital Territory (ACT) government. Our initial aims for the investigation of the data were, firstly, was the measurement approach proposed robust; that is, could it be used to classify all services found? Secondly, did the data indicate that the proposed segmentation was exhaustive and mutually exclusive? Thirdly, did the data indicate that there was different responsiveness in the different segments on the basis of adoption and use? The following section presents some initial findings based on the data. Further analysis is to be undertaken attempting to refine the insights developed below.

The 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 the volume and the total value of each type of financial transaction conducted by the government for each month during that period. The data were also classified by the channel through which the transaction took place (over-the-counter, telephone, Internet, etc). The data were classified by ledger account codes. To segment the services represented by the transactions, we considered the short description of each account code in the context of the agency that owned that code and marked the code as one of the four broad segments (Citizen, Business, Government, Employee) or Internal (for journal-like entries and other miscellaneous financial transactions). We validated our views on this segmentation with our contacts in ACT Government and they made some small changes to correct our misunderstandings. Figure 4 shows the segmentation results from this first step (Number of 'Services' [n] = 277).

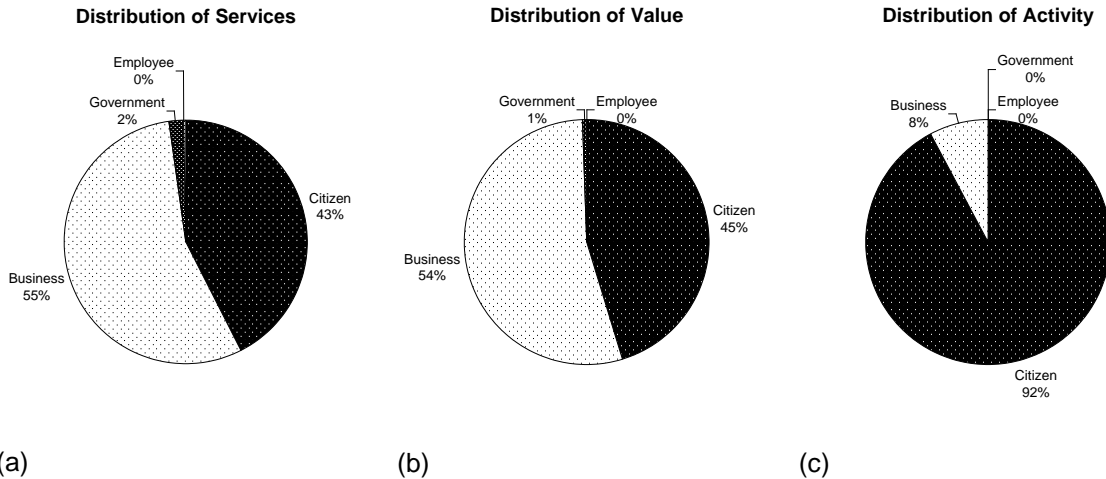


Figure 4: Distribution of Financial Transactions over 'Broad' Segments (from project data)

The charts provide an interesting initial analysis point: the distribution of transaction value across the broad segments mirrors the distribution of different types of transaction (substituting for services) 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 small number of large value transactions with 'Business'; probably no surprises there.

We then narrowed our focus onto the broad 'Citizen' segment and re-considered each code's description to assess where on the measurement dimensions these transactions were most likely to lie. Figure 5 shows the results of this further refinement of the broad Citizen segment (n=118).

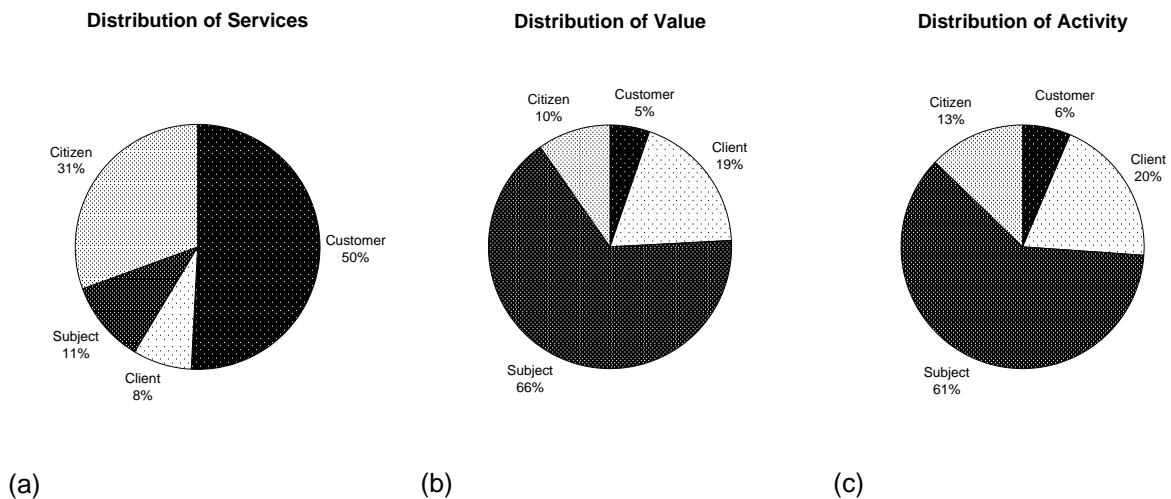
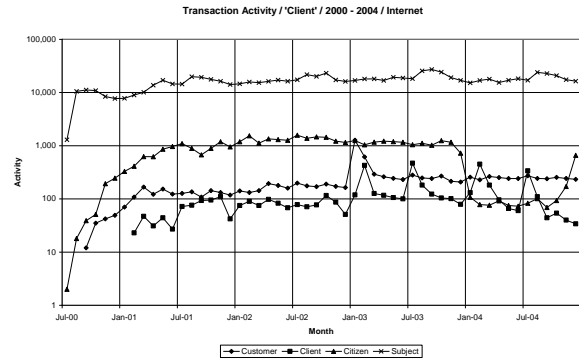
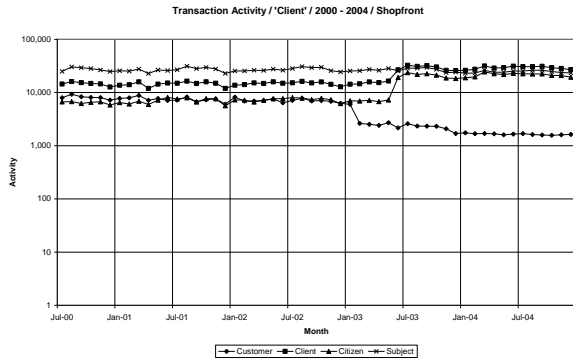


Figure 5: Distribution of Financial Transactions over 'Citizen' Segments (from project data)

The charts of the narrower segments reveal some interesting characteristics. Firstly, the distribution of 'services' indicates that a high proportion of transactions 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 indicate that *subject* transactions are dominant. This is probably not surprising as *subject* transactions are obligatory and include payment of fees, fines and other government imposts. Interestingly, the very similar distribution of value and activity implies that the average transaction value is relatively consistent across segments. It is difficult to determine the significance of this finding.



(a) Transaction activity through Shopfronts

(b) Transaction activity over the Internet

Figure 6: Comparative Activity levels in 'Citizen' segment (Shopfront vs Internet) (from project data)

Figure 6 shows a difference in the responsiveness of the narrow 'Citizen' sub-segments through the Shopfront and over the Internet (offline versus online). This reinforces that the segmentation, while valuable when considering overall government service is likely to be helpful when 'only' considering the e-government services.

These brief analyses reinforce our view that the segmentation is valid. Our ability to categorise services identified as being targeted at 'Citizens' into our proposed segmentation both completely and without overlap supports the ideas of exhaustiveness and mutual exclusion. Furthermore, using the segmentation provides some interesting insights into the distribution and characteristics of the services. Although not conclusive, this alignment with real data is encouraging.

5 Conclusion

This paper presents results from research in progress investigating whether the use of market segmentation can aid in the design of e-government services. The paper established the formal characteristics of market segmentations that were then briefly reviewed in regard to our proposed segmentation. We have proposed measurement dimensions to aid in identifying e-government service segments. These segments are being reviewed in the light of transaction data for government services available to the researchers. The paper presents initial findings of this investigation. Analysis of the data using the measurement dimensions developed reinforces the belief that the segmentation proposed is mutually exclusive and exhaustive. Further analysis is underway to attempt to reinforce the belief that the segments display differential responsiveness.

The approach to reviewing the data available does not allow us to claim a proof of the efficacy of the segmentation, and no such claim is made. However, the ability to successfully categorise government services using data collected for other purposes, does lend some weight to the segmentation. The manipulation of data in light of the proposed segmentation has already been helpful in throwing light on e-government service adoption. We are currently developing evidence of differential responsiveness in the segments that will be published shortly.

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