

Analysing e-Government Market Segment Behaviour

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This paper outlines detailed results of initial analysis of e-government transaction activity to test a new e-Government service market segmentation. Earlier work has established the segmentation and the means of measuring its presence in existing e-Government service activity. The paper presents findings of research analysing four and a half years of e-Government service activity and highlights the unique characteristics of the four proposed segments. From this platform initial suggestions for market segment driven e-Government service design are made and further research plans are outline.

Keywords: e-Government, market segmentation, service design, service adoption

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 [2]. 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. If 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 [3-6]. 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 [4-6]. This is a simple extension of the idea already practiced that separates 'Citizen' services from, say, 'Business' and 'Government'-related services.

Individuals as e-government service recipients were classified into four groups: *customer*, *client*, *subject* and *citizen* [2]; summarised here in Table 1. The segmentation was adopted from the work of Henry Mintzberg [7] rather than being developed through more classical segmentation approaches [8-13]. The potential benefits of adopting such a segmentation approach when designing e-government services were also discussed.

Table 1: Summary of 'Citizen' Segmentation [2]

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 service conscripts

Recent research has developed this idea further. In Turner, Schwager and Imran [1] the requirements of appropriate market segments were reviewed. The proposed segmentation was found to meet the six mandatory requirements of good market segmentation [3, 4, 9, 12]:

- “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” [9].

In Turner, Schwager and Imran [1], we proposed that these segments have certain transactional characteristics and that existing services can be segmented on the basis of these characteristics. The characteristics are:

- Interaction complexity—whether a meaningful transaction between the government and the constituent can be completed in a single, multiple or repetitive interactions.
- Service differentiation—the extent to which each transaction is tailored to the personal/unique circumstances of the constituent.
- Reliance on Government—whether or not the transaction requires the government as a participant or might occur between the recipient and some non-government entity.

Figure 1 indicates how the different characteris-

tics combine to identify the proposed segments.

To assist us in our research, the Australian Capital Territory (ACT) government kindly provided summary results of all financial transactions conducted by the government over the period mid-2000 to end-2004. The data provided the number of transactions and the total value of each type of financial transaction conducted by the government for each month during that period. The data was also classified by the channel through which the transaction took place (over-the-counter, telephone, Internet, etc).

There were several initial aims for the investigation of the data available. 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 our findings from the financial data analysis.

2. Research Approach

The financial transaction data was classified by ledger account codes. To segment the services represented by (some of) 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 2 shows the segmentation results from this first step (Number of ‘Services’ [n] = 277).

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 1: Segment Characteristics on Three Dimensions (All possible combinations) [1]

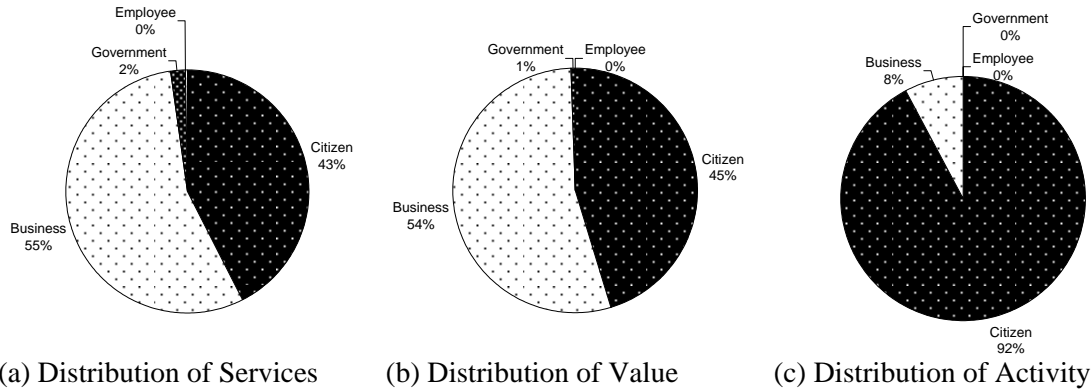


Figure 2: Distribution of Financial Transactions over 'Broad' Segments (from project data)

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. Each transaction was coded according to its value on the measurement dimensions (refer to Figure 1), from which the following segment statistics were then drawn. This codification was arbitrary, but conducted independently by each researcher and negotiated to arrive at a consensus classification for each code. Figure 3 shows the results of this further refinement of the broad 'Citizen' segment (n=118).

3. Research Findings

3.1. Overall Segmentation Findings

Figure 2 provides 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 relatively large number of small value transactions with 'Citizens' and a relatively small number of large value transactions with 'Business'; probably no surprises there.

Figure 3 reveals some further interesting characteristics. Firstly, the distribution of 'services' indicates that a high proportion of transactions are aimed at the *Customer* segment. Reviewing the code descriptions, 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, considering 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

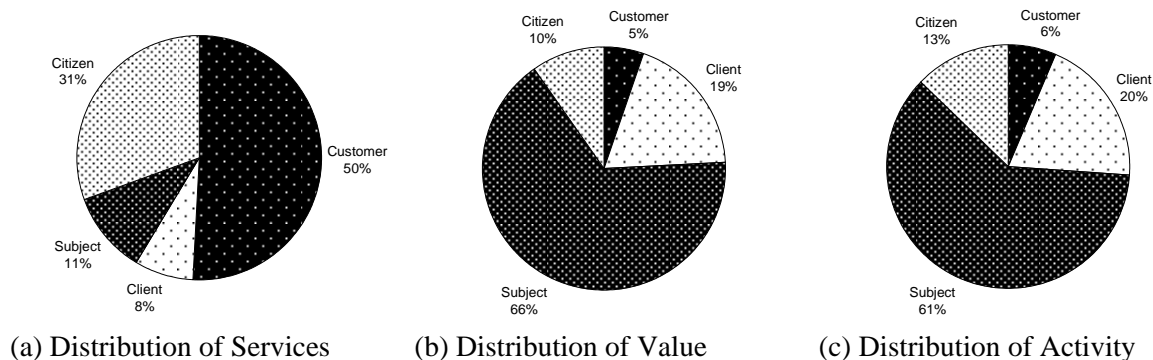


Figure 3: Distribution of Financial Transactions over Citizen Segments (from project data)

segments. It is difficult to determine the significance of this finding.

3.2. Segment-Level Findings

Turning our attention to the differences between the proposed segments, there is some clear evidence that the segments are worth investigating. In earlier work [1], we showed that the segmentation met the requirements of a ‘good’ segmentation. The following findings demonstrate the usefulness of the segmentation because of the differential responsiveness of the segments.

The first observation is that the number of account codes categorised by each segment that were active in each month of the period of investigation were different. We are using these figures as a synonym for “services available”. The structure of data provided to us implies that all these ‘services’ are available across all channels. We have used this assumption in this initial analysis. Changes in availability of the services over time reflect changes in service offering by the ACT Government over time.

Figure 4 shows the number of ‘services’ against

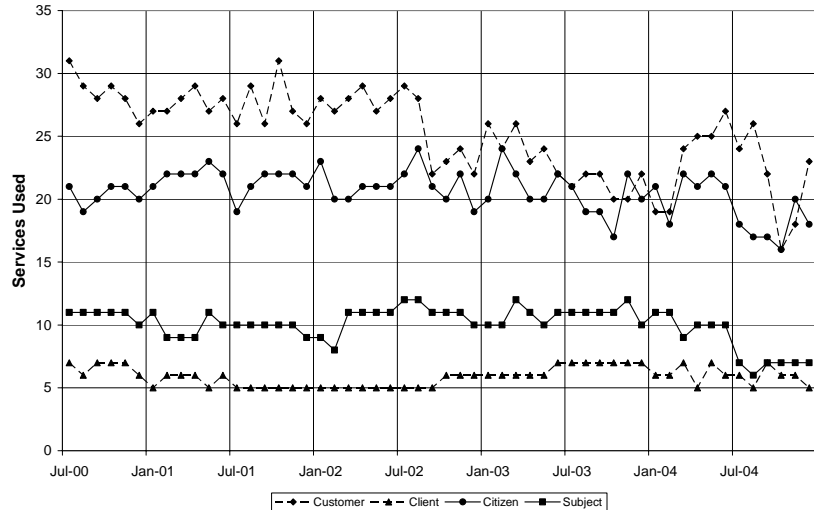


Figure 4: Number of Services Used by ‘Citizen’ Segment, by Month, Jul 2000 – Dec 2004 (from project data)

which transactions were recorded; we are interpreting this as the number of ‘services’ used by each segment. It is clear that there are different levels of adoption within each segment. Whether this is simply because of our classification or because of characteristics of the users in each segment is impossible to determine. Furthermore, the levels of adoption appear to be independent of the number of ‘services’ available. Nevertheless, there were no substantial conflicts in the segment coding by the researchers and all the broader ‘Citizen’ ‘services’ were coded. We have proceeded with the analysis in the belief that the ‘services’ are suitably segmented.

Figure 5 shows the distribution of transaction value between the four segments. Here we see characteristics that are indicative of different segment behaviour, rather than the peculiarities of our coding.

The dominance of value in *Subject* transactions is not unexpected; *Subjects* are obliged to interact with government. Transactions such as rates, licence fees and other mandatory payments are classified as *Subject*. The regular shape of the *Subject* value activity, particularly the peak

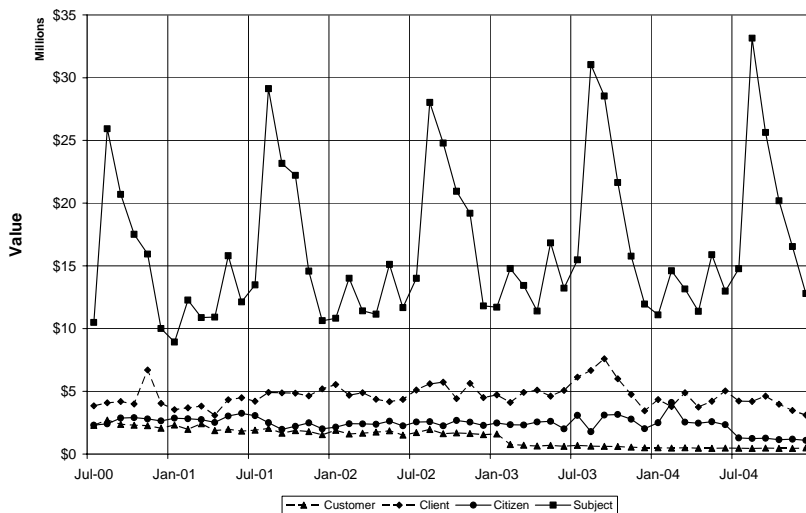


Figure 5: Total Transaction Value of ‘Citizen’ Segment, by Month, Jul 2000 - Dec 2004 (from project data)

immediately following the end of each financial year, supports this. Both *Client* and *Citizen* transaction value graphs show relative consistency. Both *Citizen* and *Customer* show a gentle decline in overall transaction value over time.

Figure 6 shows other interesting features that indicate differences between the segments. Firstly, the *Subject* segment activity profile generally mirrors the related value profile in Figure 5, as does the *Customer* segment profile. This shows a generally consistent average transaction value for each transaction in these two segments. Interestingly, the *Client* and *Citizen* segment activity levels increase sharply in June and July 2003 while, at the same time and after a brief peak in the *Client* activity, their respective total transaction values remain stable or actually gently decline. This implies that in June 2003 the nature of transactions in these segments changed resulting in a lower average transaction value. The distinct similarity in the activity level changes is still being investigated.

The graph profiles for value and activity are reasonably consistent (in line with the earlier observation about the consistency of average transaction value). The *Subject* segment displays a consistent, financial-year-driven, profile of activity. *Customer* activity is even but declines after January 2003. The ACT suffered a substantial and catastrophic bushfire in January 2003 and the decline in *Customer* activity may simply reflect the closure of the surrounding National Parks and their retail activities. This same issue may explain the sudden increase in *Client* and *Citizen* activity, as constituents participated in the ACT Government's response to the disaster.

3.3. Channel-oriented Findings

A key aspect of the data made available to us was the ability to distinguish transactions through different government channels. We have classified the data by channel and consid-

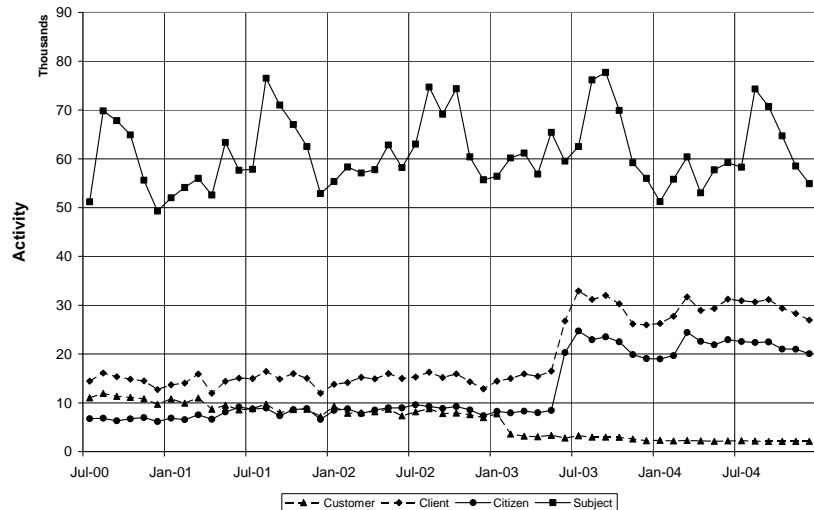


Figure 6: Total Transaction Activity of 'Citizen' Segment, by Month, Jul 2000 - Dec 2004 (from project data)

ered the differences in activity across channels of the different segments. The ACT Government classifies financial transactions across 14 'locations'. These correspond to five channels: shopfronts/over-the-counter, internet (including BPAY), through Australia Post (i.e. a third-party shopfront), postal mail, and the ACT's Austouch kiosks (phased out in 2002). Figures 7 through 10 show the use of these different channels for each of the proposed segments. All segments dominantly use the 'shopfront' channel although all segments except *Client* show a gentle decline in the number of services used in this channel. There is a corresponding gentle increase in the number of services accessed through the 'Internet/BPAY' channel. We have not analysed the data at the level of determining if these trends represent a direct move of some services onto the 'Internet' channel.

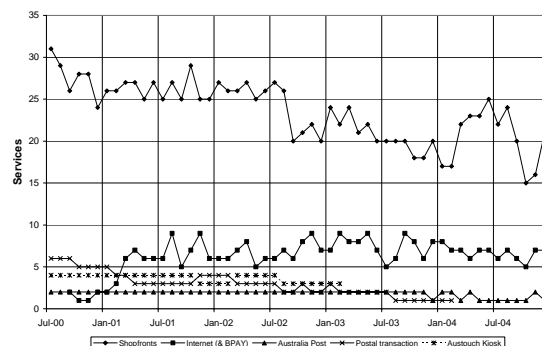


Figure 7: Services Used, Customer Segment, by Month, by Channel, Jul 2000 - Dec 2004 (from project data)

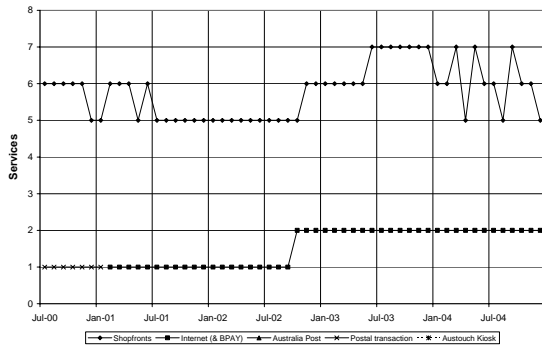


Figure 8: Services Used, Client Segment, by Month, by Channel, Jul 2000 - Dec 2004 (from project data)

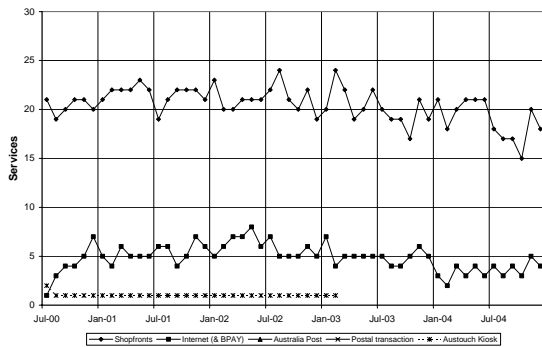


Figure 9: Services Used, Citizen Segment, by Month, by Channel, Jul 2000 - Dec 2004 (from project data)

Finally, as our interest lies in electronic government, Figure 11 shows the corresponding transaction activity. A logarithmic axis is used because the *Subject* segment so dominates the charts.

There are two important observations that arise from this last chart: the *Citizen* segment is going against trend by showing a slight decline in transaction activity (and transaction value) over the period (the other three are generally increasing on both measures), and there appears to be some substantial change in the behaviour patterns of both *Clients* and *Customers* after January 2003. We have not yet considered the data at the individual transaction/service level so are unable to offer specific insights here. However,

the *Client* segment displays a periodic cycle in activity and value after January 2003, which might imply new *Client* relationships established after the bushfire. The substantial drop in activity in the *Citizen* segment after January 2004 is also noteworthy although not yet explained.

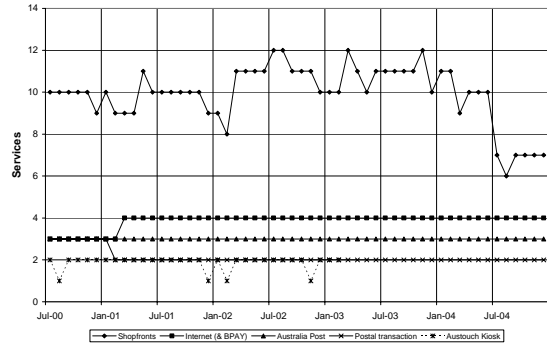


Figure 10: Services Used, Subject Segment, by Month, by Channel, Jul 2000 - Dec 2004 (from project data)

4. Conclusion

Our initial analysis of the data made available by the ACT Government through the lens of the proposed segmentation has demonstrated the usefulness of the segmentation. Filtering the data by the segments shows different patterns of behaviour and different levels of activity and value. As our analysis progresses, we will be able to make more assertive comments about the affect service design might have on segment adoption and use. In the meantime, it is certain that different segments are using government services differently and accessing them through

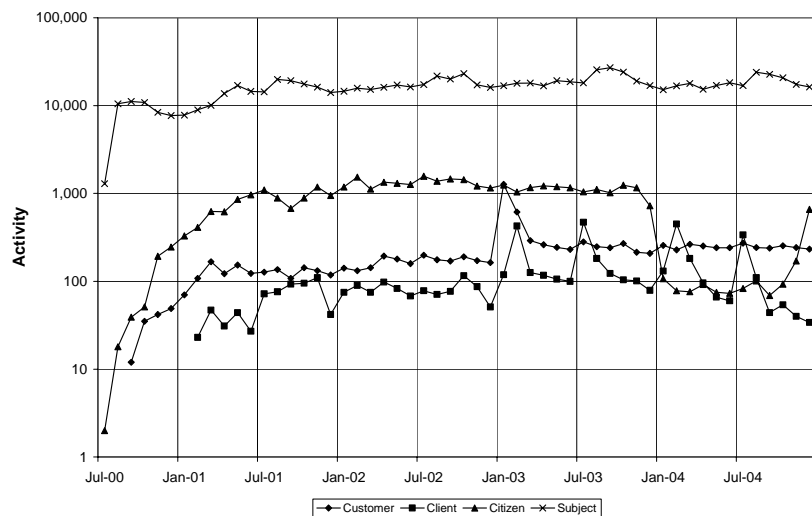


Figure 11: Transaction Activity, Internet/BPAY Transactions, by Segment, by Month, Jul 2000 - Jul 2004 (log scale) (from project data)

the Internet differently. There is a gentle trend towards more Internet use although we cannot offer any definitive causative statements here.

Our future research includes further refinement of the data analysis looking at which transactions are most commonly used by each segment and whether there are distinct trends towards (or away from) Internet adoption for them. We also hope to use the transaction level analysis to underpin recommendations for service design and improvement.

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6. References

- [1]. T.L. Turner, A. Schwager, and A. Imran. "A Preliminary Analysis of an e-Government Market Segmentation". in *European Conference on e-Government (ECEG) 2005*. Antwerp, Belgium. 2005.
- [2]. T.L. Turner. "Market Segmentation for e-Government". in *COLLECTeR 2002*. Melbourne. 2002.
- [3]. M.J. Barker. "*Marketing: An Introductory Text*". 4th ed: Macmillan. 1985.
- [4]. J.F. Engel, H.F. Fiorillo, and M.A. Cayley. "Introduction and Overview". in *Market Segmentation: Concepts and Applications*, J.F. Engel, H.F. Fiorillo, and M.A. Cayley, Editors. Holt, Rinehart and Winston, Inc: New York. p. 1 - 19. 1972.
- [5]. B. Ryan. "Circulation Matters: Towards a Model of Public Sector Marketing". in *Service Delivery and Public Sector Marketing*, C. O'Faircheallaigh, P. Graham, and J. Warburton, Editors. Macmillan: Melbourne. p. 151-172. 1991.
- [6]. T.F. Spratlen. "Government Goods and Services: Characteristics and Concepts for Marketing Analysis". in *Government Marketing: Theory and Practice*, M.P. Mokwa and S.E. Permut, Editors. Praeger Scientific: New York. p. 36 - 51. 1981.
- [7]. H. Mintzberg. "Managing Government, Governing Management". in *Harvard Business Review*. p. 75 - 83. 1996.
- [8]. H.J. Claycamp and W.F. Massy. "A Theory of Market Segmentation". in *Market Segmentation: Concepts and Applications*, J.F. Engel, H.F. Fiorillo, and M.A. Cayley, Editors. Holt, Rinehart and Winston, Inc: New York. p. 36 - 48. 1972.
- [9]. E. Roberto. "Applying a Marketing Model in the Public Sector". in *Service Delivery and Public Sector Marketing*, C. O'Faircheallaigh, P. Graham, and J. Warburton, Editors. Macmillan: Melbourne. p. 79-97. 1991.
- [10]. R.I. Haley. "Benefit Segmentation: A Decision-Oriented Research Tool". in *Marketing Classics: A Selection of Influential Articles*, B.M. Enis and K.K. Cox, Editors. Allyn and Bacon Inc: Boston. p. 308 - 316. 1981.
- [11]. R.M. Johnson. "Market Segmentation: A Strategic Management Tool". in *Marketing Classics: A Selection of Influential Articles*, B.M. Enis and K.K. Cox, Editors. Allyn and Bacon Inc: Boston. p. 317 - 327. 1981.
- [12]. R.W. Kotrba. "The Strategy Selection Chart". in *Market Segmentation: Concepts and Applications*, J.F. Engel, H.F. Fiorillo, and M.A. Cayley, Editors. Holt, Rinehart and Winston, Inc: New York. p. 89 - 95. 1972.
- [13]. W.R. Smith. "Product Differentiation and Market Segmentation As Alternative Marketing Strategies". in *Market Segmentation: Concepts and Applications*, J.F. Engel, H.F. Fiorillo, and M.A. Cayley, Editors. Holt, Reinhardt and Winston, Inc: New York. p. 29 - 35. 1972.