

December 2005

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Recommended Citation

Kazakevitch, Gennadi; Torlina, Luba; and Hendricks, Sharon, "Consumer Loyalty versus Propensity to Switch between Providers in Mature IT Markets (The Case of Mobile Phone Market)" (2005). *PACIS 2005 Proceedings*. 71.
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Consumer Loyalty versus Propensity to Switch between Providers in Mature IT Markets (The Case of Mobile Phone Market)

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Abstract

The example of the youth mobile phone market is used for pilot empirical testing of a model of consumers' decision making, based on common features of consumer behaviour in mature markets of information and high technology products. Firstly, we discuss the key properties of mature high technology markets which affect market behaviour and strategies. These properties include: established customer and provider bases; the elements of both oligopolistic and monopolistic competition; very short product life cycle; considerable product differentiation; and using product quality, versioning and price discrimination as planning and marketing tools. Secondly, a model of consumers' decision making in such markets is suggested on the assumption that a choice is to be made between the following options: to continue using the existing version of the product, to upgrade it with the current provider or to switch to another provider. Product price, quality characteristics, switching costs and network effects are demonstrated to be the variables affecting consumers' decisions and therefore, these variables should be considered by competing providers when they choose production and marketing strategies. In conclusion, the results of the empirical study are discussed in the context of their possible application to other information and high technology markets.

Keywords: Consumer Choice; Mature Markets; High Technology Product; Quality; Switching Costs; Network Effect.

“To switch or not to switch that is the question...”

1. Introduction and Key Concepts

The dichotomy of consumer loyalty and propensity to switch between brands or providers is one of the important dimensions of mature markets of information and high technology products.

We consider a market of information and high technology products as *mature*, where the potential for both new entrants and reasonable customer base growth have been largely exhausted. This definition is consistent with the conventional understanding of the *maturity* of such markets (see, for example, Gallardo, 2003, and Iyer & Soberman, 2000). Mature high technology markets, in our opinion, require special attention due to an intrinsic paradox: product providers compete with earlier versions of their own products. Acquiring new customers in mature market is increasingly difficult. Therefore, the remaining expedients for maintaining the existing level of operations, and for further growth, are limited. Strategies include either convincing existing customers to upgrade to a newer product, or providing potential customers with incentives for switching from other brands or providers. In such

markets, product providers need to develop distinct strategies, which allow them to compete effectively not only with their rivals, but with the earlier versions of their own products.

The Australian market of mobile phone services is an example of such a mature high technology market. The mobile phone industry has been growing at an exponential rate in Australia over the last decade, and has now reached a stage of maturity where 77% of the population have a mobile phone (AMTA, 2004). Therefore, further growth of existing firms, by acquiring new customers, is becoming increasingly difficult. It is also difficult to launch a successful new mobile phone services business.

The existing literature considers the mobile phone industry from multiple perspectives, including marketing (Grundstrom and Wilkinson, 2004), industrial organisation (Jonason, 2002), diffusion of innovations (Grundstrom and Wilkinson, 2004), sociological (Ling, 2000), usability of mobile technology and applications (Alanko *et al*, 1999; Barnes 2002). In this paper we apply an interdisciplinary approach, combining economic theory with information technology research. We use the example of mobile telephony industry for developing a model explaining consumer behaviour in mature high technology and information product markets. Our approach is based on the assumption that in such markets, consumers face the choice between the following options:

- (1) To continue using the existing version of the product;
- (2) To upgrade it with the current provider; or
- (3) To switch to another provider.

High technology and information markets are a special case with quite distinctive characteristics (Shapiro and Varian, 1999). ***Switching costs, network effects, and customer lock-in mechanisms***, in addition to ***price incentives, product utility and quality*** appear to be the factors influencing both consumer choice and firms' competitive strategies in high technology markets, such as the market of mobile phone services.

According to (Klemperer, 1978a, b, c, and 1989), ***consumer switching costs*** (CSCs) may include transaction, learning, artificial and contractual costs. Transaction costs, as defined by Klemperer, are the costs that are incurred, by a consumer when ceasing a relationship with one supplier and switching to a rival brand. Learning costs occur when the learning undertaken by a consumer to use one brand is not applicable to other brands. The costs of switching, both in terms of lost productivity and money spent, may outweigh any perceived benefits. Artificial costs are created by firms in order to increase customer loyalty. Contractual CSCs are induced by contracts that commit consumers to buy a product or to use a service from a firm for a particular period of time or for a particular number of purchases.

The concept of the ***network effect*** has been established in the literature on infrastructure and utility sectors (Economides, 1996). The network effect is a positive externality that occurs where the benefit consumers perceive to be available from using a product, depends on how many others use it (Van Hoose, 2003). This concept has been applied to information and high-technology products in tandem with CSC (Farrell and Shapiro, 1988). In particular, Shapiro & Varian (1999) believe, that the challenge for firms seeking to introduce new technology, that is not compatible with existing technology, is to build network size and thus overcome the combined CSC of all consumers. This is, obviously, applicable to the emergence and growth of the mobile phone market.

Generally, ***consumer lock-in*** is induced by a seller of good or service, and occurs where CSC are higher than the perceived benefit from using an alternate product (Van Hoose, 2003).

Zauberman (2003), who also discussed this concept, concluded that consumer lock-in tends to decrease consumers' propensity to search and switch. Zauberman suggested further that lock-in occurs due to a consumer's preference to minimise immediate costs and an underestimation of the impact of future CSC. Shapiro & Varian (1999) categorised several types of lock-in, including durable purchases, loyalty programs, brand-specific training, the absence or insufficiency of tools for converting data into different formats, and others.

As far as market structures and competition are concerned, the majority of literature devoted to switching costs, network effects, and customer lock-in mechanisms has been dealing with oligopolistic markets, where market power is exercised by competitors acquiring their market shares and affecting market prices, while innovations, product variety, quality, or upgrade are not predominant competitive tools. Goods are assumed to be homogenous and each firm is assumed to possess some market power (e.g. Chen & Hitt, 2002, Elzinga & Mills, 1998, Farrell & Shapiro, 1988, Klemperer, 1987a,b,c, 1988, 1995, Valletti, 2000), allowing them to price at above marginal cost and obtain monopoly profits.

In practice, the market structure of the mobile telephony in Australia, like many other markets of high technology and information products, displays features of both oligopolistic and monopolistic competition. In this paper, we develop further the existing theory of network effects and CSC in oligopolistic markets, combining it with the model of monopolistic competition in the markets of high technology and information products (Kazakevitch and Torlina, 2003). This combination allows the development of a new theoretical model of consumer behaviour in mature high technology and information product markets. The model is applied to the youth mobile phone market in Australia.

The remainder of this paper is structured as follows. In the next section we describe the model, underlying assumptions, and the rationale for the inclusion of the factors, which underpin consumer behaviour in high technology and information markets. In the following section we present some results of the quantification of the model and empirical tests. Firstly, we describe the observed features of consumer behaviour in the Australian youth mobile phone market. Secondly, we establish which factors influence consumer behaviour, and therefore, consumer demand and ranking of those factors. Finally, we discuss the results of the empirical study of the considered market, and the applicability of this approach to markets with similar structure.

2. The Model

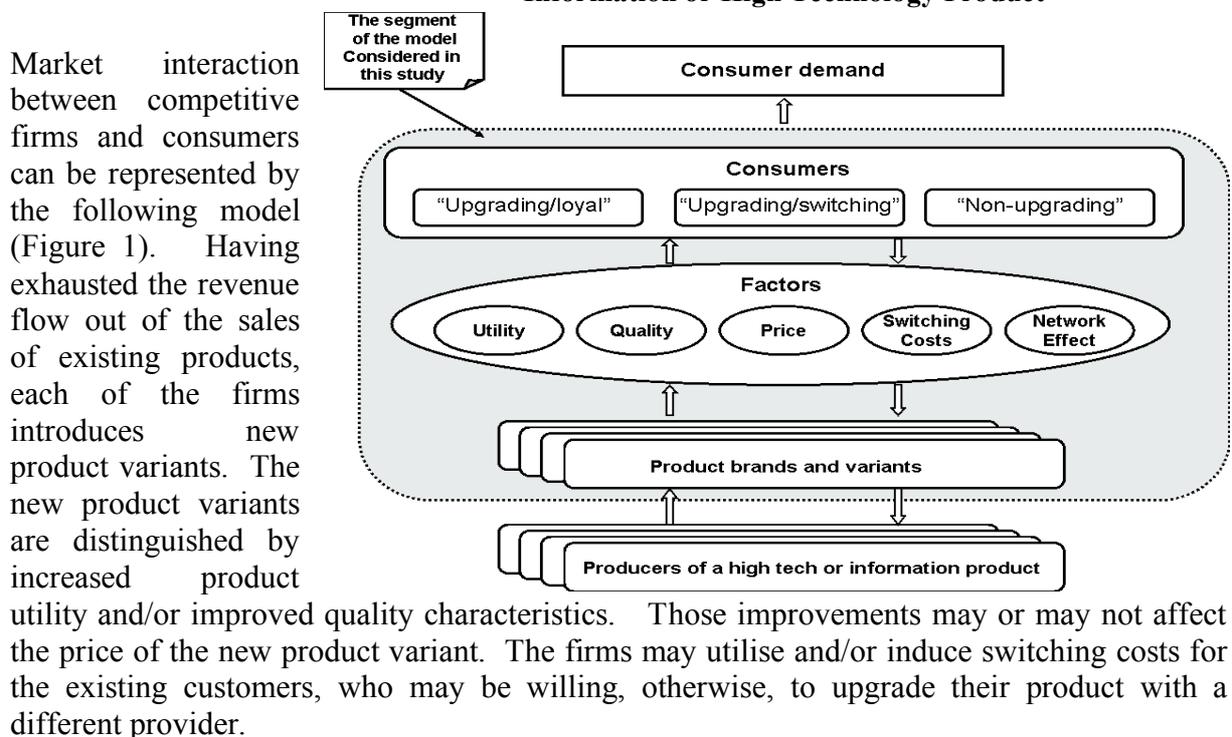
We consider a market for an information technology product that satisfies the conventional properties of monopolistic competition; and combine those properties with some of the features of oligopolistic competition (See Varian and Varian, 1984; Jehle, 1991). Also, we consider the assumptions related to competition for customers, as well as to consumer choice in mature high technology and information product markets (Kazakevitch and Torlina, 2003). Finally, we specify the factors affecting consumer choice in the market of mobile phone services.

The suggested model is based on the following assumptions:

- The market consists of several competing profit maximizing firms. Each of the firms possesses a visible market share, and therefore, exercises some market power;
- Each of the firms produces more than one product variant, with differentiated features;

- The products, produced by all the firms, are viewed by the buyers as close though not perfect substitutes for one another;
- The differences between the products are viewed by consumers as perceived differences in product quality and utility characteristics;
- Each of the sellers can be considered as the monopolist of its particular product variant with a limited degree of monopoly power;
- Such a monopolist enjoys a monopoly power and making economic profit during only a short period of time from the introduction of a unique product, technology or feature until they becomes available to rivals, or until a new “more innovative” product is introduced by this monopolist or by a rival;
- To prolong monopoly power, the firms utilize competitive techniques, which are not directly embodied in the utility or quality of product. Those techniques may include price discrimination, as well as switching costs, network effect, and consumer lock-in inducements;
- The market is mature: new entries are difficult to pursue; the overall number of consumers is not considerably increasing, therefore, the existing firms mostly compete for existing customers by introducing new product variants and new price/cost incentives; the firms attempt to convince their own customers to upgrade to their new products, and competitors’ customers to switch from competitors to their products;
- Consumers make their decision based on the following alternatives: they either stay, for the time being, with the current version of the product; or upgrade it with the current provider; or upgrade it with a different provider.

Figure 1. A Model of a Mature Market of an Information or High Technology Product



In the industries which naturally generate network externalities, such as computer networking and telecommunications, the firms can further amplify the network effect. Network incentives can be introduced based on new technologies (such as 3G telephony) and/or on cost incentives offered to members of the same network (such as discounts on calls of the

same mobile phone provider’s customers communicating with each other). The firms also pursue reducing switching costs for the customers, who may be willing to switch to their services from other providers.

Consumers make their choice, based on the information regarding all the products available on the market with a view to all of the above-mentioned factors: utility; quality; price; switching costs; and network externalities. As a result, during each period of the time consumer population forms three “behavioural” categories: (1) “loyalists” upgrading with the same provider; (2) “non-loyalists” switching to a different provider” and (3) “non-upgrading loyalists”. The earlier two categories constitute effective consumer demand.

3. Consumer Behaviour in the Australian Youth Mobile Phone Market: Quantification of the Model and Some Empirical Results

In this study, we are interested in the highlighted “consumer choice” segment of the model (Figure 1) with application to the youth mobile phone market. In other words, we address the question: how do the listed factors affect consumer strategy with regard to upgrading to a new version/brand of the product. The decision whether to upgrade mobile phone products with the same provider, or to switch to another provider, or not to go for an upgrade for the time being, is considered as the dependant variable of the model specified for the mobile telephony market. Factors affecting consumer choice are treated as independent variables. They are specified in Table 1.

Table 1. Factors of Consumer Choice in the Mobile Phone Market

Product Utility Factors (PUF)	<ol style="list-style-type: none"> 1. Overall importance of the product utility factor 2. Benefits and costs of a new mobile phone package are considered. 3. The positive decision on upgrade (and switching) is made only if benefits out-weight costs.
Product Price Factors (PPF)	<ol style="list-style-type: none"> 1. Overall importance of the price factor 2. Price is an important factor of decision making 3. Prices for all the packages available on the market are compared before a decision on upgrading is made. 4. Price of upgrade is prohibitive
Consumer Switching Costs (CSC)	<ol style="list-style-type: none"> 1. Overall importance of the switching cost factor 2. Consumer fears being locked into the current contract 3. The time and effort required for learning how to use a new product is taken into account. 4. The cost of ‘breaking’ a current mobile phone contract is perceived as prohibitive 5. The offer of a financial incentive to switch to a different provider is persuasive 6. Switching from the contract to the pre-paid option (or from the pre-paid to the contract option) is considered. 7. The offer of an additional non-phone related gift is persuasive 8. The potential of a discount at retail outlets is important. 9. The opportunity to trade in an old handset for cash is an important factor affecting the consumer’s decision

Network Effect Factor (NE)	<ol style="list-style-type: none"> 1. Overall importance of the network factor 2. SMS entertainment updates on my mobile are an important (was an important) factor affecting my purchase decision 3. Receiving sport and video highlights on a mobile phone is important 4. Discounted calls to nominated friends and relatives 5. The chosen mobile phone package was recommended to me by an acquaintance 6. The reputation of the brand is taken into account 7. The compatibility of the consumer's phone features with that of Friends/family is an important factor affecting purchase decisions
Product Quality/ Features Factor	<ol style="list-style-type: none"> 1. Overall importance of the handset specific quality factors (QHS) <ol style="list-style-type: none"> 1.1 Built in camera 1.2 Built in video camera 1.3 Internet access 1.4 Additional accessories (such as car kit) 2. Overall importance of the plan/product specific financial factors (PSFF) <ol style="list-style-type: none"> 2.1 Cap on monthly bill 2.2 Increased discounts in return for increased contract length 2.3 The opportunity to 'roll over' unused free monthly calls 2.4 A designated number of free SMS per month per recharge card 2.5 A designated number of free calls per month per recharge card 2.6 A designated time of day to make free calls

For the purpose of the quantification of the model, a structured questionnaire with fixed alternatives and Likert scale answers was developed. The survey was conducted on a pilot size sample. The population, which this study is based on, is the Australian youth mobile phone market. For the purposes of the study, "youth" is defined as all aged between 18 and 30. "Market" is defined as all those, within the age range, who own a mobile phone, as well as those considering purchasing a mobile phone. The sample type selected for this pilot stage of the study is a non-representative convenience sample. The sample consists of 120 university students approached on campus over a period of one week. The justification for the sample size is that such a size is sufficiently large for the purposes of parametric statistical analysis in general, and discriminant analysis in particular.

Discriminant analysis has been applied to establish a relationship between the independent variables (factors), in terms of their relative importance, and dependant variables (the decision by consumers with regard to upgrade and loyalty). Generally, this statistical tool allows for studying the difference between two or more groups of cases in the sample, determining simultaneously whether meaningful differences exist between the groups, and identifying the discriminating power of each variable (Klecka, 1980). One way of describing group differences is to compute the Fisher's linear combination coefficients, or a weighted sum of independent variables. The weights, obtained for each of the variables indicate, how much or how little each factor contributes, positively or negatively, to the differentiation between the groups. The 'Test of equality of Group Means' indicates whether or not there is a statistically significant difference between the responses of the three groups. The 'Wilks' Lambda', computed for each independent variable, further indicates if there is a significant difference among groups across all the independent variables. The overall Wilks' Lambda indicates that there is a significant difference among groups across all independent variables, if the significance level is below 0.1. Finally, the 'Classification Function Coefficients' are the

actual coefficients of the Fisher’s linear discriminant functions, ranking the relative importance of independent variables for discriminated groups.

Two variants of the model were constructed. In the first one, the aggregate model, consumer behaviour in the youth mobile phone market was analysed as a function of aggregate factors, as they are shown in Figure 1, with the exception of the “Quality” factor. Two aggregate factors related to Quality are considered. One integrates the handset quality/features, the other one integrates the overall importance of the financial factors built into a contract or prepaid mobile phone product. In the second, the detailed model, instead of the aggregated factors, the disaggregated factors (see the right column in Table 1) are discriminated by the three groups of customers, to explain the difference in decision making between the groups.

3.1 The Aggregate Factors of Consumer Choice

The aggregate model, that discriminates the groups of customers with respect to the above-mentioned aggregate decision making factors, indicated an overall significant difference between the groups (Wilks' Lambda Significance level below 0.1). Of the aggregate factors taken into consideration, the **Product Utility (PUF)**, **Product Price (PPF)** and **Handset Specific Factors (QHF)** demonstrate statistically significant differences between the three groups. These factors hold different importance in the decision making processes of the three groups of customers. The differences between the groups with regard to the aggregate **Consumer Switching Costs (CSC)**, **Network Effect (NE)**, and **Product Specific Financial Factors (PSFF)** appear to be statistically insignificant (Table 2).

Table 2. Tests of Equality of Group Means for the Aggregate Model

	Wilks' Lambda	Chi-square	Sig.
Test of Function	.773	28.919	.004

Test of Variables	Wilks' Lambda	F	Sig.
Overall importance of PUF	.873	8.364	.000
Overall importance of PPF	.932	4.226	.017
Overall importance of CSC	.991	.525	.593
Overall importance of NE	.962	2.259	.109
Overall importance of QHS	.932	4.206	.017
Overall importance of PSFF	.967	1.992	.141

Ranking the relative importance of the independent variables for discriminated groups has indicated that **Product Price Factor (PPF)** appears to be the most important for all three groups of customers, followed by **Product Specific Financial Factors (PSFF)**. **Product Utility (PUF)** and **Network Effect (NE)** factors also have the same rank among all three groups of customers. Differences between the groups’ ranking appear to be noticeable only with regard to the overall less important **Consumer Switching Costs (CSC)** and **Quality Handset (QHF)** factors (Table 3).

The analysis indicates that market price of the product, “value for money”, and attractive financial services and discounts strongly dominate the decision making in all three groups of customers. The other factors, such as additional services enhancing social interaction, incentives and inconveniences of switching between providers, and the novelty features of

new products are of less importance. Interestingly, though, the factors which seem to be of lowest priority in the decision making process appear to be real group differentiators. “Loyal upgrading” customers rank “novelty features” of a new product as relatively more important than “inconveniency of changing product”. “Loyal non-upgrading” customers demonstrate a more conservative approach, indicating that their decisions are based on “inconveniency of switching products” which prevails over obtaining “novelty features”. The third group, “Disloyal” customers, indicates that overall “incentives to switch to a new provider” are more attractive than the “novelty features” of the current provider’s products. In terms of managerial relevance and focus of the strategic approach, further analysis is required in order to develop strategies allowing product providers to reduce or neutralize factors leading to the incentives to switch providers.

Table 3. Classification Function Coefficients and Ranks for the Aggregate Factors

Groups of customers	Group 1. Have not purchased recently, not upgrading		Group 2. Upgrading with the same provider		Group 3. Upgrading with a different provider	
	Coeff.	Rank	Coeff.	Rank	Coeff.	Rank
Overall importance of PUF	2.879	3	3.425	3	3.515	3
Overall importance of PPF	7.225	1	7.110	1	6.745	1
Overall importance of CSC	1.508	5	.698	6	1.071	5
Overall importance of NE	1.752	4	2.236	4	2.026	4
Overall importance of QHS	.647	6	1.005	5	.742	6
Overall importance of QFF	4.559	2	4.913	2	4.933	2

3.2 The Detailed Factors of Consumer Choice

The picture is not complete without considering ranking and differences between the customer groups with regard to detailed consumer choice factors.

As in the case of the aggregate model, the detailed model shows, that the overall difference between the groups is statistically significant (Wilks' Lambda Significance Level below 0.1).

In Table 4, the list of detailed variables is clustered in two areas. The first one includes the variables, with regard to which the difference between the groups of customers is significant. Factors in this group have different impact on the decision making process of different categories of customers (non-upgrading loyalists, upgrading loyalists, and “switching” customers).

The second consists of variables representing insignificant differences in the perceived importance of the factors in the decision making process of the three groups of customers. Fifteen of the detailed variables have a significance level above 0.1 indicating that these variables do not discriminate between the groups. They might be either equally unimportant or equally important to each group. Nevertheless, they all contribute to the determination of the consumer preferences in each of the groups. In a similar fashion to the case of the aggregate model, the overall significance level is less than 0.1, indicating that the difference between the groups of customers is significant.

Table 4. Tests of Equality of Group Means for the Detailed Model

	Wilks' Lambda	Chi-square	Sig.
Test of Function	.415	88.861	.006

Test of Variables	Wilks' Lambda	F	Sig.
Statistically significant difference (Sig<0.1)			
Benefits of purchasing outweigh costs	.849	10.220	.000
Sports video highlights	.887	7.349	.001
Costs of upgrade prohibitive	.911	5.634	.005
SMS entertainment updates	.918	5.151	.007
Built in camera	.928	4.433	.014
Financial incentive to switch	.931	4.284	.016
Price is important factor	.937	3.857	.024
Free calls	.937	3.837	.024
Internet access	.945	3.317	.040
Free SMS's	.947	3.233	.043
Built in video	.948	3.184	.045
Cap on monthly bill	.950	3.031	.052
Brand reputation	.957	2.602	.078
Discount calls with min. length contract	.958	2.498	.087
Statistically insignificant difference (Sig>0.1)			
Will consider all packages on market	.965	2.110	.126
Phone related gifts	.968	1.901	.154
Trade in old handset for cash	.971	1.701	.187
Time taken to learn considered	.974	1.555	.216
Feel I am locked-in to contract	.984	.964	.384
Discount calls with friends on network	.984	.960	.386
Recommended by acquaintance	.986	.812	.447
Cost of breaking contract prohibitive	.990	.578	.563
Discounts at retail outlets	.990	.558	.574
Designated time of day for free calls	.991	.539	.585
Roll-over of unused free calls	.992	.474	.624
Phone compatibility	.993	.409	.665
Switch from prepaid to contract etc.	.995	.262	.770
Consider costs and benefits	.997	.165	.848
Additional non-phone related gifts	.999	.033	.968

Table 5 represents the classification function coefficients of the detailed model as well as the corresponding ratings for all three groups of customers. Two kinds of ratings are considered. One of them shows the relative importance of variables within each of the aggregate factors. The other one is the overall rating across all the detailed variables.

Table 5. Classification Function Coefficients and Ranks for the Detailed Factors

Consumer Groups	Group 1. Have Not Purchased Recently, not Upgrading			Group 2. Upgrading with the Same Provider			Group 3. Upgrading with a Different Provider		
	Coeff.	Rank within Aggr. Factor	Over-all Rating	Coeff.	Rank within Aggr. Factor	Over-all Rating	Coeff.	Rank within Aggr. Factor	Over-all Rating
Product Utility Factors (PUF)									
Consider costs and benefits	3.754	2	6	3.858	2	6	4.091	2	7
Benefits of purchasing outweigh costs	3.986	1	5	4.728	1	2	4.725	1	5
Product Price Factors (PPF)									
Price is important factor	5.729	1	1	5.361	1	1	5.523	1	2
Will consider all packages on market	.605	3	17	.336	3	18	.552	3	16
Price of upgrade prohibitive	5.155	2	2	4.572	2	4	4.774	2	4
Consumer Switching Cost Factors (CSC)									
Fear I am locked-in to contract	1.276	4	13	1.034	4	14	1.701	3	12
Time taken to learn considered	-.296	7	21	-.683	7	25	-.012	6	18
Cost of breaking contract prohibitive	-.818	8	24	-.894	8	27	-1.042	8	25
Financial incentive to switch	2.356	1	8	1.613	2	10	2.461	1	8
Switch from prepaid to contract etc.	1.262	3	14	1.647	1	9	1.391	4	13
Additional non-phone related gifts	-.293	6	19	-.211	6	20	-.110	7	19
Discounts at retail outlets	.935	5	15	.550	5	17	.072	5	17
Trade in old handset for cash	1.903	2	10	1.125	3	12	1.836	2	10

Network Effect Factors (NE)									
SMS entertainment updates	-.676	4	22	-.291	5	21	-.585	4	21
Sports video highlights	4.712	1	3	4.638	1	3	5.588	1	1
Discount calls with friends on network	-1.154	6	28	-.130	4	19	-.628	5	22
Recommended by acquaintance	1.863	2	11	.980	3	15	1.717	2	11
Brand reputation	.688	3	16	1.081	2	13	-.121	3	20
Phone compatibility	-1.013	5	26	-.486	6	24	-.865	6	24
Handset Specific Quality Factors (QHS)									
Built in camera	.579	2	18	1.298	2	11	.814	2	15
Built in video	-.713	3	23	-1.545	4	28	-1.570	4	29
Internet access	-1.020	4	27	-.794	3	26	-.800	3	23
Phone related gifts	2.189	1	9	2.323	1	8	1.976	1	9
Plan/Product Specific Financial Factors (PSF)									
Cap on monthly bill	1.340	3	12	.862	3	16	.848	3	14
Discount calls with min. length contract	-2.446	6	29	-2.185	6	29	-1.292	6	28
Roll-over of unused free calls	-.937	5	25	-.363	4	22	-1.154	4	26
Free SMS	-.672	4	21	-.386	5	23	-1.194	5	27
Free calls	3.594	2	7	3.820	2	7	4.798	1	3
Designated time of day for free calls	4.539	1	4	4.425	1	5	4.324	2	6

The results, obtained using the detailed model, generally confirm the conclusions of the classification of the aggregate variables. The most important factor affecting the consumer behaviour of the considered category mobile phone customers is the **Price** (PPF).

Within the second important category of **Product Specific Financial Factors** (PSF) all three groups of customers highly value such features as Designated Time of Day for Free Calls, Free Calls Allowance, and Cap on Monthly Bills. The other three variables within this aggregate factor appear to be at the bottom of the list.

Within the **Network Effects** (NE) category the following factors appear to be significant influences on customer choice: Brand Reputation; Recommendation by Acquaintance; and Sports Video Highlights. The rest of the factors in this category, including Phone Compatibility, and SMS Entertainment Updates are less significant for consumer decision making.

Both incentives and obstacles are considered within the **Switching Costs** factor category (CSC). Understandably, the attitudes of the customer groups are rather different with regard to the Switching Costs. “Non-upgrading” and “switching” customers consider financial incentives, as well as the opportunity of trading in the old handset for cash, as the most important reasons for making a decision “to switch” or “not to switch” between providers. The dilemma of switching between prepaid and contract types of service looks the most important for loyal customers. All the customers see “lock in” as an important disincentive to switch. Time taken to learn how to use a new handset is not seen as a major obstacle. Nor are additional non-phone related gifts considered a major incentive.

Finally, the detailed analysis of the **Handset Specific Quality Factors (QHS)** confirms findings from the aggregate model about the lowest importance of those factors. Of the QHS factors, only Phone-Related Gifts appear to be a distinctively more important sub-factor.

The overall conclusions from the detailed model confirm more precisely the conclusions derived from the aggregate model. The financial variables such as Price, Plan/Product Specific Financial Factors, the financial components of Consumer Switching Costs and Network Effects are more important for consumer decision making than the technological components of product differentiation. An interpretation of this phenomenon can be attempted from both the consumer population/sample and market structure perspectives. On the one hand, research on the youth segment of mobile telephony consumers and the convenience sample of on-campus students might pre-determine the financial consideration to be dominant for decision making under hard budget constraints. On the other hand, pricing and financial incentives to customers appear to be more powerful competitive tools, than technological innovations. This can be seen as indicative of the maturity of the industry in a further sense, in addition to the definition given in the introduction to this paper. Not only has the ability to increase the overall number of consumers been exhausted, the feasibility of new entries has become limited in the case of the mobile phone industry, but one can conclude that the attractiveness of rapidly progressing technological innovations has been diminishing. New features are immediately becoming uniform across the industry. This may be the reason why technological product differentiation appears to be a less important factor; and the type of competition is becoming closer to oligopoly rather than monopolistic competition.

4. Conclusion

In conclusion, we discuss the results of the study, and possible further applications of the findings.

Firstly, we have developed a model which incorporates new factors in an extended consumer demand analysis framework in relation to information and high technology products. A particular market structure always creates a supply side environment for consumer decision-making. The mature high technology market structure is a special case, with quite distinctive producer competition and consumer behaviour characteristics. As discussed earlier, in such markets, product quality, represented by a bundle of product features and services, network externalities and consumer switching costs, becomes increasingly important in producer and

consumer market strategies, in addition to traditional market determinants. In this paper, we have presented a model of a mature market of high technology or information product, where traditional market determinants of utility and price have been complemented by quality, network effects, and switching costs.

Secondly, we have discussed the results of an empirical study of one such market. A questionnaire has been developed, and data collected to support quantifying the “consumer choice” segment of the model with application to the Australian youth mobile phone market. The study has supported an analysis that distinguishes between three groups of mobile telephony customers, identifying the differences in their buying behaviour and their decision making patterns. We have also investigated the ranking, by different customer groups, of both aggregated factors and the sub-factors underlying the aggregated factors.

Thirdly, we believe, the suggested approach might be applied to other markets with similar structures. In particular, we envisage application of the proposed methodology to mature markets of specialised software products, such as data management tools, accounting, mathematical and other professional packages.

A consequence of constructing and quantifying the model is that it allows the analysis of consumer decision making factors in a particular type of market. Where the context and the factors affecting a specific market are identified, the suggested approach provides a tool for ranking each of the factors and sub-factors. This allows a researcher to analyse and compare their relative importance, with a focus on consumer demand determination for a high technology product.

As demonstrated in the earlier sections of this paper, this approach can be used for the analysis of market structures of mature markets of information high technology products, as well as for practical decision making and strategy formulating by both consumers and producers. However, the concept itself, and especially the implementation discussed in this paper, are not free of limitations. In particular, a more representative sample, capturing the demographic dimension of analysis, is desirable for more conclusive results with regard to the Australian youth mobile telephony market. Groups of customers representing different age groups or different income categories might have enriched this study, by enabling new dimensions for analysis and interpretation of results.

Finally, we envisage further development of this study in the following two directions: (i) moving from discriminant function and ranking to quantifying parameters of actual market demand functions; and (ii) quantifying the whole model, including the supply side. We believe that game theory, together with experimental economics tools, would provide a most realistic and effective way to progress this study further.

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