

An Exploratory Study on the Applicability of MNP in Uzbekistan: A Conjoint Analysis

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Abstract

The mobile telecommunication sector is increasingly gathering way becoming a key area for the economic development in Uzbekistan. One way to promote competition among providers is the introduction of a number portability service. This paper estimates subscriber's willingness to pay (WTP) for the MNP service in the mobile communication market in Uzbekistan. Consumer valuation was estimated using a conjoint analysis. Since number portability had not been introduced at the time of the study, stated preference data from the conjoint survey was used. Results indicate that currently subscribers do not attach a lot of importance to the MNP service, while price and service quality are most valuable components. The results of this study provide important implication for mobile network operators and policy developers on potential MNP implementation.

Keywords:

Mobile Number Portability, Conjoint Analysis, Willingness to Pay

I. Introduction

One of the fast growing and significant sectors of the telecommunication industry is a mobile telecommunication sector which is becoming one of the most important infrastructures in the nation. This is the result of enormous technical progress as well as of the increased number of network operators in the intense competition that has developed.

The mobile telecommunication market of Uzbekistan is the fourth biggest market by the number of subscribers in the Central Asia and Eastern Europe after Russia, Ukraine and Poland. Mobile Network Operators (MNO) provide mobile telecommunication service to the 27-million population of Uzbekistan [8]. The mobile telecommunication service market consists of three GSM operators, MTS, Beeline,

Coscom, and two CDMA operators, Perfectum Mobile and Uzbektelecom Mobile. According to "Avesta Research" [3], the market share of each operator is shown in the Figure 1.

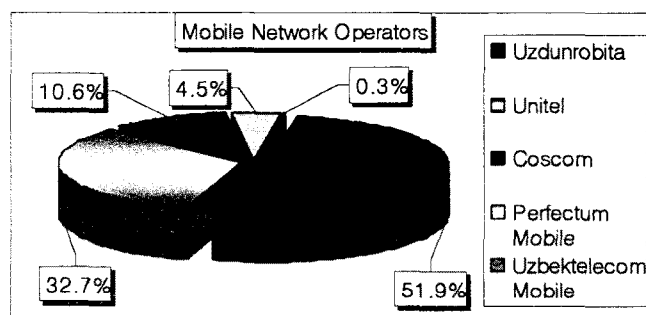


Figure 1 - Market Shares of Mobile Network Operators

The large market shares of GSM operators (Uzdurobita, Unitel, Coscom) compare to those of CDMA (Perfectum Mobile, Uzbektelecom) can be explained by their earlier introduction to the public and low switching costs among each other.

During the past three years the Uzbek mobile communication service market has experienced a colossal increase in the number of subscribers. Its number doubled each year during 2004 – 2006 growing in a geometrical progression. National Radiofrequency Committee of Uzbekistan [24] announced on July 1st, 2007, that the number of mobile subscribers has reached 3,744,085. Only first six months of 2007 showed the increase by 102,408 or 27.3% of a total number (see Figure 2). High growth can be explained by the increased number of front offices across the country.

A high growth rate along with the penetration rate of about 14.0% by July 1st, 2007, proofs us that the mobile communication service in Uzbekistan becomes more popular with the public. To believe analytic's forecast the number of subscribers should reach 4.9 million till the end of 2007. Though, the growth rate of the subscriber's base will be expected to decrease the pace [28].

KOTRA in Uzbekistan reports that the mobile

communication sector reached a gross profit of 622 billion Sum¹ (approx. US\$ 500 million) in 2006 and 172.14 billion Sum (US\$ 138 million) for the first quarter of 2007. This is 150.2% higher compare to the same period of 2006. Direct foreign investments are also revealed to have exceeded US\$ 1.33 million [18].

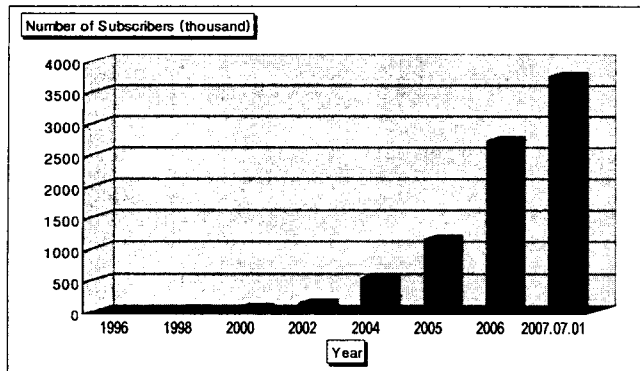


Figure 2 - The growth of subscribers' base

Following the trend of mobile communication markets in other countries, number portability service will be finally introduced to the public when the market reaches a certain level of saturation.

II. Mobile Number Portability (MNP)

Generally, subscribers are required to give up their number when switching providers. MNP brings new opportunity to customers by giving the right to keep their mobile telephone number when switching between mobile telecommunication service providers. The main regulatory objectives of MNP are to bring considerable benefits to consumers of mobile services: lower price, higher quality, greater choice and a greater range of services. Subscribers would be allowed to take advantage of the choices in a more competitive telecommunication market. NERA/Smith [25] proposed a classification of five potential benefits of introducing MNP: (1) Avoided costs of number change in the absence of MNP; (2) Benefits of moving to a more preferred operator and obtaining services from them when MNP is introduced [4]; (3) Intensified competition among providers of mobile telecommunication services benefits non-switching consumers as well as those who actually switch [1],[9]; (4) Avoided costs of finding changed number [26]; (5) Increased investment in number value due to re-allocation of property rights [35].

While first two benefits are private, the rest benefits resulting from the strengthening of competition and increased investment incentives are public. The later ones accrue regardless whether customers actually port their number or not, but from the option to do so [5].

MNP from a property rights perspective suggests that the property rights in mobile telephone number is reallocated from operators to customers. This contributes to the bargaining power of consumers.

¹ US\$ 1 = 1252 Sum (June, 2007)

III. Previous Studies

MNP, though limited, was first implemented in Singapore in 1997. The United Kingdom and Netherlands first implemented MNP in Europe in 1999. Nowadays, except a few EU member states, the rest have introduced MNP. USA and South Korea (all in 2004), and Japan (2006) followed suit [5].

MNP has been investigated from different perspectives in different countries. In some countries, results show positive effect on MNP implementation, whereas in those of others the expected results had not been achieved. Lee et al [19] investigated the customer behavior toward MNP in Korea. MNP have lowered the switching costs considerably since its implementation. More than 70% of population preferred to retain the number. On the other hand, 88.6% of population will not switch to another service provider unless there is some compensation for the switch. Gerpott [11] studied customer retention, loyalty, and satisfaction in the German mobile telecommunication market and the results show that it is important for customers to retain their numbers over a long period. On the other hand, US mobile subscribers have indiscriminate attitude to MNP service which means that MNP does not have a direct effect on the subscribers' switching decisions [30].

Though some studies positively assess MNP, on the other hand, other studies highlight the negative aspects of MNP. Reinke [29] argues that even if MNP can increase the competition in the telecommunication market, the means by which number portability is implemented may either insure or threaten competition and universal service. Less benefit from MNP is received in a well developed telephony market with high penetration rates [3]. The introduction of MNP in the EU has a negative impact on prices although liberalization of telecom has a positive impact on the demand for mobile services [12]. Shin's [30] study reveals that MNP indirectly enhanced switching barriers through the increased subscriber's lock-in strategies and other hidden costs that makes subscribers stay with current carriers. MNP may deteriorate the customers' price information if the consumer is ignorant of relevant pricing [10].

Summarizing previous studies on MNP, findings show that switching cost has been the common obstacle for subscribers to change carriers. The following section shows the method to estimate MNP using a conjoint analysis.

IV. Methodology and Analysis

Conjoint Analysis (CA) has been widely applied in marketing [13], [15], transportation [14], [22], healthcare [33], and environmental management [16].

CA models the nature of consumer trade-offs among multi-attribute products or services [27]. Respondents would be shown a set of products created from a combination of levels from all or some of the constituent attributes. Then they would be asked to rank or rate the products they are shown [34]. The method measures the importance individual respondents attach to various product attributes and the

utility that consumers attach to the different levels of the various attributes, based on their valuation of the complete product [23], [32]. Thus, CA enables the marketing researcher to identify the attribute combinations that confer the highest level of utility to the consumer and to establish the relative importance of attributes in terms of their contribution to the total utility derived by the specific respondent. This makes it an appropriate technique to assess subscribers' attitude to a new service such as mobile number portability.

B. van den Berg et al. [33] pointed important advantage that CA has, such as, (1) respondents, while answering, make a trade-off between different aspects of the scenarios presented; (2) more information about respondent's preferences is collected since they evaluate different scenarios; (3) the heterogeneity of a commodity is better captured.

An important disadvantage of CA is the relatively large burden it puts on respondents. The more cards are given for ranking the more problematical it is for respondents who can become bothered by the survey.

Lehmann et al [20] described five stages in the design of a CA study. The design of each stage is discussed below.

4.1 Identifying the attributes

The first stage is to establish the attributes for the study. It is critical to the success of the conjoint exercise to select only necessary attributes for the survey questionnaires [2]. Many attributes have potential influence on a subscribers' decision to switch a provider. Attributes were selected after scrupulous reviewing of related literature and getting feedback from subscribers.

The following attributes (dependent variables) were selected for investigation: a company name (COMPANY), monthly mobile phone expenses (PRICE), discounts within the same network (DISCOUNT), call and service quality (CSQ), and availability of a number portability service (MNP). The authors believe that these attributes have key influence.

In addition, independent variables were considered in order to analyze the relationship between respondent's preferences and their socio-economic characteristics such as age (AGE), sex (SEX), education (EDU), and monthly income (INCOME).

In total, five dependent and four independent variables were selected for the study.

4.2 Assigning levels the attributes

The second stage is to assign levels to the attributes. Levels chosen for each attribute must be defined in a way that is meaningful to respondents. They should assure that attributes are measured objectively and are able to be controlled [7]. Thus, the most critical attributes should be selected and the number should be limited as much as possible. All attribute levels are shown in Table 1.

The companies (COMPANY) selected for the study are GSM mobile network operators: Uzdurobita, Unitel and

Coscom. CDMA operators (Perfectum Mobile and Uzbektelecom Mobile) were excluded due to their small market share at the time of study. Another reason for exclusion is higher switching costs when switching from a CDMA operator to that of GSM and vice versa compared to those that occur among GSM operators.

Table 1 - Attributes and levels

Variable	Description	Level
COMPANY	GSM Mobile network operator providing services in Uzbekistan	Uzdunrobita Unitel Coscom
PRICE	Subscribers' monthly expenses for provided services	US\$5 US\$10 US\$20 US\$30
DISCOUNT	Discount calls within the same network	Yes / No
CSQ	Call and service quality	Satisfactory Intermediate Unsatisfactory
MNP	Availability of the mobile number portability service	Yes / No

It is an uneasy task to decide on how many levels this attribute should include. It is required that the minimum amount of US\$5 should be deposited when getting the SIM-card with a phone number. Since subscribers are very price-sensitive and the price distribution range is very wide, the author decided to keep the range as narrow as possible without limiting the description ability of it. Monthly expenses for provided services (PRICE) were subdivided in four levels: US\$5, US\$10, US\$20 and US\$30.

Some tariffs imply discount calls (DISCOUNT) within the same network. As it was mentioned above, a price-sensitive user prefers to select an operator with whom his or her friends signed the contract if discount calls are available. Subscribers' decision is based on the availability of discount calls.

Table 2 - Independent variables and levels

Independent Variable	Description	Level
AGE	Age (lower age, middle age and higher age)	0-25 26-44 45-65
SEX	Sex	Male Female
EDU	Education level	School University
INCOME	Income per month in US dollars (high income, middle income and high income)	<\$100 \$100 - \$300 >\$300

Call and service quality (CSQ) is defined according to the subscribers' perception of call clarity, coverage, variety of value-added services and service quality. It is described by

three levels: satisfactory, intermediate and unsatisfactory.

MNP availability is the last attribute to be defined. At the time of study, MNP had not been introduced. The short introduction of MNP is required in order to aid comprehension by respondents.

Independent variables were used to segment results in order to display any variance in preferences across individuals in certain demographic groups. Table 2 shows the different levels taken by each independent variable.

4.3 Choice of scenarios

The CA method presents respondents with the multiple scenarios with different attributes represented in different levels. A full profile design which is all the possible combinations of levels and attributes consists of 144 (3x4x2x3x2) possible profiles. In order to reduce complexity and associated negative impacts, the number of profiles is to be reduced to a more acceptable number. The full profile approach uses a fractional factorial design, which presents a suitable fraction of all possible combinations of the attribute levels. The resulting orthogonal array is designed to capture main effects without confounding results.

The Generate Orthogonal Design procedure from SPSS Conjoint version 14.0 was used to generate an orthogonal array. As a result, all possible 144 profiles were reduced to 16 profiles which are shown in Table 3.

Table 3 - The list of profiles

Profile	COMPANY	PRICE	DISCOUNT	CSQ	MNP
1	Coscom	\$10	No	Satisfied	No
2	Coscom	\$5	Yes	Intermediate	Yes
3	Unitel	\$5	No	Unsatisfied	Yes
4	Uzdunrobota	\$30	No	Unsatisfied	Yes
5	Uzdunrobota	\$10	No	Intermediate	Yes
6	Uzdunrobota	\$10	Yes	Unsatisfied	Yes
7	Uzdunrobota	\$5	Yes	Satisfied	No
8	Uzdunrobota	\$20	No	Intermediate	No
9	Coscom	\$20	Yes	Unsatisfied	Yes
10	Coscom	\$30	No	Unsatisfied	No
11	Uzdunrobota	\$30	Yes	Satisfied	Yes
12	Unitel	\$30	Yes	Intermediate	No
13	Unitel	\$20	No	Satisfied	Yes
14	Uzdunrobota	\$5	No	Unsatisfied	No
15	Uzdunrobota	\$20	Yes	Unsatisfied	No
16	Unitel	\$10	Yes	Unsatisfied	No

4.4 Establishing preferences

Contingent ranking conjoint analysis was employed in this study due to its reliable results and easiness. Each set of attribute levels (profile) in an orthogonal design represents a different version of the case under study. Each profile was presented to the respondents in the form of a card similar in physical appearance but different in the combination of

features. Respondents were asked to rank given cards according to their preferences from the most preferred to the least preferred.

Before interviewing respondents, a carefully constructed introduction had been done. It allowed the respondents better understand the context of the study. For example, MNP was not introduced to public at the time of a survey. Without explanation, acquired data would not reflect the reality and lead to the wrong conclusion.

4.5 Data analysis

CA is a compensatory multi-attribute model which assumes that the strength on one attribute compensates the weakness of another [20]. It assumes that the consumer's overall evaluations in the additive model can be expressed as a sum of the separate part-worths of the attributes [31].

In order to estimate the parameters of the conjoint model, OLS regression was applied. OLS regression analysis with rank order data produce solutions that have predictive validity close to that of the more expensive and more complicated non-metric techniques [6], [17]. However, the standard errors and statistical tests are not valid when regression analysis is applied to rank order data. Therefore, the fit of the model to the data is normally evaluated in terms of Spearman's rank correlation coefficient between the input values and estimated values of the dependent (rank order) variables [20].

Effects coding was applied in order to code the 16 hypothetical scenarios. These scenarios were presented to the respondents and allowed for the calculation of the coefficient of the "left-out" dummy variable [21]. The "COMPANY" variables was treated as a dummy variable and subjected to effects coding. One arbitrarily chosen level of each attribute was omitted from the regression formula which was the "Coscom" levels [32].

The model used in this study assumes that an individual i faces a choice among j alternatives in each of t choice sets in a survey, and is asked to rank the alternatives in order of preference [22]. The individual's utility is as follows:

$$U_{ij} = \beta_{iCOMPANY} COMPANY_{ij} + \beta_{iDISCOUNT} DISCOUNT_{ij} + \beta_{iSCS} SCS_{ij} + \beta_{iMNP} MNP_{ij} + \beta_{iPRICE} PRICE_{ij} + CONSTANT \quad (1)$$

where β_i is a vector of the coefficients of attribute vectors, $COMPANY_{ij}$, $PRICE_{ij}$, $DISCOUNT_{ij}$, CSQ_{ij} , MNP_{ij} are the attribute vectors associated with alternative j .

Statistical Package for the Social Science (SPSS) Conjoint version 14.0 was the chosen tool for analysis of the data. Least Square Analysis is used to estimate the coefficients and their statistical significance.

Once the survey had been done, the results were segmented across demographic variables. This gave us ability to track any variance in preferences across individuals belonging to a certain group. Respondents were segmented into groups according to:

- Age (lower age, middle age and higher age)

- Gender (male, female)
- Education (school, university)
- Income (low income, middle income and high income)

Equation (1) was re-estimated to present respondent's utilities which are included only in a certain segment.

V. Results and Discussion

Out of all possible targets for survey, Tashkent city was chosen due to its high population (8 percent out of the total population of Uzbekistan) and relatively high penetration rate of mobile communication.

The questionnaire was pre-tested through direct interviews with ten respondents who were well acquainted with the current situation of the mobile telecommunication market in Uzbekistan.

In its final form, the survey was conducted over e-mails, chats and direct interviews with respondents. The number of survey responses was 115 out of 180 totally sent surveys. This constitutes 64 percent. Later one more survey was excluded by SPSS due to its inconsistency.

The obtained number of responses is satisfactory considering respondents were informed that the survey would take some time to complete, and no incentives were given for participation. In addition, the low mobile penetration rate in Uzbekistan is another argument that justifies the received number of responses.

The results of the regression are represented in Table 4. Attributes with a higher variance value play a more significant role than those with smaller values.

Table 4 – Estimation results

Attribute	Mean of β	Variance of β
COMPANY ^a	0*	1.3092
CSQ	5.213716*	5.2137
PRICE	-3.9893*	6.1374
MNP	1.325658*	0.8838
DISCOUNT	2.351974*	1.5680

*Statistical significance of 1%

^a Attribute was effects coded in such a way that the coefficient of the "left-out" attribute level equal the negative sum of the "included" categories.

PRICE is most significant of all other attributes followed by CSQ. The COMPANY and DISCOUNT attributes are almost of the same significance. The low variance value of MNP shows that subscribers have no interest in this service.

The average importance scores for overall survey and each demographic group had been calculated and presented by Figure 3 to show any preference differences in demographic groups. The demographic group "All" depicts all respondents' relative importance of attributes in average. The PRICE of service plays the main role which is followed by CSQ. COMPANY and DISCOUNT have less than a half of price's importance score. The least importance was attached to MNP which is a sixth of the price of service.

When survey results are segmented by age, the received

sequence of importance scores resembles that which had been done for all surveys. The only difference is observed in group '45-' who value MNP higher than call discounts. Also this group showed the greatest brand loyalty (COMPANY). There were only 2 responses from subscribers older than 45; it is the reason why answers can deviate greatly from those with a high response rate.

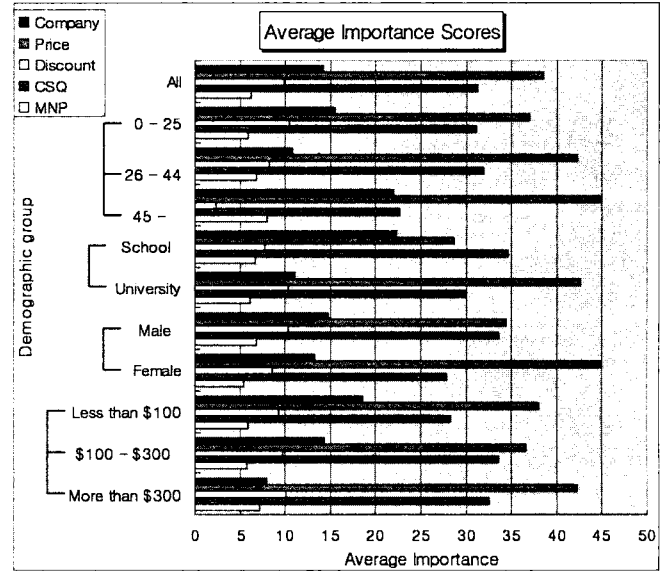


Figure 3 - Average Importance Scores

People with high education attach more importance to PRICE while those with school education value CSQ. It can be explained that people with school education start working earlier and their focus had been shifted from price to quality. Also subscribers from the school education segment are more company loyal users than those from the university segment.

While male's preferences for PRICE and CSQ were almost the same, female valuation of PRICE was much higher than CSQ. It can imply that females have other areas of interest where they can spend saved money. The other attributes didn't show any significant differences.

In the demographic groups divided by income, the "\$100-\$300" group prefers good PRICE along with good CSQ while the other two were more concerned about PRICE. People who earn less than \$100 appeared to be twice brand loyal than those with the income of more than \$300. The third group showed a certain indifference to attributes such as COMPANY, DISCOUNT and MNP.

VI. Conclusion and Future Directions

This study investigates the subscribers' behavior and perception towards COMPANY loyalty, CSQ, PRICE, MNP and DISCOUNT in total and segmented by demographic groups.

PRICE appeared to be of high importance almost in each group except the "School" education group where people gave their preferences to CSQ. The country where prices are relatively high compare to salaries, PRICE will always play

the main role when selecting a mobile operator.

The second thing, that the subscribers value, is call and service quality (CSQ).

Almost in each demographic group there is a significant gap between segments that are brand loyal (COMPANY) and that are not. Operators may devise different strategies for various subscribers group to minimize churn rate within each group of subscribers. Along with competitive prices and good call and service quality, they may start subsidize subscribers' cellular phones and introduce a mileage system.

DISCOUNT showed stable importance score across all demographic groups.

The lowest importance score was attached to MNP in almost each group. It can be explained by the fact that this service had not been introduced by the time of performing research. In order to avoid discrepancy between assumed MNP benefits and actual situation, regulators should not just enforce number portability, but they should rather seek to reduce customer ignorance and raise customers' perceptions on MNP

Regulators should not only develop effective policy and regulation but also come up with detailed and thorough technological, economical and regulatory plans.

MNP is an inevitable step to come. The question is how well prepared will be all stakeholders.

References

- [1] Aoki, R., and Small, J. (1999). "The Economics of Number Portability: Switching Costs and Two-part Tariffs," Working Paper, University of Auckland.
- [2] Auty, S. (1995). "Using Conjoint Analysis in Industrial Marketing. The Role of Judgment," *Industrial Marketing Management*, Vol. 24(3), pp. 191-206.
- [3] Avesta Research (2007). The Mobile Telecommunication Market of Uzbekistan: Summary of the First Half-year of 2007. <http://www.avestagroup.uz/lib/research/frtelecom1H07r.pdf>
- [4] Buehler, S., and Haucap, J. (2004). "Mobile Number Portability," *Journal of Industry, Competition and Trade*, Vol. 4, pp. 223-238.
- [5] Buehler, S., Dewenter, R., and Haucap, J. (2006). "Mobile Number Portability in Europe," *Telecommunication Policy*, Vol. 30, pp. 385-399.
- [6] Cattin, P. and Wittink, D.R. (1982). "Commercial Use of Conjoint Analysis: A Survey," *Journal of Marketing*, Vol. 46, pp. 44-53.
- [7] Center for International Economics (2001). Review of Willingness-to-pay Methodologies. Prepared for the Independent Pricing and Regulatory Tribunal of NSW, Canberra.
- [8] CIA. The World Factbook, Uzbekistan. <https://www.cia.gov/library/publications/the-world-factbook/print/uz.html>.
- [9] Galbi, D.A. (2001). "Regulating Prices for Shifting between Service Providers," *Information Economics and Policy*, Vol. 13, pp. 181-198.
- [10] Gand, A., King, R. (2000), Consumer Behavior and Marketing Strategy. Research paper, Center for Customer Behavior Research at University of Minnesota, Twin Cities, MN
- [11] Gerpott, T., Rams, W., and Schindler, A. (2001). "Customer Retention, Loyalty, and Satisfaction in the German Mobile Cellular Telecommunications Market," *Telecommunications Policy*, Vol. 25, pp. 249-269.
- [12] Grzybowski, L. (2005). "Regulation of Mobile Telephony across the European Union: An Empirical Analysis," *Journal of Regulatory Economics*, Vol. 28(1), pp. 47-67.
- [13] Green, P.E., and Srinivasan, V. (1978). "Conjoint Analysis in Consumer Research: Issues and Outlook," *Journal of Consumer Research*, Vol. 5, pp.103-123.
- [14] Hensher, D. (2001). The Valuation of Commuter Travel Time Savings for Car Drivers: Evaluating Alternative Model Specifications," *Transportation*, Vol. 28, pp. 101-118.
- [15] Huber, J., Train, K. (2001). "On the Similarity of Classical and Bayesian Estimates of Individual Mean Part Worths," *Marketing Letters*, Vol. 12, pp. 257-267.
- [16] Hurlimann, A., and McKay, J. (2007). "Urban Australian Using Recycled Water for Domestic Non-portable Use – An Evaluation of the Attributes Prices, Saltiness, Colour and Odour Using Conjoint Analysis," *Journal of Environmental Management*, Vol. 83, pp. 93-104.
- [17] Jain, A.K., Acito, F., Malhotra, N.K. and Mahajan, N. (1979). "A Comparison of the Internal Validity of Alternative Parameter Estimation Methods in Decompositional Multiattribute Preference Models," *Journal of Marketing Research*, Vol. 16, pp. 313-322.
- [18] KOTRA Report (2007). Big Bang! Uzbekistan Telecommunication Market. http://news.naver.com/news/read.php?mode=LSD&office_id=093&article_id=0000004982§ion_id=101&menu_id=101.
- [19] Lee, J.S., Kim, Y.B., Lee, J.D., and Park, Y. (2006). "Estimating the Extent of Potential Competition in the Korean Mobile Telecommunications Market: Switching Costs and Number Portability," *International Journal of Industrial Organization*, Vol. 24, pp. 107-124.
- [20] Lehmann, D.R., Gupta, S., Stechkel, J.H. (1998). Marketing Research. Addison Wesley, Massachusetts
- [21] Lusk, J.L., House, L.O., Valli, C., Jaeger, S.R., Moore, M., Morrow, B., and Traill, W.B. (2002). Heterogeneity of Consumer Preferences as Impetus for Non-tariff Trade Barriers? Experimental Evidence of Preferences for Genetically Modified Food in the United States and European Union. Mississippi State University, Unpublished.
- [22] McFadden, D. (1974). Conditional Logit Analysis of Qualitative Choice Behavior. In P. Zarembka (ed.), *Frontiers in Econometrics*, Academic Press: New York.
- [23] Malhotra, N.K. (1996). Multidimensional Scaling and Conjoint Analysis. Marketing Research. An Applied Orientation. Second edition. Upper Saddle River, New Jersey: Prentice Hall, Inc., pp.671-683, 709-710.
- [24] National Radiofrequency Committee of Uzbekistan (NRCU). http://www.gkrch.uz/scr_44.html

- [25] NERA/Smith. (1998). Feasibility Study and Cost Benefit Analysis of Number Portability for Mobile Services in Hong Kong. Final Report OFTA, NERA/Smith, London
- [26] Ofel (1997). Economic Evaluation of Number Portability in the UK Mobile Telephony Market. London: Ofel.
- [27] Padberg, D.I., Ritson, C. and Albisu, L.M. (1997). Agro-food Marketing. New York: CAB International, pp.210-219, 263-264, 269-275
- [28] PrimeTass (2007). The Number of Subscribers Increased by 37.6 Percent and Reached 3.74 Million People between January and June in 2007. http://www.sotovik.ru/news/news_28137.html
- [29] Reinke, T.H. (1998). "Local Number Portability and Local Loop Competition: Critical Issues," *Telecommunications Policy*, Vol. 22, pp. 73-87.
- [30] Shin, D.H. (2006). "A Study of Mobile Number Portability Effects in the United States," *Telematics and Informatics*, Vol. 24, pp.1-14.
- [31] Steenkamp, J.B. (1987) "Conjoint Measurement in Ham Quality Evaluation," *Journal of Agricultural Economics*, Vol. 38, pp. 473-480.
- [32] Tull, D.S. and Hawkins, D.I. (1993). Derived Attitude Scales. Marketing Research: Measurement and method. Sixth edition. New York: Macmillan publishing company, pp.406, 413, 416-417, 644, 655-656, 841-845.
- [33] Van den Berg, B., Al, M., Brouwer, W., Van Exel, J., Koopmanschap, M., (2005). "Economic Valuation of Informal Care: The Conjoint Measurement Method Applied to Informal Care Giving," *Social Science & Medicine*, Vol. 61, pp. 1342-1355.
- [34] Wikipedia. Conjoint Analysis. http://en.wikipedia.org/wiki/Conjoint_analysis
- [35] Gans, J.S., and King,S.P. (2001). "Regulating Endogenous Customer Switching Costs," *Contributions to Theoretical Economics*, Vol. 1(1), pp. 1-29.