

Smartphone Adoption: Design of Factors Within the Framework of Theory of Consumption Values



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Abstract After the initial feature mobile phone adoption, there is a widespread smartphone proliferation. The Theory of Consumption Values (TCV) is a marketing theory that explains purchase behavior of consumer goods and services. The framework consists of functional, social, epistemic, hedonic, and conditional values; the latter being functional and/or social values present only in a specific situation. TCV is used in mobile device adoption literature disproportionately more often than in other fields. However, virtually all TCV studies focused on smartphones are qualitative. The aim of this research is to design factors which could be later used in quantitative studies. These factors are identified using principal component analysis. With regards to the results, there were five factors identified for functional values, six factors for social values, three factor for epistemic values, four factors for hedonic values, and seven factors for conditional values.

Keywords Adoption · Smartphone · Theory of consumption values

1 Introduction

According to Kotler et al. (2017, p. 23), “[s]martphones are ever-present, always on, finely targeted and highly personal.” According to Hollensen (2016, p. 542), “[s]martphones make up an increasing share of mobile devices.” With the rise of the

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smartphone penetration on the market, the need for the explanation what are the consumers' motives to own one has arisen. In literature, there exist several studies presenting reasons to buy and use smartphones.

The reason why users need to engage in using smartphones during their leisure time was researched in several studies. One of the main questions that tried to solve and answer was the identification what were the very essential features smartphones offer that influence the users' decision making.

Jung (2014) looked at the benefits one can gain by using a smartphone. As the research showed there were few that could be mention: sense of confidence, amusement (by spending free time during the day), sense of comfort by using a smartphone and restorative as well. When they looked into the functions frequently used on smartphones they found that the very first reason is the core product description: the communication function. Smartphones were more and more used as a tool to be in touch and stay connected through different types of mobile messengers and nowadays more and more important presence on various social networks. Other very important function according to Jung (2014) influencing the decision to own a smartphone was the information search function. Because of these mentioned the usage of a smartphone led to improved socialization, more productive daily life and to the satisfaction of so acquired information. The study showed a strong connection between leisure time and restorative. The users showed important habit of using a smartphone to entertain themselves.

Kim et al. (2013) integrated and extended the traditional theoretical and conceptual behavioural constructs which utilised the cognitive-affective-conative stages framework which went beyond users' intention to use mobile technology and identified the mobile users' engagement motivations' impact which would keep the engaging behaviour while using a smartphone. The results showed that users' engagement was strongly beyond intention and this lead to their future behaviour. They identified three sub-elements of motivations which influenced the users: utilitarian, hedonic, and social motivations. They results confirmed that users have three stages of attitude: cognitive, affective, and conative. Users' satisfaction was increased by users' motivation to engage in using a smartphone. The other factor influencing the users' satisfaction was their social motivation. This study supported why "hedonic and social" motivations were highly related to their continued engagement intention.

In addition, Yeh et al. (2016) found that consumer value and the users' identification with a specific brand predicted a positive brand loyalty. They found emotional value the most significant in creating a brand loyalty toward specific smartphone producer. Other were brand identification, functional value and followed by social value. The interesting outcome of their study was that the effect of functional value on brand loyalty did not change as age decreased which implied insignificant effect of age differences.

Rahim et al. (2016) investigated the factors influencing purchase intention of a smartphone among university students in Malaysia. They focused at the identification of a possible relationship between product features, brand name, social influence, product sacrifice and purchase intention of smartphones. As they confirmed, product features were significantly and positively related to purchase intention of smartphones. Other relevant findings were: there was a significant and positive relationship between brand name and purchase intention and a significant and positive relationship between social influence and purchase intention of smartphones as well. The surprising result of their study among university students was the fact that they were not willing to sacrifice anything with a high value to them to buy a smartphone. To conclude the purchase intention of buying smartphones according to this study was positively related to specific product features, brand name and social influence.

When it comes to social values and perceived ease of use, Haba et al. (2017) found that they did not have a direct nor indirect effect on smartphone purchase intention among Malaysian working professionals. However, perceived usefulness, economic value and brand image had an indirect effect on smartphone purchase intention in their study. Lay-Yee et al. (2013) also tried to identify the factors affecting the costumer intentions to buy a smartphone. They found that most of the smartphone users placed the product features as the highest priority when buying a smartphone. After that came convenience as the second consideration based on their research. They stressed also the importance of a brand in influencing the customer's decision to buy a smartphone. Social influence also had a significant impact on smartphone users purchase decision, where users were referring to friends, family, and other relevant people for them. It also had less impact on affecting the purchase decision as compared to the other selected variables tested in this study.

This paper does not use any Technology Acceptance Model-inspired model but it utilizes the Theory of Consumption Values. The Theory of Consumption Values (Sheth et al. 1990) provides a framework to categorize customer's motives for buying:

- functional values—values related to utility,
- social values—values related to being highly valued by others,
- epistemic values—values related to learning,
- hedonic values—values related to pleasure,
- conditional values—functional and/or social values present only in some situation.

The aim of the paper is to create constructs within the Theory of Consumption Values that could be used for future quantitative research of smartphone adoption. The rest of the paper is organized in the following way: In the next section, there is a description what data were collected and how, and how they were analyzed. In the following section, results of the analysis are presented. The last section offers conclusions.

2 Data and Methodology

Following the framework of Saunders et al. (2012), the following choices were made: the philosophy was chosen to be positivism, the approach was selected to be induction, the methodological choice was mono method quantitative, the strategy was survey, and the time horizon was set to be cross-sectional.

Data were collected using a paper-based questionnaire in 2013. There were 277 respondents, of them 69 were men, 207 were women and one respondent did not provide the information. They were 19–25-years old, average being 20.7. Respondents were students of University of Economics in Bratislava, Slovakia; Prešov University, Slovakia and Pavol Jozef Šafárik University, Slovakia. Overall, 174 respondents owned a smartphone.

Statements for the values were rated on a 1–6 Likert scale, 1 meant fully agree and 6 meant fully disagree; there was no central value in order to avoid the central fixation bias. The questionnaire per se is not provided, and statements are not explicitly mentioned in this section but wording and order of the statements will be provided in Tables 1, 2, 3, 4 and 5 in the next section.

With regards to the data analysis, principal component analysis with VARIMAX rotation is used to generate factors for each value. It is possible that a different rotation method (such as OBLIMIN, QUARTIMAX, EQUAMAX, PROMAX) would lead to different results but VARIMAX rotation was used because the created factors should be later used for a regression, so orthogonality is of essence. SPSS is used for data analysis.

Table 1 Rotated component matrix for functional values

Smartphones	Component				
	1	2	3	4	5
are convenient	0.300	−0.225	0.595	−0.086	−0.094
are unreliable	0.056	0.563	−0.309	0.198	−0.088
difficult to use	−0.287	0.574	0.173	0.205	0.059
are too expensive	−0.109	0.138	0.202	0.594	0.387
are trouble free	0.030	0.005	0.730	−0.121	−0.033
don't have adequate battery life	−0.031	−0.040	−0.120	−0.078	0.774
are too big to carry around	−0.032	0.413	−0.096	0.175	0.499
have difficult-to-use keyboards	−0.026	0.686	−0.227	−0.059	0.248
have screens that are too small	−0.205	0.644	0.065	−0.125	−0.081
save time	0.484	−0.049	0.569	0.147	−0.138
are good time killers	0.032	−0.116	−0.086	0.738	−0.149
improve job performance	0.629	0.204	0.292	0.074	−0.130
deprive me of my privacy	0.169	0.229	−0.244	0.621	0.049
help increase social networks	0.470	−0.210	0.059	0.294	0.307
keep people in touch with friends and family	0.717	−0.157	0.072	0.014	0.071
keep people organized	0.723	−0.071	−0.019	−0.064	−0.110
provide instant information	0.710	−0.204	0.127	0.047	0.008

Table 2 Rotated component matrix for social values

	Component					
	1	2	3	4	5	6
Children (12 and under)	−0.160	0.003	0.072	0.217	0.435	0.567
Teenagers	0.192	−0.050	−0.043	0.241	0.772	0.038
People in their 20s	0.551	0.023	−0.024	0.213	0.638	−0.102
People in their 30s	0.444	0.542	0.027	0.095	0.354	−0.256
People in their 40s	0.156	0.859	0.082	0.066	0.070	−0.062
People in their 50s	−0.076	0.842	0.149	−0.022	−0.068	0.158
People 60 and over	−0.249	0.636	0.340	−0.100	−0.227	0.207
College students	0.719	0.007	−0.081	0.067	0.275	0.063
Salespeople	0.654	0.135	0.011	0.056	0.062	0.074
Unemployed people	−0.104	0.157	0.739	0.053	0.031	0.038
Sole proprietors (small business owners)	0.451	0.035	0.525	−0.094	0.262	0.137
Business travelers	0.671	−0.077	0.214	0.093	0.072	−0.044
Skilled laborers	0.237	−0.116	0.524	0.310	−0.038	−0.392
Musicians	0.144	0.114	0.363	0.286	0.067	−0.070
Factory workers	0.024	0.147	0.640	0.199	−0.199	0.283
Retired people	−0.272	0.170	0.579	−0.109	−0.037	0.311
Business managers	0.788	−0.074	−0.089	0.153	0.034	−0.079
Wealthy people	0.463	−0.039	−0.170	0.383	−0.271	−0.124
Disabled persons	0.196	0.072	0.244	0.095	−0.111	0.678
Highly educated people	0.406	0.186	0.045	0.444	−0.163	0.178
Gamers	0.067	−0.044	0.103	0.692	0.295	−0.083
Mac users	0.086	−0.101	0.028	0.740	0.093	0.096
People wearing designers shoes	0.092	0.092	0.115	0.635	0.113	0.106

3 Results

Rotated component matrix for functional values is provided in Table 1. Based on eigenvalues, five factors were created.

Based on the correlation coefficients from Table 1, it is possible to name these factors:

- 1. Efficacy
- 2. Impracticality
- 3. Comfortability
- 4. Problematic aspects of ownership
- 5. Low comfort

Rotated component matrix for social values is provided in Table 2. Based on eigenvalues, six factors were created.

Based on the correlation coefficients from Table 2, it is possible to name these factors:

Table 3 Rotated component matrix for hedonic values

	Component			
	1	2	3	4
I enjoy the aesthetic appearance of a smart phone	0.234	−0.001	0.798	0.146
I have fun when using a smart phone	0.308	−0.133	0.777	0.028
I worry when I use smart phone	0.018	0.665	−0.043	−0.123
I feel happy when I use smart phone	0.681	0.073	0.413	−0.128
I feel clever when I use smart phone	0.777	0.170	0.266	−0.140
I feel safe when using a smart phone	0.686	0.190	0.210	−0.091
I feel content when using a smart phone	0.696	−0.046	0.421	0.074
I feel angry when using a smart phone	0.081	0.732	0.034	0.013
I feel disappointed when using a smart phone	0.108	0.830	0.042	0.020
I feel confident when using a smartphone	0.766	0.071	0.116	0.199
I feel restless when using a smartphone	0.270	0.759	0.058	0.009
I feel independent when using a smart phone	0.763	0.067	0.074	0.075
I feel more able than others when I use a smart phone	0.790	0.186	0.003	0.114
I feel clumsy when using a smart phone	0.046	0.793	−0.060	0.200
I feel stressed when using a smart phone	0.081	0.827	−0.034	0.168
I feel nostalgic because of my smart phone	0.381	0.555	−0.189	0.101
I feel a sense of belonging when I use my smart phone	0.621	0.241	−0.037	0.361
I feel proud when I use my smart phone	0.753	0.070	0.078	0.325
I feel impatient waiting for the smart phone to do things	0.189	0.019	0.158	0.723
I feel frustrated because of the difficult learning curve	0.106	0.619	−0.070	0.421
I feel trapped because I am restricted to the functions on the smart phone	0.018	0.514	−0.004	0.582

Table 4 Rotated component matrix for epistemic values

	Component		
	1	2	3
Settle disagreements with friends	0.426	0.211	0.038
Get more information about something that sparks my curiosity	0.580	0.504	−0.062
See how smart phones work	0.401	0.520	0.037
Get more in-depth information about items in the news	0.555	0.489	−0.217
Download new applications to see what other people are talking about	0.540	0.449	0.082
Listen to educational audio recordings	0.006	0.034	0.717
Improve skills with applications that help me practice something	0.159	0.747	0.126
Stimulate the mind by playing puzzle or number games	0.035	0.543	0.499
To try out new applications in hope for finding something new and fantastic	0.311	0.599	0.413
Download and read classic literature	−0.086	0.592	−0.089
Explore the capabilities of the smart phone device	0.328	0.590	0.190
Visit social networking sites to satisfy curiosity about friends' activities	0.785	−0.036	0.309
Ping friends for advice	0.768	0.092	−0.166
Surf the web for entertainment	0.697	−0.013	0.438

Table 5 Rotated component matrix for conditional values

	Component						
	1	2	3	4	5	6	7
<i>Using voice communication</i>							
Near a television	0.064	0.038	0.182	0.070	0.253	0.687	0.106
Near a computer	0.283	0.060	0.137	0.137	0.305	0.679	0.133
Near a video game console	0.062	-0.004	0.252	0.102	0.066	0.827	-0.040
Inside your home	0.444	0.154	0.072	0.189	0.360	0.310	0.494
Outside of your home	0.254	0.163	-0.045	0.276	0.666	0.220	0.287
Away from office	0.317	0.228	0.017	0.220	0.581	0.304	0.238
Commuting	0.266	0.103	0.109	0.135	0.839	0.178	0.003
Traveling	0.234	0.136	0.075	0.161	0.787	0.116	-0.083
<i>Using text-based communication</i>							
Near a television	0.761	0.095	0.286	0.125	0.181	0.081	0.055
Near a computer	0.715	0.028	0.376	0.027	0.168	0.215	-0.026
Near a video game console	0.444	-0.041	0.436	-0.013	-0.017	0.469	-0.341
Inside your home	0.791	0.239	0.007	0.247	0.150	0.053	0.223
Outside of your home	0.747	0.225	-0.133	0.242	0.193	0.131	0.173
Away from office	0.777	0.229	-0.093	0.283	0.174	0.112	0.109
Commuting	0.713	0.225	-0.052	0.273	0.430	0.019	-0.172
Traveling	0.617	0.276	-0.075	0.323	0.431	-0.053	-0.103
<i>Accessing entertainment</i>							
Near a television	0.103	-0.032	0.685	0.438	0.148	0.035	0.178
Near a computer	0.050	0.028	0.778	0.317	0.006	0.132	0.139
Near a video game console	-0.046	-0.063	0.716	0.201	-0.008	0.417	-0.108
Inside your home	0.292	0.171	0.338	0.543	0.104	0.016	0.458
Outside of your home	0.216	0.221	0.133	0.720	0.195	0.120	0.217
Away from office	0.244	0.292	0.088	0.751	0.123	0.184	0.134
Commuting	0.276	0.243	0.119	0.727	0.226	0.131	-0.114
Traveling	0.262	0.323	-0.060	0.722	0.260	0.015	-0.117
<i>Web surfing</i>							
Near a television	0.299	0.443	0.604	-0.094	0.137	0.005	0.089
Near a computer	0.013	0.291	0.768	-0.219	0.055	0.085	-0.012
Near a video game console	-0.076	0.220	0.659	-0.046	-0.062	0.358	-0.049
Inside your home	0.242	0.631	0.345	0.059	-0.050	0.090	0.417
Outside of your home	0.147	0.781	0.136	0.233	0.166	0.018	0.214
Away from office	0.229	0.778	0.101	0.237	0.064	0.119	0.198
Commuting	0.225	0.754	0.104	0.254	0.183	0.025	-0.188
Traveling	0.098	0.797	0.058	0.251	0.195	-0.065	-0.143

1. Wealthy people
2. 30+ years old
3. Low income
4. Niche groups
5. 12–29 years old
6. Children and disabled

Rotated component matrix for hedonic values is provided in Table 3. Based on eigenvalues, four factors were created.

Based on the correlation coefficients from Table 3, it is possible to name these factors:

1. Positive feelings connection with smartphone usage
2. Negative feelings connection with smartphone usage
3. Fun and aesthetics
4. Limitations of technology

Rotated component matrix for epistemic values is provided in Table 4. Based on eigenvalues, three factors were created.

Based on the correlation coefficients from Table 4, it is possible to name these factors:

1. Retrieving information from & about friends and from other sources
2. Learning about smartphones and applications
3. Education

Rotated component matrix for conditional values is provided in Table 5. Based on eigenvalues, seven factors were created.

Based on the correlation coefficients from Table 5, it is possible to name these factors:

1. Text-based communication everywhere
2. Web surfing without a cable connection
3. Entertainment and web surfing with cable connection
4. Entertainment and web surfing without cable connection
5. Voice communication out of home
6. Voice communication with cable connection
7. Voice communication inside home

With regards to the results, it is interesting that within functional values (Table 1) high- and low-comfort-related statements created two factors (3 and 5), not one with correlation coefficients with opposite signs for the two groups. Generally, the same thing can be observed within hedonic values (Table 3), the first two factors are positive and negative feelings in connection with smartphone usage. This may link to what Kano et al. (1984) identified as different consumer satisfaction driver types. Namely, must-be features are expected by default; when they are not present, a consumer is dissatisfied, and when they are present, a consumer is only neutral, i.e. not overly satisfied. Low-comfort-related statements from Table 1 and negative

feelings connected to smartphone usage from Table 3 seem to fit the must-be features, i.e. when they are low/absent, a user is neutral. Another type is a delighter/exciter, i.e. a feature that makes a product attractive when present but does not cause a dissatisfaction when missing. This seems to be the case of high-comfort-related statements in Table 1 and of positive feelings connected to smartphone usage in Table 3.

There exists also a one-dimensional satisfaction driver type—when a feature is missing, a consumer is dissatisfied, and when it is present, a consumer is satisfied. Epistemic values (Table 4) were split into three groups that do not involve positive and negative aspects of the same thing but this can be also due to available statements. These values are rather delighter/exciter, not the one-dimensional driver type.

Having a sample of respondents of a certain age may be a limitation. Specifically, it may have possibly influenced the factors calculated for social values (Table 2). Two (of six) factors are 12–29 years old and 30+ years old; the first factor describes the respondents (as mentioned in the second section, they were 19–25-years old, average being 20.7), and the second factor describes people older than them. If respondents were older, it is possible that there would three factors that could be described as younger than them, their age group, and older than them. On the other hand, even with a probabilistic sample, the results may be the same because the threshold age of 30 roughly divides what Prensky (2001) calls digital natives and digital immigrants. Prensky (2001) did not set the threshold value but it is often interpreted that people born after 1980 are digital natives. A later threshold year should be used for Slovakia because (more than 8-bit) computers and networks became more accessible only after the Velvet Revolution in late 1989; it was restricted before because of both the communist regime and the embargo enacted by the Coordinating Committee for Multilateral Export Controls (CoCom).

Statements for conditional values in Table 5 grouped somewhat within the framework used in the questionnaire text-based communication, voice communication, entertainment and web surfing. Only two factors cover a combination of two, namely entertainment and web surfing; it may be because web surfing replaces other sources of entertainment especially for young people, i.e. digital natives.

4 Conclusion

The aim of the paper was to design factors within the Theory of Consumption Values that could be in future used in quantitative studies for smartphone adoption or continued use or for smartphone brand loyalty research. Since (linear or logistic) regression (which requires uncorrelated independent variables) is the most likely method that will be used in future research which will use these factors, factor analysis with VARIMAX rotation was used to group statements within five consumption values. Other than VARIMAX rotation would possibly lead to factors that are inter-correlated.

Eventually, five factors were identified for functional values, six factors for social values, three factors for epistemic values, four factors for hedonic values, and seven factors for conditional values. Loadings for certain variables were relatively low. It is possible to exclude them; this may lead to different composition of factors. Using a different rotation will most likely also lead to different composition of factors. The factors presented in the paper should hold well for a sample consisting of respondents in their late teen age and in their early twenties. It is not possible to refute a possibility that social values would be grouped differently in case of older respondents. If only older respondents are used, it is possible that entertainment would not be merged with web surfing within conditional values as these people may use more traditional forms of entertainment in a greater extent.

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References

- Haba, H. F., Hassan, Z., & Dastane, O. (2017). Factors leading to consumer perceived value of smartphones and its impact on purchase intention. *Global Business and Management Research: An International Journal*, 9(1), 42–71.
- Hollensen, S. (2016). *Global marketing* (7th ed.). Harlow: Pearson.
- Jung, Y. (2014). What a smartphone is to me: Understanding user values in using smartphones. *Information Systems Journal*, 24(4), 299–321.
- Kano, N., Seraku, N., Takahashi, F., & Tsuji, S. (1984). Attractive quality and must-be quality. *Journal of the Japanese Society for Quality Control (in Japanese)*, 14(2), 39–48.
- Kim, Y. H., Kim, D. J., & Wachter, K. (2013). A study of mobile user engagement (MoEN): Engagement motivations, perceived value, satisfaction, and continued intention. *Decision Support Systems*, 56(1), 361–370.
- Kotler, P., Armstrong, G., Harris, L. C., & Piercy, N. (2017). *Principles of marketing* (7th European ed.). Harlow: Pearson.
- Lay-Yee, K. L., Kok-Siew, H., & Yin-Fah, B. C. (2013). Factors affecting smartphone purchase decision among Malaysian generation Y. *International Journal of Asian Social Science*, 3(12), 2426–2440.
- Prensky, M. (2001). Digital natives, digital immigrants. *On the Horizon*, 9(5), 1–6.
- Rahim, A., Safin, S. Z., Kheng, L. K., Abas, N., & Ali, S. M. (2016). Factors influencing purchasing intention of smartphone among university students. *Procedia Economics and Finance*, 37, 245–253.
- Saunders, M., Lewis, P., & Thornhill, A. (2012). *Research methods for business students* (6th ed.). Harlow: Pearson Education.
- Sheth, J. N., Newman, B. I., & Gross, B. L. (1990). *Why we buy what we buy: A theory of consumption values*. Cincinnati, OH: South-Western Publishing.
- Yeh, C.-H., Wang, Y.-S., & Yieh, K. (2016). Predictive smartphone brand loyalty: Consumer value and consumer – brand identification perspectives. *International Journal of Information Management*, 36(3), 245–257.