

Nikou, Shahrokh; Bouwman, Harry

Conference Paper

Mobile service platform competition

19th Biennial Conference of the International Telecommunications Society (ITS): "Moving Forward with Future Technologies: Opening a Platform for All", Bangkok, Thailand, 18th-21th November 2012

Provided in Cooperation with:

International Telecommunications Society (ITS)

Suggested Citation: Nikou, Shahrokh; Bouwman, Harry (2012) : Mobile service platform competition, 19th Biennial Conference of the International Telecommunications Society (ITS): "Moving Forward with Future Technologies: Opening a Platform for All", Bangkok, Thailand, 18th-21th November 2012, International Telecommunications Society (ITS), Calgary

This Version is available at:

<https://hdl.handle.net/10419/72515>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

**Proceedings of the 19th ITS Biennial Conference 2012
Bangkok, Thailand**

Mobile Service Platform Competition

By

Shahrokh Nikou and Harry Bouwman

Mobile Service Platform Competition

Shahrokh Nikou
Åbo Akademi University (IAMSIR) & TUCS
Snikou@abo.fi

Harry Bouwman
Delft University of Technology & (IAMSIR)
W.A.G.A.Bouwman@tudelft.nl

Abstract

Mobile service platforms are becoming particularly important as play a significant role in consumers' decisions to accept, adopt and use mobile services and applications. Literature on mobile service platforms focuses mainly on strategic issues in managing multi-sided platforms and economic issues of two sided markets, still literature is highly conceptual and empirical research on the awareness and preferences of consumers is lacking. Yet, there is a lack of empirical research on platforms developed by mobile network operators. By making use of conjoint analysis, 62 Finnish respondents participated in an empirical study. The conjoint analysis results show that application costs and type of operating system are the most important criteria to make a decision and the provider of the service platform is not of the concern. However, consumers value issues such as security and privacy arrangement which are often guaranteed by network operators. Our findings have three suggestions to mobile network operators: (1), they settle for becoming a bit-pipe provider, (2), open their platforms, and (3), let other market competitors such as Apple, Google, Facebook be responsible for providing mobile services and applications.

Keywords: Mobile Service Platforms, Device Manufacturers, Service Provide-Centric Platform, Operator-Centric Platform, Application Cost.

1. Introduction

Mobile service platforms are becoming increasingly important due to the exponential growth of the mobile services and applications. Yet, they play a major role in consumers' decisions to accept, adopt and use mobile services and applications. It has been argued that after several years of increasing technological fragmentation, mobile telecommunications industry is now in the period of platformization (Ballon, 2009). Poel, Renda, and Ballon (2007) defined a mobile service platform as a hardware configuration, a software framework or an operating system. Literature on mobile service platforms focuses mainly on strategic issues in managing multi-sided platforms or to a lesser degree on economic issues of two sided markets (Rochet and Tirole, 2010). Still, literature is highly conceptual and empirical research on the perceptions, awareness, and preferences of consumers to a large extent is lacking. Prior studies, if not all, have focused on issues –like mobile operating systems or application stores and empirical research that take platforms developed by mobile network operators into consideration remains scant.

Mobile network operators used to have a dominant position in mobile service market with their so called walled garden strategy. In this model, data and resources are strictly available only for their own use and application developers have to follow often very restricted rules set by network operators for participation in application development process. However, the situation is now changed and the network operators' good days have come to an end due to the entry of device manufacturers e.g., Apple and full IP-based companies e.g., Google in mobile service provisioning market. These new market players have been able to attract consumers' attentions with their (often) innovative mobile services and applications. Device manufacturers such as Apple, Nokia and Samsung and full IP-based companies such as

Google with their own App-stores and operating systems use different strategies and business models to transform the mobile service market; therefore a fierce competition has been emerged among all players in mobile communications sector. As a result, it has been recommended that mobile network operators should open their assets and resources to third parties' participations to remain in market competition (Raivio, Luukkainen and Juntunen, 2009; Yoon, 2007). Thus in recent years, several network operators such as Vodafone, O2 and Orange have already taken the open Telco initiative to optimize their App-stores by providing technological supports e.g., Application Programming Interface (API) and Software Development Kits (SDKs) to application developers in order to create and offer compelling mobile services and application.

Insofar as, the type of a platform (open vs. closed) although plays a significant role, it is not the main issue and other relevant platforms' layers and modules such as application cost, provider of the platform and mobile operating systems are significant factors which need to be dealt with.

The core objective of the current study is to investigate how platforms developed by mobile network operators are perceived by consumers in this emerging market and how they can compete with other platform providers. To do so, an empirical study which makes use of conjoint analysis approach will be conducted. The motivation behind using conjoint analysis is its viability to assess how users value different features that make up a service or product (Bouwman and Janssen, 2010). As such, the results of the study on consumers' preferences will have some important practical and theoretical implications. The theoretical implications address the gaps found in Information System Research with regard to characteristics of mobile service platform. It provides practical clues to practitioners with regard to the platform competition between the Telco's vs. device manufacturers/ full IP-based companies'.

The remaining part of the paper is organised as follows. Section 2 provides literature review on mobile service platform. Section three introduces the research methodology and illustrates different stages in conducting a conjoint analysis study. Section four provides the research results and section 5 presents discussions, conclusion and limitations.

2. Mobile Service Platform Providers

Due to the continuous technological advances and the emergence of mobile service platforms, mobile communications industry has become highly dynamic (Basole and Karla, 2011). Therefore, multitude market opportunities have been emerged in recent years and have opened a gate for the participation of the new participants e.g., device manufacturers and full IP-based companies. Moreover, some of the players with strong market position such as mobile network operators have thus re-positioned themselves to go beyond their core business. Furthermore, they have also extended their activities to neighbouring value chain stage and have become e.g., content provider, service platform or portal provider. Thus, it is not possible to conceptualization mobile business market as a linear and one dimensional supply chain process anymore (Li and Whalley 2002; Peppard and Rylander 2006). Consequently, Basole (2009) and Rosenkopf and Padula, (2008) have described the mobile industry as a complex ecosystem with various inter-company leaderships across various segments. A mobile service platform coordinates interactions between two distinct entities: mobile handsets and applications in mobile communication. Mobile service platforms have become an integral part of mobile communication ecosystems after tremendous growth in mobile applications and smart-phones usage. Service platforms can provide capabilities and supports for third parties and service developers. Service delivery and how end-users obtain mobile services have thus undergone profound changes. To the best of our knowledge, the most widely used platforms are offered through mobile network operators, device manufacturers and IP-based companies. In platform discussions, there are highly relevant layers and modules e.g., security and privacy arrangement, application cost (free vs. payable), type of platform (open vs. closed), mobile operating systems (iOS, Android to name a few), and platform provider (network operator, device manufacturers and full IP-based companies) which will be covered in the following subsections.

2.1 Mobile Network Operator Centric Platform

In this model, network operator acts as a portal provider and end-users access services via the operator portal. The approach taken by network operators is called walled garden (Vodafone Live is an example of operator-centric platforms). It is noteworthy to mention that this approach has largely been terminated in Europe, but still play an important role in Japan (Weber, Hass, and Scuka, 2011). The main reason to have walled garden strategy is the tendency to be protective of their customers and networks. The main problem with this model is, it imposes strong selection criteria on the services that content providers and application developers can offer (Jaokar and Fish, 2006). Developers are required to pay certain commission fee for using the Telecom portal as a channel for service distribution and are bound to a predefined format. Selected developers and partners are given the tools and supports to develop services specifically for the operators' portal. As a result, mobile network operators often have only a limited number of applications and services available to end-users. However, owning the network infrastructure gives network operators an advantage to leverage their trusted image as well as superior privacy and security arrangements to retain customers (Chen and Lu, 2011). To this end, it can be argued that network operator-centric platforms are typically closed and offer a limited number of services, private, secure and reliable services.

2.2 Device Centric Platform

In this model, the service platform corporate between the mobile device (in the form of mobile operating system) and application store. Several device manufacturers provide their own operating system and App-store: Nokia with Symbian (Ovi), Apple with iOS (App-store), Research in Motion with BlackBerry (BlackBerry App World), and HTC with Android (Google Play). Developers can participate in the creation and development process of mobile services and applications through the Software Development Kit (SDK) provided by device manufacturers. End-users can access and obtain mobile services and applications through App-stores. Vast variety of applications can be found in App-stores either for free or to be purchased. Apple and BlackBerry platforms are relatively strictly governed (called closed platform) and have placed restrictions on developers and third party participation for using the platform (De Reuver et al., 2011). Whereas, platform provided by Google and Nokia are usually have less restrictions (called open platform) and developers can engage in service creation freely. Moreover, applications and services provided by device manufacturers are often unlimited in number and end-users can download their preferred application free of charge or for advance service they need to pay a certain fee. Customers' security and privacy arrangement can be considered as a major challenge for device manufacturers.

2.3 Service Provider Centric Platform

The third types of platforms is called service provider-centric such as Google and Facebook and they are known as open platforms, which means application developers can easily participate in service creation and development. Although Google can also be considered as a device manufacturer e.g., with their Nexus One smart-phone, nonetheless, in the current study, it is considered as a service provider centric platform only. Safeguarding customers' security and privacy arrangement is an issue that can potentially loosen the service providers' position in communication market. In fact, in this model the service providers do not own the network infrastructure, thus they cannot ensure the privacy and security arrangement which in turn could adversely affect the end-user's experience. Applications provided can be obtained via their App-stores such Facebook with App Center and Google with Google Play. Mobile service platforms are basically different with respect to the operating system, but this may have implications on security and privacy arrangements. Furthermore, several other elements such as type of platform (open or closed), the number of available applications (limited or unlimited) and application cost (free or payable) may also have implications on end-users preferences. Table one summarizes the main characteristics of each platforms discussed earlier. These similarities and differences will be later used to design a conjoint analysis questionnaire.

Table 1 Mobile service platforms' characteristics

Characters	Service Platform		
	Network Operator -Centric Platform	Device-Centric Platform	Service Provider- Centric Platform
Operating Systems	-NA-	Apple (iOS), Nokia (Symbian), BlackBerry OS	Google (Android)
Privacy Arrangement	Guaranteed	Best Effort Delivery	Best Effort Delivery
Security Arrangement	Guaranteed	Best Effort Delivery	Best Effort Delivery
Number of Application	Limited	Unlimited	Unlimited
Application Cost	Payable/Free	Payable/Free	Payable/Free
Type of Platform	Closed	Closed/Open	Open

In addition to the characteristics of different platforms and based on the conjoint analysis requirements, several constructs which significantly affect users' intentions to choose and use a mobile service platform have been identified for the purpose of this study to be used in the questionnaire. A short introduction is given below for each of the constructs.

1. Intention to choose a platform: shows how various features composing a mobile service platform are attractive to end-user and influence their intention to choose a particular mobile platform (Hammershøj, Sapuppo, and Tadayoni, 2009).
2. Intention to switch to a new platform: shows what are the end-users' intentions with regard to changing to a new handset with a new platform.
3. Intention (likelihood) to use more applications: shows if mobile services and applications are attractive to users and can provide values that they do not possess yet.
4. Willingness to pay more for application: shows how much end-users are willing to pay for using and downloading new applications (Bauer et al., 2005).
5. Intention to download more applications: shows if the availability of advanced applications offered by a particular service platform is attractive for end-users.
6. Performance enhancement: shows how using a particular platform can improve and enhance users' daily tasks performance, in other words, if the platform fits in the users' day-to-day routine, then they might be able to organize their daily tasks in an easier, more efficient and more effective way.
7. Willingness to pay more for monthly subscription: shows end-users' willingness to pay more for their monthly subscriptions for using a service platform (Urban, 2007).

3. Research Methodology

Conjoint analysis can be used to determine, measure, and predict consumers' behaviour. Moreover, it shows how consumers value different features that define a product or a service (Green and Srinivasan, 1978; Srinivasan, 1978). Conjoint analysis is by far the most widely used approach in marketing research (Green, Krieger, and Wind, 2001; Nikou, Bouwman, De Reuver, 2012a; Nikou, Bouwman, and De Reuver, 2012b). Conjoint analysis often involves in the trade-offs consumers make while choosing different features of products or services. Conjoint analysis has significant advantage over the other statistical methods. Conjoint analysis unlike traditional methods assumes that there are several factors influencing the decision process of end-users simultaneously. Moreover, conjoint analysis estimates the importance value that consumers place on several features of a service or product while making purchasing decision. Ordinary least squares regression or logit analysis can be used to obtain importance values or utilities from respondents' answers. In traditional survey approaches often respondents are asked to estimate how much value they place on each attribute, while on the contrary, conjoint analysis captures the consumers' preferences in a series of choices or ratings.

3.1 Design of the Conjoint Instrument

There are important steps in designing a conjoint analysis which must be followed. The first step is to determine which method is going to be used for the data collection e.g., online survey or pen-and-paper questionnaire. The second step is to identify the attributes and their levels (the product features). In conjoint analysis the levels of attributes describing a service or product are combined together to form a description of hypothetical bundles (Lee et al., 2006). Several attributes and levels were derived with regard to the mobile service platforms discussed in section 2 (see table 2). Next step is to choose an appropriate conjoint analysis approach. Based on the review of the previous studies where the conjoint analysis was used (Kohne, Totz, and Wehmeyer, 2005; Pagani, 2004; Shin, Kim, and Lee, 2010; Van de Wijngaert and Bouwman, 2009), full-profile conjoint analysis (also known as full-concept) approach was chosen to be used. In full profile, it is possible to assess what users truly value in a product or a service (estimating the utilities). Moreover, full profile conjoint assumes that all of the attributes are independent from each other. In general, conjoint is an appropriate approach when the number of attributes is not very large. Participants in the research project are requested to rank, rate or score a set of profiles (cards) according to their preference, one at a time. In a full-profile conjoint analysis, each profile (card) describes a complete product or service consisting of a different combination of levels of all attributes. The levels and attributes as used in the current study are summarized in table 2.

Table 2 Attributes and the levels of attributes

Attributes	Levels			
	Operating Systems	Symbian (Nokia)	iOS (Apple)	Android (Google)
Service Platform	Operator-Centric Platform		Device-Centric Platform	Service-Provider Centric Platform
Privacy Arrangement	Guaranteed		Best Effort Delivery	
Security Arrangement	Guaranteed		Best Effort Delivery	
Number of Application	Limited		Unlimited	
Free vs. Payment Apps	Free		Payable	
Type of Platform	Open		Closed	

3.2 Conjoint profile cards and orthogonal design

Full profile conjoint approach consists of all the possible combinations of the attributes and levels. In the current study the combination of all the attributes and levels creates 384 (4 x 3 x 2 x 2 x 2 x 2 x 2) possible service profiles/conjoints. Based on previous research, Johnson and Orme (1996) and Pignone et al., (2011) suggest that it would be a tedious task for respondents to answer all the questions when the number of profiles is too high. Therefore, to make the task easier for respondents, full profile conjoint analysis uses what is termed as fractional factorial design to present a suitable fraction of all possible combinations of profiles. The resulting set is called orthogonal array. Orthogonal array/design considers only the main effect of each attribute level, and not the interaction effects between attributes. In the current study, SPSS software version 18 was used to generate the orthogonal design, resulting in 16 unique cases/cards or stimuli out of the 384 possible service profiles which are small enough to include in a survey and large enough to assess the relative importance of each attributes and their levels (see appendix 1). Then, seven questions related to the dependent variables were formulated (see section 2.3, and for a more detailed description appendix 1). The last issue that needs to be addressed is the utility and part-worth in conjoint analysis. Analysis of the data is done with the conjoint procedure (command syntax) and results in a utility score. These utility scores are called a part-worth, for each attribute level. The obtained utility scores provide a quantitative measure of the preference for separate parts of the product (assigned to the multiple attributes). The larger values indicate greater preference.

3.3 Sampling

Data was collected by making use of a web questionnaire as well as a paper-and-pencil questionnaire that was distributed in one of the Finnish Universities. The data was collected in

February-March 2012. A short description explaining the different layers and modules in service platform was provided to respondents. The questionnaire was pre-tested by 10 experts and smart-phone users who were familiar with the conjoint analysis as well as mobile communication services to check the accuracy of the questionnaire and possible ambiguous expressions. Finally, adjusted questionnaire was distributed among 85 respondents. We obtained 62 (response rate 73%) complete questionnaires back in response. Potential participants were 72.58% male and 27.42% were female with the average age 28.74 years. The majority of the respondents owned a smart-phone (74.19%) and all of the respondents held some sort of academic degree (see table 3).

Table 3 Respondents' background information

Platform/ operating Systems	Android (Google) 29.3% (N=18)	iOS (Apple) 22.58% (N=14)	BlackBerry OS (BlackBerry) 4.8% (N=3)	Mobile Widows (Microsoft) 4.8% (N=3)	Symbian (Nokia) 27.41% (N=17)	Others 8% (N=5)
Occupation	Working at Telecom 1.61% (N=1)		Working at another firm 9.67% (N=6)		Student 72.58% (N=45)	Other 15.18% (N=9)
Education	Bachelor 51.61% (N=32)		Master 29% (N=18)		PhD 11.30% (N=7)	Other 14.51% (N=3)
Smart-phone	Yes: 74.19% (N=46)			No: 25.81% (N=16)		
Gender	Female 27.42% (N=17)			Male 72.58% (N=45)		
Age	From 21 to 70 (Average 28.74)					

4. Results

The conjoint analysis results show that conjoint (service profile) 11 has received the highest utility value in all seven dependent variables questions with the average value of 4.59 based on the respondents' preferences. In this service platform, security and privacy arrangements are guaranteed and users have freedom to download unlimited free applications, see table 5.

Table 5 Highest utility value

Card ID	Operating Systems	Service Platform Provider	Privacy Arrangement	Security Arrangement	Number of Application	Application Cost	Type of Platform
Conjoint 11 with utility value = 4.59	Android (Google)	Device-centric Platform	Guaranteed	Guaranteed	Unlimited	Free	Open

Generally speaking, this is apparently by far the most attractive service platform to the respondents, because when they were asked to state their intention to choose a platform, service profile 11 has received the highest score; Table 6 shows the mean and standard deviation value for conjoint 11. On the other hand, conjoint (service profile) 6 has received the lowest score and it is considered as the least important service platform. In this service platform, there is limited number of applications and end-users have to pay to obtain mobile services/applications. Moreover, security and privacy related issues are on the basis of best effort delivery, see table 6 for more details).

Table 6 Intention to choose & to switch, likelihood to use, wiliness to pay, intention to download, life efficiency

Card ID	Q1	Q2	Q3	Q4	Q5	Q6	Q7
Highest Score (Conjoint 11)	$\mu = 4.98$ SD=1.86	$\mu = 4.77$ SD=1.82	$\mu = 4.74$ SD=1.86	$\mu = 3.69$ SD=1.98	$\mu = 4.94$ SD=1.73	$\mu = 4.18$ SD=2.00	$\mu = 3.37$ SD=2.07
Lowest Score (Conjoint 6)	$\mu = 2.35$ SD=1.43	$\mu = 2.08$ SD=1.20	$\mu = 2.31$ SD=1.44	$\mu = 2.03$ SD=1.44	$\mu = 2.18$ SD=1.51	$\mu = 2.33$ SD=1.33	$\mu = 1.85$ SD=1.30

Furthermore, results show that respondents are willing to pay more for conjoint 11 ($\mu = 3.69$, SD= 1.98, N=62) and less for conjoint 6 ($\mu = 2.03$, SD= 1.44, N=62). It means that end-users are only ready to pay more for service platforms which are attractive to them and fits into

daily task routines. Although respondents are willing to switch from their current platform to a new one ($\mu= 4.14$, $SD= 1.76$, $N=62$), they are not willing to pay high fee to adopt a new service platform ($\mu= 2.60$, $SD= 1.66$, $N=62$).

4.1 Conjoint analysis results

In order to see how different attributes of mobile service platforms used in the conjoint profiles contributed to the different dependent variables, like intention to use and switch from current platform to a new one, willingness to pay, et cetera, it is recommended to check if the data have met certain conjoint requirements. Moreover, the validity of the conjoint model has to be evaluated by checking the value of Pearson's r as well as Kendall's tau (Orme et al., 1997; Sorenson and Bogue, 2005). Pearson's r and Kendall's tau values are recommended to be ($>.80$) and ($>.70$), respectively. All models used in this study had values above the recommended benchmark values, indicating that there is a strong relationship between the rating and the utilities. Simple dummy variable regression was used to evaluate the utility of the attributes.

For the majority of the respondents, Google (Android) operating systems and application cost are the most relevant criteria. When they are asked to state their preferences with regard to choosing a service platform or switching from one service platform to another one, Android OS is the most influential criterion to them. While, when the respondents were asked to state their opinions with regards to willingness to pay and intention to use/download more application, application cost is the most important criterion to make decision. It is noteworthy that BlackBerry and Symbian OSs have the highest negative utility. Indicating that these past leaders, especially with the death of Symbian OS, are relegated to the bottom of the market and the may eventually be dropped out entirely as they are in real danger, see table 7.

Table 7 Conjoint results for the dependent variable questions, Q1-Q4

Attributes	Levels of Attributes	Q1, I would choose this platform		Q2, I would switch to this platform from my current platform		Q3, I would use more applications		Q4, I would be willing to pay more for mobile applications	
		Utility	Importance	Utility	Importance	Utility	Importance	Utility	Importance
Operating Systems	Symbian (Nokia)	-.332	29%	-.346	31%	-.287	19%	-.300	31%
	iOS (Apple)	.366		.351		.179		.274	
	Android (Google)	.428		.516		.268		.365	
	BlackBerry OS (BlackBerry)	-.462		-.521		-.159		-.339	
Service Platform	Operator Centric Platform	.040	4%	-.110	7%	.016	7%	-.023	8%
	Device Centric Platform	.048		.140		.089		.095	
	Service Provider Centric platform	-.088		-.030		-.105		-.072	
Privacy Arrangement	Guaranteed	.093	6%	.162	10%	.094	6%	.71	6%
	Best Effort Delivery	-.093		-.162		-.094		-.71	
Security Arrangement	Guaranteed	.219	14%	.227	13%	.186	13%	.141	12%
	Best Effort Delivery	-.219		-.227		-.186		-.141	
Number of Application	Limited	-.139	9%	-.137	8%	-.155	11%	-.101	9%
	Unlimited	.139		.137		.155		.101	
Application Cost	Free	.448	28%	.365	21%	.562	39%	.280	25%
	Payable	-.448		-.365		-.562		-.280	
Type of Platform	Open	.138	10%	.163	10%	.073	5%	.099	9%
	Closed	-.138		-.163		-.073		-.099	
Pearson's r		.998	p<.000	.975	p<.000	.995	p<.000	.958	p<.000
Kendall's tau		.967	p<.000	.900	p<.000	.933	p<.000	.900	p<.000

As for questions concerning the respondents' intention to choose a platform or switch from their current platform to a new one (question 1 & 2), the conjoint results show a similar pattern for both questions. Operating system has the highest importance value (29%) and (31%) respectively for question 1 and 2; within this attribute, Google (Android) operating system has the highest utility value of (Q1= .465) and (Q2= .565). With regard to the second most important attribute, application cost received the highest importance rate (Q1= 28%, utility value for free application= .488) and (Q2= 21%, utility value of free application= .365). Moreover, BlackBerry OS has the negative utility value (Q1= -.462) and (Q2= .521), for more detail see table 7.

With regard to the intention to use more applications (question 3) and willingness to pay (question 4), we can observe that application cost in question 3 and operating systems in question 4 are utmost important criteria for the respondents. The results indicate that the respondents are intended to use more applications if they are offered free applications, as this criterion attributes to positive utilities (.562). Moreover, with regard to willingness to pay (question 4) respondents are more concerned about the operating systems available in service platforms and Android OS has the highest positive utility value (.365).

Next, the conjoint results for the remaining dependent variables (question 5-7) are presented. With regard to intention to download more applications (Q5), organizing life much easier (Q6), and willingness to pay more for monthly subscription (Q7) application cost has the highest importance rate (40%) and (30%), and (29%) respectively, see table 8. Free application attributes to a positive utility value of (Q5= .678), (Q6= .363) and (Q7= .346). Interestingly, type of platform in question 5 (6%), privacy arrangement in question 6 (3%) and again type of platform in question 7 (8%) have the lowest importance rates.

Table 8 Conjoint results for the dependent variable questions, Q5-Q7

Attributes	Levels of Attributes	Q5, I would download more applications		Q6, I would be able to Organize my life much easier, efficient and effective		Q7, I would be willing to pay more for my monthly subscription	
		Utility	Importance	Utility	Importance	Utility	Importance
Operating Systems	Symbian (Nokia)	-.264	18 %	-.307	24 %	-.201	20 %
	iOS (Apple)	.074		.244		.123	
	Android (Google)	.351		.261		.249	
	BlackBerry OS (BlackBerry)	-.161		-.198		-.171	
Service Platform	Operator Centric Platform	-.035	7 %	-.049	11 %	-.057	9 %
	Device Centric Platform	.129		.152		.133	
	Service Provider Centric platform	-.094		-.103		-.075	
Privacy Arrangement	Guaranteed	.157	9 %	.036	3 %	.119	10 %
	Best Effort Delivery	-.157		-.036		-.119	
Security Arrangement	Guaranteed	.190	11 %	.185	16 %	.153	13 %
	Best Effort Delivery	-.190		-.185		-.153	
Number of Application	Limited	-.150	9 %	-.105	9 %	-.126	11 %
	Unlimited	.150		.105		.126	
Application Cost	Free	.678	40 %	.363	30 %	.346	29 %
	Payable	-.678		-.363		-.346	
Type of Platform	Open	.095	6 %	.088	7 %	.097	8 %
	Closed	-.095		-.088		-.097	
Pearson's r		.996	p <.000	.995	p <.000	.988	p <.000
Kendall's tau		.983	p <.000	.950	p <.000	.850	p <.000

5 Discussions, conclusion and limitations

The core objective of the current study was to examine how different attributes of mobile service platforms, especially platforms developed by mobile network operators were perceived and rated by the respondents who were participated in this research project. Service platform characteristics e.g., operating systems, platform provider, security and privacy arrangement, number of applications, cost of applications and type of platform which were examined in this study are considered to be the most relevant factors that impact users' behaviours and decisions. The study findings show that respondents are highly concerned with the application costs and the types of operating system, as these attributes are by far the most important criteria for adopting/choosing a platform. Strikingly, results indicate that provider of the service platform, (i.e., device-centric, service provider-centric or mobile network operator-centric platforms) does not play a significant role in the decision of the respondent while adopting a service platform. But, if they have to choose a platform, respondents prefer to adopt platforms provided by device manufacturers or full IP-based companies. It can be speculated that consumers do not have an interest in the platforms' provider as such, but that indirectly the openness of platforms for free apps and Google (Android) and Apple (iOS) operating systems are decisive.

While there is a lot of discussion in the professional and scientific domain as to whether operators or device makers should provide a platform; discussions on platform does not play a significant role for consumers. For end-users, tangible issues like application costs and brand of the device are much more important than intangible features like privacy and security related issues. The findings also suggest that device manufacturers and full IP-based service platform providers will continue to have a lot of leverage and power over network operators because users still choose the platform based on the device. The findings indicated that respondents are willing to adopt new platforms or change their current platform to a new one, only when buying a new phone, but the willingness to pay for mobile applications and more subscription fee is relatively low. It can be wondered to which degree consumers are aware that with the choice for a specific brand of mobile phone, they are also interlocked into a specific platform. Most probably they are aware of the difference among the iOSs, mobile Windows and the Android platform, but not of the fact that they implicitly choose for a service provider or a network provider platform.

The findings of this study may have a number of implications for mobile service platform providers. The result supports our suggestion that, the battle between different platform providers should closely be taken into consideration. Platform providers should pay close attention to mobile operating systems and the application costs. Network operators-centric platform can leverage their network infrastructures to gain competitive market advantage by providing services according to the users' demand especially with regard to security and privacy issues. All-IP service providers and device manufacturers have relatively weak position to provide reliable security and privacy arrangements.

As any other scientific research, this study has number of important limitations that need to be mentioned. The sample consists of students who may not have a good financial status and that may impact their willingness to pay for downloading and using more mobile services and application. A limitation lies in the fact that the respondents in this study are not representative of any population, due to the fact that the focus of conjoint analysis is to give important conceptual insights. On a methodological level, this study has used an orthogonal design that focuses on the main effects and not on interaction effects. In future research, it can be discussed whether for instance privacy issues and security are unrelated. Moreover, there are other questions in need of further investigation, for example; a more extensive survey has to be conducted in order to see whether respondents in different countries have different opinions with regard to mobile service platforms.

Reference:

- Ballon, P. (2009). The platformisation of the European mobile industry, *Communications & Strategies*, Dossier: Changeover in the mobile ecosystem, no. 75, 3rd Quarter 2009, pp.15-33.
- Basole, R.C. (2009). Visualization of inter-firm relations in a converging mobile ecosystem. *Journal of Information Technology* 24(2), 144–159.
- Basole, R.C., and Karla, J. (2011). On the Evolution of Mobile Platform Ecosystem Structure and Strategy. *Business and Information Systems Engineering*, 3(5), 313-322.
- Bauer, H., Barnes, S., Reichardt, T., and Neumann. (2005). Driving Consumer Acceptance of Mobile Marketing: A Theoretical Framework and Empirical Study. *Journal of Electronic Commerce Research*, 6(3), 181-192.
- Bouwman, H and Janssen, M. (2010). Dealing with technology and actor views in designing ICT service systems. *Journal of Design Research*, 8(4), 359-374.
- Chen, X and Lu, T. J. (2011). The Core Applications and Experience of Typical 3G Operators. *Advanced Materials Research*, 204(210), 1536-1539.
- De Reuver, M., Bouwman, B., Prieto, G., and Visser, A. (2011). Flexible service platforms. *Futures*, 43(9), 979-985.
- Green, P. E and Srinivasan, V. (1978). Conjoint analysis in consumer research: issues and outlook. *Journal of consumer research*, 5(2), 103-123.
- Green, P. E., Krieger, A. M., and Wind, Y. (2001). Thirty years of conjoint analysis: Reflections and prospects. *Interfaces*, 31(3), 56-73.
- Hammershøj, A., Sapuppo, A., and Tadayoni, R. (2009). Mobile Platforms, An analysis of Mobile Operating Systems and Software development platforms. Available at: http://vbn.aau.dk/files/19198582/Mobile_Platforms.pdf (accessed 18 August 2012).
- Jaokar, A., and Fish, T. (2006). *Mobile Web 2.0., The innovator's guide to developing and marketing next generation wireless/mobile applications*. London: Futuretext, 2006, pp.108-109.
- Johnson, R. M and Orme, B. K. (1996). How many questions should you ask in choice-based conjoint studies? Research Paper Series, Sawtooth Software. Available from <http://www.sawtoothsoftware.com/download/techpap/howmanyq.pdf> (accessed 18 August 2012).
- Kohne, F., Totz, C. and Wehmeyer, K. (2005). Consumer preferences for location-based service attributes: a conjoint analysis. *International Journal of Management and Decision Making*, 6(1), 16-32.
- Lee, J., Cho, Y., Lee, J. D. and Lee, C. Y. (2006). Forecasting future demand for large-screen television sets using conjoint analysis with diffusion model, *Technological Forecasting and Social Change*, 73(4), 362-376.
- Li, F., and Whalley, J. (2002). Deconstruction of the telecommunications industry: from value chains to value networks. *Telecommunications Policy* 26:451–472.
- Nikou, S., Bouwman, H. and De Reuver, M. (2012a). Mobile Converged Rich Communication Services: A Conjoint Analysis. In: proceeding of 45th Hawaii International Conference on System Science, pp.1353-1362.
- Nikou, S., Bouwman, H. and De Reuver, M. (2012b). The Potential of Converged Mobile Telecommunication Services: A Conjoint Analysis. *info*, 14(5), 21-35.
- Orme, B.K., Alpert, M.I., and Ethan, C. (1997). Assessing the Validity of Conjoint Analysis. Research Paper Series, Sawtooth Software. Available from: http://business.nmsu.edu/~mhymn/M310_Articles/CA_Validity.pdf (accessed 20 August 2012).
- Pagani, M. (2004). Determinants of adoption of third generation mobile multimedia services. *Journal of Interactive Marketing*, 18(3), 46-59.
- Peppard, J., and Rylander, A. (2006). From value chain to value network. *European Management Journal* 24(2), 128–141.
- Pignone, P., Brenner, A., Hawley, S., Sheridan, S., Lewis, C., Jonas, D., and Howard, K. (2012). Conjoint Analysis Versus Rating and Ranking for Values Elicitation and Clarification in Colorectal Cancer Screening. *Journal of General Internal Medicine*, 27(1), 45-50.
- Poel, M., Renda, A. and Ballon, P. (2007). Business model analysis as a new tool for policy evaluation: policies for digital content platforms', *info*, 9(5), 86-100.

- Raivio, Y., Luukkainen, S. and Juntunen, A. (2009). 'Open Telco: a new business potential'. In: Proceeding of the 6th International Conference on Mobile Technology, Application & Systems, ACM, Sep 2-4, Nice, France.
- Rochet, J. C and Tirole, J. (2010). Platform competition in two-sided markets. *Journal of European Economic Association*, 1(4), 990-1029.
- Rosenkopf, L., and Padula, G. (2008). Investigating the microstructure of network evolution: alliance formation in the mobile communications industry. *Organization Science* 19(5), 1–19.
- Shin, H. K., Kim, A. and Lee, C. W. (2011). Relationship between consumer's preference and service attributes in mobile telecommunication service. *Expert Systems with Applications*, 38(4), 3522-3527.
- Sorenson, D and Bogue, J. (2005). A conjoint-based approach to concept optimisation: probiotic beverages. *British Food Journal*, 107(11), 870-883.
- Srinivasan, V. (1978). A Model and Estimation Procedure for Multi-Stage Decision Processes. Working Paper, Graduate School of Business, Stanford University.
- Urban, A. (2007). Mobile Television: Is It Just A Hype Or A Real Consumer Need? *OBS*, 1(3), 45-58.
- Van de Wijngaert, L and Bouwman, H. (2009). Would you share? Predicting the potential use of a new technology. *Telematics and Informatics*, 26(1), 85-102.
- Weber, A., Haas, M. and Scuka, D. (2011). Mobile service innovation: A European failure. *Telecommunications Policy*, 35(5), pp.469-480.
- Yoon, J-L. (2007). Telco 2.0: A New Role and Business Model. *IEEE Communications Magazine*, January 2007, pages 10-12.

Appendix 1. List of profiles (Conjoints)

Card ID	Operating Systems	Service Platform Provider	Privacy Arrangement	Security Arrangement	Number of Application	Application Cost	Type of Platform
1	BlackBerry OS	Operator-Centric Platform	Best Effort Delivery	Best Effort Delivery	Unlimited	Free	Open
2	iOS (Apple)	Device-centric Platform	Best Effort Delivery	Best Effort Delivery	Limited	Free	Open
3	BlackBerry OS	Operator-Centric Platform	Best Effort Delivery	Guaranteed	Limited	Payable	Open
4	Symbian (Nokia)	Device-centric Platform	Best Effort Delivery	Guaranteed	Unlimited	Payable	Closed
5	Android (Google)	Operator-Centric Platform	Best Effort Delivery	Guaranteed	Limited	Payable	Closed
6	BlackBerry OS	Device-centric Platform	Guaranteed	Best Effort Delivery	Limited	Payable	Closed
7	Android (Google)	Service-provider centric platform	Guaranteed	Best Effort Delivery	Limited	Payable	Open
8	BlackBerry OS	Service-provider centric platform	Guaranteed	Guaranteed	Unlimited	Free	Closed
9	iOS (Apple)	Service-provider centric platform	Best Effort Delivery	Guaranteed	Unlimited	Payable	Open
10	Symbian (Nokia)	Operator-Centric Platform	Guaranteed	Guaranteed	Limited	Free	Open
11	Android (Google)	Device-centric Platform	Guaranteed	Guaranteed	Unlimited	Free	Open
12	Android (Google)	Operator-Centric Platform	Best Effort Delivery	Best Effort Delivery	Unlimited	Free	Closed
13	Symbian (Nokia)	Service-provider centric platform	Best Effort Delivery	Best Effort Delivery	Limited	Free	Closed
14	iOS (Apple)	Operator-Centric Platform	Guaranteed	Best Effort Delivery	Unlimited	Payable	Closed
15	Symbian (Nokia)	Operator-Centric Platform	Guaranteed	Best Effort Delivery	Unlimited	Payable	Open
16	iOS (Apple)	Operator-Centric Platform	Guaranteed	Guaranteed	Limited	Free	Closed

List of dependent variable questions:	Totally disagree (1)						totally agree (7)
1. I would choose this platform.	①	②	③	④	⑤	⑥	⑦
2. I would switch to this platform Instead of my current platform.	①	②	③	④	⑤	⑥	⑦
3. I would use more applications.	①	②	③	④	⑤	⑥	⑦
4. I would be willing to pay more for mobile applications.	①	②	③	④	⑤	⑥	⑦
5. I would download more application.	①	②	③	④	⑤	⑥	⑦
6. I would be able to organize my life much easier, efficient and effective.	①	②	③	④	⑤	⑥	⑦
7. I would be willing to pay more for my monthly subscription.	①	②	③	④	⑤	⑥	⑦