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Consumer valuation of Fintech: The case of Mobile Payment in Korea

Abstract

Fintech, the convergence of finance and internet related technology, is regard as new promising financial service. Among Fintech services, mobile payment which is new type of payment tool for consumer with smartphone started to draw attention. As the mobile payment started to replace current payment service, consumer valuation of the service is important as business viewpoint. In the case of valuation, totally four important attributes (origin, availability, economic benefit, and accessibility) were postulated for consumer decision making of mobile payment. This study conducted conjoint analysis to define ideal pair of mobile payment attributes. Result showed that among the four attributes, availability which refers to where the service can be used was mostly valued from consumers. This result corresponded to both user and non-user of mobile payment.

1. Introduction

Advancements in mobile technology have created great impact on people's daily lives. Through smart mobile devices that enable connectivity anytime and anywhere, users can have access to various services that fulfill users' needs. As the smartphone penetration rates of 52 key countries expected to reach 66% in 2018, which number is 3% increased than 2017, smartphone services that can be enjoyed from users also have growing consistently (Zenith Media, 2017). One of the most notable services delivered on the mobile platform is financial technology, which is commonly referred to as Fintech. Fintech is the convergence of internet technology and financial services that offered for social media and IOT area (Kim et al, 2015). As a new way to deliver

financial services, technologies like Fintech encourage users to purchase products with their phone and it enables users to make transactions easily. Among various Fintech services, mobile payment (M-payment) is an essential technology that enables users to purchase items easily without the stress of inserting personal information for each purchase (Kim et al, 2010). Once users store personal information on the mobile device or application, future purchases can be made by just inserting a pin, iris scanning or tapping one's finger on the device. As users take advantage of the convenience and the ubiquitous environment, the Fintech market is anticipated to grow significantly. According to DMC (2017), 88% of participants in Korea answered they have experience to purchase with m-payment service in six months. With this notable popularity of m-payment lead more mobile financials with diversified services.

2. Mobile payment industry of Korea

2. 1. Mobile payment companies in Korea

In Korea, major industrial firms operate their own mobile payment services. For example, the two large technology companies, Naver and Kakao, deliver mobile payment services on their platform. Naver is the most used portal site in Korea and Kakao is the nation's largest mobile instant messaging (mIM) service operator. Mobile payment from platform service providers is available only online. The benefits of using the portal based mobile payment service are that they offer discounts and membership points to its account holders. Once users store their credit card information, users are able to purchase items online with just a password or a finger print on the mobile device. The ease of purchase and other financial rewards has made portal service providers to be the most widely used mobile payment service in Korea (DMC, 2017).

Global consumer device manufacturers, Samsung and LG, also provide mobile payment services. Mobile payment from device based service providers are available both offline and online. For offline payments, the Magnetic Secure Transmission (MST) and remittance service is used, and for online purchases users can just use their pin or finger prints. By targeting specific device holders, companies are challenged to provide more distinct and convenient services to lock-in users to the device.

Major retail companies like Shinsegae and Lotte also offer M-payment services.

They offer both online and offline service, but they do not provide remittance service. The advantage of using mobile payment from retail companies is that they provide shopping benefits and financial rewards.

There are also other mobile payment services delivered from payment gateway (PG) firms. For instance, online applications such as "Payco" enable mobile payment through its website or mobile application. Financial companies and major telecommunication companies also strive to deliver mobile payment services within its own platform. The launch of mobile payment services from various service providers implies that Fintech technology is a lucrative market with significant growth potential. As each company endeavors to join the mobile payment market, the competition to acquire a strong user base is expected to become intensely competitive.

2. 2. Media related mobile payment companies

Look in the deep inside of mobile payment industry of Korea, notable phenomenon can be found. The thing is among the lots of firms which now providing their own M-payment service, three big services are from media based companies. In the case of Kakao Pay, the top mIM service of nation which has 40 million users in Korean are engaged in Kakao talk. Moreover, in the case of Samsung which was regarded as the most famous device firm in Korea, they also show remarkable performance in mobile payment market with their own payment service "Samsung pay". In addition, the biggest telecommunication company which has almost 50% of Korean telecom users named SK telecom also engaged in M-payment competition. These three companies are based on media and ICT but they lead one of the financial services, mobile payment market, now in Korea. Thus, in this research paper, mobile payment services from ICT related major firms will be analyzed as representative of Korean mpayment market.

Under this complex condition of m-payment in Korea with four attributes, it is necessary to clarify characteristic of these new payment services. This is because mobile payment can be one of product that users tend to consume with their certain preferences. However, previous papers mostly concentrated on Technology Acceptance Model (TAM) based research, and there is no paper that regards mobile payment as product which has characteristics that can be preferred by consumer. To fill the gap of the limitation, this paper adopted four characteristics as mobile payment attributes (origin, availability, economic benefit, and accessibility) for valuation of m-payment users. This study seeks to find which characteristics affect people's choices in using the mobile payment service. In addition, it aims to analyze which attributes are more valued in the mobile payment market. Base on this conception, two research questions can be brought out like below.

RQ 1: Which factors mostly affect people's choices in using mobile payment services? RQ 2: Which mobile payment company or application has the most valued attributes?

3. Literature review

3. 1. Origin

In the case of mobile payment market in Korea, there are variety payment services with different origin. As mention above, six sorts of firms (finance, payment gateway, distribution, platform, device, and telecommunication) provide different services that are characterized by each company and now compete with their own service in the market. These characterized mobile payment services are options for users to make a decision to select what they want to use. According to Hwang (2017), perceived fit of extension of business and perceived service quality of its original brand (parent brand) have effect on user's decisions of using sequel extensions. It means that users' choice is depend on appropriate relation of certain service and its origin service. The origin service's quality also can be concerned as factors of users' choice of extended service. Thus, origin can be a key attribute of mobile payment service. It is important that ICT related companies' performances are prominence in Korean m-payment market, so three main internet communication technology firms (platform, device, and telecommunication) will be suggested as representatives for mobile payment origin.

3. 2. Availability

As internet and mobile services are available without limitation, online transactions are growing rapidly. Online environment offers chance to select channel for

consumption. For example, consumers are able to buy what they want both online and offline. However, there is personal preference that effect users' choice a way to consume. Mobile payment can be regarded as tool for purchasing and it is important whether the tool is available in where the users want. With this conception, Shankar (2002) conducted whether level of consumer loyalty and satisfaction for same service is different when they select service online versus offline for hotel reservation service. Different preference between online and offline also could occur in the case of mobile payment decision because it is also one of service that should be selected and used by users. Thus, availability can be one of attributes of mobile payment with three levels: online, offline, and both.

3. 3. Economic Benefit

When people choose financial service, economic benefit is the most important factor for their decision. In the case of credit card, people will select credit card company which offers profitable economic benefits (Chakravorti, 2003). This consumer preference is also apply to mobile payment service because it is one of different form of credit card. In this term of economic benefit, this paper wants to define what kind of benefit is the most valuable for mobile payment users. In the case of mobile–related m-payment services, they offer three kind of economic benefits: discounting, membership, and fee exemption. First of all, all of three major media originated mobile payment firms offer discounting service and some of mobile payment users are able to enjoy membership benefit. Membership benefit refers to mileage that can be used like cash from saving portion of users' consumption. Fee exemption also can be provided for some of m-payment users. In mobile payment service of Korea, some of them also offer remittance service, especially Kakao pay tend to exempt fee of remittance money. In this paper, the case of discounting will be deleted of level for economic benefit attribute because all of mobile payments now providing discounting service.

3. 4. Accessibility

Accessibility refers to how much easy to reach the product or services for consuming and it is one of important attributes of all of products that can be consumed by users. According to Thang & Tan (2003), consumers consider accessibility for their

selection of grocery by taking a test which adopted geographical factors like closest to home, easiest to reach by car. As the grocery shopping is dairy consumption, easy to reach could be regard as important advantage. In the terms of mobile payment, it is also dairy consumption behavior. Thus, accessibility (easy to reach) is important for mobile payment decision for users. In the case of mobile related m-payment, there are three kinds of accessibility types: embedded in device, embedded in application, and should be downloaded. In the case of Samsung pay, it was already embedded in their mobile device like Galaxy series as application, and Kakao pay is already embedded in parent application Kakao talk. General case of mobile payment application should be downloaded from app store like T-pay.

4. Methodology

Table 1.

4. 1. Conjoint analysis on mobile payment

| Attributes and levels in conjoint an | nalysis on mobile payment | |
|--------------------------------------|-----------------------------------|------------------------|
| Attribute | Level | Example |
| Origin(service provider) | Device | Samsung Pay |
| | Platform | Kakao Pay |
| | Telecommunication | T-Pay |
| Availability | Online & Offline | Samsung Pay |
| - | Online | Kakao Pay |
| | Offline | T-Pay |
| Economic Benefit | Membership | Samsung Pay, Kakao Pay |
| | Fee Exemption | Kakao Pay |
| Accessibility | Embedded in device or application | Samsung Pay, Kakao Pay |
| - | Should be downloaded | T-Pay |

Conjoint analysis has been applied to research papers about consumers' preferences (Green & Srinivasan, 1978) in various fields, including internet related technologies. Research with regard to financial services such as credit card and online banking service valuation also adopted conjoint analysis as their methodology (Kara, 1996 & Dauda, 2015). Conjoint Analysis is able to be conducted with attributes that can be evaluated the value or utility of product and service from users (Schaupp, 2005). Thus, attributes and each level of analysis metrics are keys of this research. In this paper, all of four attributes and each level were extracted by user interview and exploring current mobile payment market in Korea, especially in media-related companies as mentioned in a previous part. First, "origin" of the service provider will be included as

loyalty towards the service provider impacts users' decisions in using new services. Second, "availability" will be used to see whether consumers prefer services delivered online or offline. Third, "economic benefit" will be considered as financial rewards are important for consumers. Last, "accessibility" of the mobile payment service will be examined whether the service is easy for users to approach. Table 1 indicates attributes and level of conjoint analysis on m-payment.

4. 2. Data collection and analysis

This study was conducted in South Korea where has a notable number of smartphone penetration rate. Questionnaires based on profiles of conjoint analysis attributes and levels were distributed by professional online survey company 'Embrain'. In this survey of mobile payment, from the 20s to 40s participants were limited as the respondents who are active in consumption and mobile uses. Among 367 responses of the survey, 257 responses which pass the verification question were selected for this study and this number of participants were almost evenly categorized as potential users (150 people) and experienced users (107 people) to compare the result of two different conditions. Table2 describes specific respondents demographic of this study.

| | | User | | Non-user | |
|-----------|----------------------|------|------|----------|------|
| | | # | % | # | % |
| Sex | Male | 66 | 44.0 | 53 | 49.5 |
| | Female | 84 | 56.0 | 54 | 50.5 |
| Age | 20s | 40 | 26.7 | 42 | 39.2 |
| - | 30s | 51 | 34.0 | 31 | 29.0 |
| | 40s | 59 | 39.3 | 34 | 31.8 |
| Internet | No internet shopping | 1 | 1.0 | 21 | 19.6 |
| Shopping | 1~2 times | 59 | 39.3 | 46 | 43.0 |
| Frequency | 3~5 times | 49 | 32.7 | 20 | 18.7 |
| | More than 6 times | 41 | 27.3 | 20 | 18.7 |

| Table 2. | | |
|----------|----------|---------|
| Responde | nt demog | raphics |

_ . . .

This paper adopted a full-profile approach to identifying consumer preference of each attributes levels. With four attributes and each three and two levels, 36 $(3 \times 3 \times 2 \times 2)$ conjoint profiles could be formatted. The numbers of profiles are massive for participants to answer, and there is high possibility to deviate or reject to attend the survey. Thus, fractional factorial design was utilized to reduce the profiles by 9 cases. This questionnaire consisted of comparison types of questions with totally 34 pairs of profiles (2 pairs of the profile were excepted because of absurd comparisons). It is handle for participant to answer questions eleven times, thus the comparisons were divided into three different versions of survey: 12 comparisons in version 1, 11 comparisons in version 2 and 3. As seen in Fig 1 Respondents should proceed twenty times or eleven times of selection between two profiles or do not choose. For profile formation and fractional factorial design, orthogonal design was used in SPSS 24. Moreover, XLSTAT statistical package was used for data analyzing. Choice-based conjoint analysis was adopted as the model of this study.

| Comparison1 | Α | В | С |
|------------------|---|---|-----------|
| Origin | Telecommunication Company such as T Pay | Telecommunication Company such as T Pay | |
| Availability | Only available <u>Online</u> | Only available <u>Offline</u> | Would not |
| Economic Benefit | <u>Membership point</u> | <u>Membership point</u> | choose |
| Accessibility | Embedded in Device or application | Should be downloaded | |
| • | | | |

Fig 1. Example of pairwise comparison questions.

5. Result

As the results of model of this study which were reported in Table 3,4, goodness of fit was confirmed by rejecting the null hypothesis that all of the estimated coefficients are 0 (user group:-2LL=3171.62, p<.001; Wald=2434.24, p<.001/ non-user group:-2LL=2170.01, p<.001; Wald=1722.89, p<.001). In utility result of the user group, device (level 1) in origin attribute, and online (level 2) in availability attribute were not statistically significant. Moreover, each level of economic benefit and accessibility also were not statistically significant. In the meantime, utilities of non-user group were significant except the second level (platform) of origin attribute.

Table 3. Conjoint result of user group.

| Attribute | Sublevel | Importance | Utility | SD | Wald | 95% C.I |
|---------------|----------------------|------------|---------|-------|---------|-------------|
| Origin | device | 17.766 | 0.076 | 0.044 | 3.041 | 009 ~ .162 |
| | platform | | 0.134 | 0.042 | 10.110 | 052 ~ .217 |
| | telecommunication | | -0.211 | 0.047 | 19.785 | 304 ~118 |
| Availability | online & offline | 65.391 | 0.682 | 0.042 | 260.469 | .600 ~ .765 |
| | online | | -0.094 | 0.044 | 4.535 | 181 ~007 |
| | Offline | | -0.588 | 0.051 | 134.650 | 668 ~489 |
| Economic | membership | 8.551 | -0.083 | 0.033 | 6.376 | 148 ~019 |
| benefit | fee exemption | | 0.083 | 0.033 | 6.376 | .019 ~ .148 |
| Accessibility | Embedded in device | 8.293 | 0.081 | 0.034 | 5.539 | .013 ~ .148 |
| | should be downloaded | | -0.081 | 0.034 | 5.539 | 148 ~ .013 |

Table 4.

Conjoint result of non-user group.

| Attribute | Sublevel | Importance | Utility | SD | Wald | 95% C.I |
|---------------|--------------------------------------|------------|---------|-------|---------|-------------|
| Origin | device | 21.448 | 0.195 | 0.050 | 15.094 | .097 ~ .293 |
| | platform | | 0.043 | 0.049 | 0.752 | 054 ~ .139 |
| | Telecommunication | | -0.238 | 0.055 | 18.474 | 346 ~129 |
| Availability | online & offline | 49.437 | 0.591 | 0.049 | 144.101 | .495 ~ .688 |
| | online | | -0.185 | 0.052 | 12.667 | 287 ~083 |
| | Offline | | -0.406 | 0.056 | 52.259 | 517 ~296 |
| Economic | membership | 13.357 | -0.135 | 0.038 | 12.838 | 208 ~061 |
| benefit | fee exemption | | 0.135 | 0.038 | 12.838 | .061 ~ .208 |
| Accessibility | Embedded in device or application | 15.758 | 0.159 | 0.041 | 15.319 | .079 ~ .239 |
| | should be downloaded | | -0.159 | 0.041 | 15.319 | 239 ~ .079 |

As shown in Table 5 which indicates utilities, user group mostly prefers platform (.13) as the mobile payment origin. Device (.08) was ranked as the second and telecommunication (-.21) followed next. For the case of non-user group, while telecommunication (-.24) still least preferred, device (.20) is the most preferred origin of mobile payment and platform (.04) followed next.

For availability attribute of mobile payment service, available both online and offline (.68) was strongly preferred by user group. Available only online (-.09) was ranked as the second and only offline (-.59) followed. Same with the user group, respondents in non-user group mostly preferred mobile payment service which is available both online and offline (.59) and only for online level (-.19) and only for offline level (-.41) followed in sequence.

The relative superiority of fee exemption of both user (.08) and non-user group (.14) over membership (user: -.08/ non-user: -.14) is certain in economic benefit attribute of using mobile payment. Lastly, already embedded in device or application is

relatively higher in both user (.08) and non-user group (.16) than mobile payment service that should be download (user: -.08/ non-user: -.16).

| Attribute | Sublevel | Utility | Utility | | | |
|---------------|--------------------------------------|------------|----------------|--|--|--|
| | | User group | Non-user group | | | |
| Origin | device | 0.076 | 0.195 | | | |
| | platform | 0.134 | 0.043 | | | |
| | telecommunication | -0.211 | -0.238 | | | |
| Availability | online & offline | 0.682 | 0.591 | | | |
| | online | -0.094 | -0.185 | | | |
| | offline | -0.588 | -0.406 | | | |
| Economic | membership | -0.083 | -0.135 | | | |
| benent | fee exemption | 0.083 | 0.135 | | | |
| Accessibility | embedded in device or application | 0.081 | 0.159 | | | |
| | should be downloaded | -0.081 | -0.159 | | | |

Comparison of utility between user and non-user groups.

Table 5

Table 6.

As seen in Table 6, the result of the importance of two different groups indicated quite relative patterns. For both groups, the user group and the non-user group has a similarity that the availability (user group: 65.39/ non-user group: 49.44) and origin (user group: 17.77/ non-user group: 21.45) were the most and second most important attributes of mobile payment service. However, while economic benefit (8.55) was ranked as the third and accessibility (8.29) was the last in the user group, economic benefit (13.357)was lower than accessibility (15.76) in non-user group. The notable difference between user group and non-user group is importance percentage of availability attribute. Despite the user group of availability is more than 50% (65.39), non-user group is less than 50% (49.44%). Importance of the case of non-user group is relatively evenly distributed than the user group.

| Comparison of relative importa- | nice between user and non-user groups | | | | |
|---------------------------------|---------------------------------------|------|----------------|----------------|--|
| Attribute | User group | | Non-user group | Non-user group | |
| | Importance(%) | Rank | Importance(%) | Rank | |
| Origin | 17.766 | 2 | 21.448 | 2 | |
| Availability | 65.391 | 1 | 49.437 | 1 | |
| Economic benefit | 8.551 | 3 | 13.357 | 4 | |
| Accessibility | 8.293 | 4 | 15.758 | 3 | |

For the total result of all of the respondents (Table 7), both of user and non-user group rejected the null hypothesis that all of the estimated coefficients are 0 validated goodness of fit (-2LL=5324.75, p<.001; Wald=4161.88, p<.001). Conducted importance shows that availability (59.48) is the highest score of mobile payment attributes and

origin (18.11), accessibility (11.69), economic benefit followed in sequence. Similar to the two different groups' utility results, the first level (device: .13) was mostly preferred in origin attribute. Available both online and offline (.64) ranked as the first in available attribute and fee exemption (.10) is higher than the first level of economic benefit attribute. At last, also same with user and non-user group result, the first level embedded in device or application (.11) ranked as the most preferred level of accessibility attribute.

| Attribute | Sublevel | Importance | Utility | SD | Wald | 95% C.I |
|-----------------------|--------------------------------------|------------|---------|----------|-----------|-------------|
| Origin | device | 18.105 | 0.127 | 0.03 | 3 14.756 | .062 ~ .191 |
| | platform | | 0.098 | 0.03 | 2 9.283 | .035 ~ .160 |
| Telecommunication | | -0.224 | 0.03 | 6 38.848 | 294 ~154 | |
| Availability | online & offline | 59.484 | 0.643 | 0.03 | 2 403.732 | .581 ~ .706 |
| | online | | -0.135 | 0.03 | 4 16.144 | 201 ~069 |
| Offline | Offline | | -0.508 | 0.03 | 8 183.258 | 582 ~435 |
| Conomic | membership | 10.717 | -0.104 | 0.02 | 5 17.602 | 152 ~055 |
| benefit fee exemption | fee exemption | | 0.104 | 0.02 | 5 17.602 | .055 ~ .152 |
| Accessibility | Embedded in device or application | 11.694 | 0.113 | 0.02 | 6 18.776 | .062 ~ .164 |
| sho | should be downloaded | | -0.113 | 0.02 | 6 18.776 | 164 ~ .062 |

6. Discussion and conclusion

Table 7.

As one of findings of mobile payment consumer valuation study, it is important that availability, especially the condition whether the service is able to be used both online and offline is mostly valued. In the case of Korea, some of the major mobile payment services only offer service only for online or offline. However, as the result of the study shows, service available both online and offline is the key factor of consumer choice of the new type of payment service. As the mobile payment replace past type of payment tools like a credit card or cash, the new payment service should be available anywhere anytime. This phenomenon is because this payment service is based on media ubiquitous aspect. Thus, people require a wide range of use mobile payment as the main tool for purchase.

Origin of the payment service is also important as the second most valued attribute. In the terms of origin, people tend to prefer mobile payment from device company and platform firm originated mobile payment followed in sequence. The selected companies are already lead the Korean market of mobile payment but the result that device originated payment is more valued is important. For many reasons of this circumstance, device users have the loyalty of the smartphone because the service is related to functions of the device Thus, this characterized consumer might make a decision to choose device related. This consumer preference was already shown in the market of mobile payment service in Korea.

In the terms of economic benefit and accessibility, these two attributes were valued the third and least from consumers with quite similar scores. In economic benefit, the attribute which ranked as the thirdly valued from consumer, fee exemption is a more attractive benefit rather than membership. This situation shows that now people regard or use mobile payment as remittance tool. The result shows it is important to serve remittance service for no fee. For accessibility attribute, consumers prefer mobile payment service that already embedded in their device or application that they use. Consumers tend to do not make an effort to download a new application on their device for payment service.

Contrary to expectation, there were only two differences between mobile payment user group and non-user group result. First of all, the importance of the mobile payment attributes and the least valued attributes for both two groups was different. While in the case of user group, economic benefit is more valued than accessibility, accessibility is more valued than economic benefit in non-user group. This is because easy to reach the service is one of the key factors when consumers want to begin to use some service. Thus, for the non-experienced consumer, accessibility is more important. In addition, there is a difference in the utility of origin between the user and non-user group. While mobile payment from platform firm was mostly preferred as its origin in the case of the user group, device originated mobile payment was valued most for nonuser group.

As new types of tool for purchase, the Fintech market shed light on mobile payment service and new research started to analyze this payment. However, now the current stage of research did not define what is the boundary of mobile payment among many kinds of Fintech services. Thus, it is important to identify the specific definition of mobile payment. This specifying defined term aid the market to be confused. Moreover, the result indicated that consumer value mobile payment service which already embedded in their device or application that they use and can be utilized both online and offline. These two requirements can be served with fulfilled security. In the countries where already maturated mobile payments are served, they have regulation about the new types of payment service. Therefore, research regulation with regard to security is needed for the market of mobile payment to be matured.

This study conducted mobile payment valuation of consumer in Korea in the situation that new type of purchase service replace current tool of payment such as credit card and cash. Diversified mobile payment services were came out to the market in Korea with many different characteristics. Thus, it is important to know that which mobile payment could be the leader of Korean market. To analyze valued factors of mobile payment, choice-based conjoint analysis was conducted as the method of this study. As the result, where it can be used is the most important characteristic of choice of mobile payment service. Moreover, the origin, accessibility and economic benefit valued after availability in sequence. Significant result of this study is that user and nonuser of mobile payment do not have distinct difference. However, importance ranking of economic benefit and accessibility was different with user and non-user group. Also, it was different in the utility of origin, user group prefers platform, and non-user group valued device. These results suggest future direction for mobile payment firms what is the factor that the consumers need. For the future study with regard to mobile payment service, identifying the definition of mobile payment should be clear. In addition, government's regulation on mobile payment should be discussed for security of the payment.

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