Understanding Acceptance of Fintech Service in Korea: 
Focused on Decomposed TPB into TAM

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Abstract This study explored an appropriate research model that could explain and predict the spread of fintech, a new financial services in Korea. We reviewed two theoretical frameworks, theory of planned behavior(TPB) and technology acceptance model(TAM), which are frequently cited to explain human behavior and new technology adoption, respectively. Then, we proposed a decomposed theory of planned behavior(DTPB) as a research model and examined the model through PLS path modeling. As a result, every path except PEOU-ATT path in TAM is significant, and the explanatory power toward behavioral intention(R2=0.573) is also significantly greater in the proposed model. Accordingly, the proposed DTPB is appropriate to explain the spread of fintech in Korea. Finally, suggestions for the following studies are discussed.

Key Words : Fintech, Theory of planned behavior, Technology acceptance model, Decomposed theory of planned behavior, PLS path modeling

요약 이 연구는 최근 우리나라에 도입되고 있는 새로운 금융서비스인 핀테크의 확산을 설명하고 예측하기 위한 연구모형을 탐색하는데 목적이 있다. 이를 위해 인간행동과 새로운 기술수용을 설명하는데 각각 자주 인용되고 있는 이론인 계획행동이론(TPB)과 기술수용모형(TAM)을 검토하여 이를 융합한 분해계획행동이론(DTPB, Decomposed theory of planned behavior)을 연구모형으로 제안하고 PLS 경로모형분석을 통해 검정하였다. 연구결과, TAM 경로 중 하나인 인지한 용이성-태도(PEOU-ATT) 경로를 제외한 모든 경로가 유의하였고, 모형의 설명력은 57.3%로 우수하게 나타났다. 따라서 우리나라의 핀테크 확산을 설명하는데 본 연구가 제안한 DTPB가 적합한 것으로 입증되었다. 마지막으로 향후 연구를 위한 제안 을 제시하였다.

주제어 : 핀테크, 계획행동이론, 기술수용모형, 분해계획행동이론, PLS 경로모형분석

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1. Introduction

Fintech is a new compound of word ‘financial’ and ‘technique’. Fintech signifies payment, remittance, asset management, crowdfunding through mobile, or the industry merged with IT and finance business. Especially in Korea, fintech and simple payment service (SPS) are synonyms. Korean perceives fintech to be a symbol of financial reform because industry, academy, and bureaucrats exemplify fintech as financial reform since the incumbent president set up four reform agendas.

Actually, Korean consumer has comparatively rich digital financial environment, i.e., most advanced internet and mobile banking service in Asia; but some regulations by the governmental authorities hinder consumer from using the services sometimes. After President Park Geun-hye pinpointed inconvenient financial services from Active-X software with MS Explorer in 2014, Korea had been resigned to inconvenience in using digital financial services[1]. Fintech had been entering an early stage of spread in Korea, and then the online shopper from countries overseas become got considerably rid of the inconvenience of shopping at the Korean Internet mall.

Since the incumbent president was inaugurated, financial reform has been a major reform agenda in Korea. When industry, academy, and bureaucrats refer to financial reform thereafter, they have focused on the dissemination of fintech. We need to examine what affects Korean to adopt fintech through some possible models. Thus, this study aims to explore an appropriate model to understand the spread of fintech in Korea.

2. Literature Review and Hypotheses

2.1 TPB, TAM and Decomposed TPB

Social psychologists have examined relationship among belief, attitude, behavioral intention, and behavior with various theoretical perspectives, of which the representatives are theory of reasoned action (TRA) and TPB[2]. Since presented by Fishbein, TRA has been applied effectively to understand and predict human behavior in a variety of fields[3]. A meta-analysis on the TRA[4] found that the theory had strong predictive utility. However, some researchers including Professor Icek Ajzen noted that the theory was deficient in explaining behavior especially of people who have little or feel they have little power over their behaviors. As a result he added a new construct to the TRA. This construct is the concept of perceived behavioral control which resulted in the Theory of Planned Behavior (TPB)[5]. Ajzen[6, 7] asserted that the theory had emerged as one of the most influential and popular conceptual frameworks for the study of human action.

TPB addresses that three kinds of considerations influence human behavior, which are beliefs about the likely consequences or other attributes of the behavior (behavioral beliefs), beliefs about the normative expectations of other people (normative beliefs), and beliefs about the presence of factors that may further or hinder performance of the behavior (control beliefs). In their respective aggregates, behavioral beliefs produce a favorable or unfavorable attitude toward the behavior; normative beliefs result in perceived social pressure or subjective norm (SN); and...
control beliefs give rise to perceived behavioral control (PBC), the perceived ease or difficulty of performing the behavior. In combination, attitude toward the behavior, subjective norm, and perception of behavioral control provoke the formation of a behavioral intention. Finally, with a sufficient degree of actual control over the behavior, people are predicted to carry out their intentions when the opportunity arises. Therefore, intention is estimated as the immediate antecedent of behavior[7].

TAM is a framework that is applied frequently for explaining acceptance and usage of new technology. Davis[8, 9] suggested TAM which is based on TRA and a model to predict and explain user acceptance of information technology. Davis eliminates SN from TRA due to little explanation. According to the model, attitude toward a system influences and determines user’s intention to use the system, and then the intention determines to use the system actually. Especially, Davis presented two beliefs regarding user acceptance of the system, perceived ease of use (PEOU) and perceived usefulness (PU), which have an effect on attitude toward the system, and in turn the attitude influences the intention. PEOU refers to "the degree to which a person believes that using a particular system would be free of effort" and PU "the degree to which a person believes that using a particular system would be enhance his or her job performance"[8] p.320.

Whereas TAM is regarded as a powerful and robust model for understanding and predicting the acceptance of new technology, previous studies [2, 10, 11] have employed decomposed TPB for more predictability, which decomposes attitude by two salient belief in TAM. With using TPB to provide a basic framework, decomposed TPB decomposes attitude by incorporating PEOU and PU as mediating constructs in the model. Especially, Taylor and Todd suggested a decomposed TPB which the authors labeled the augmented TAM, because TAM exclude the influence of social (SN) and control factor (PBC) on behavior [10, 12]. Such two factors have been confirmed to have a significant influence on technology usage behavior [e.g., 10, 12, 13, 14, 15, 16, 17, 18]. Due to predictive utility in technology usage research and wide spread application in social psychology, the authors added SN and PBC to TAM for providing a more complete test of the important determinants of technology usage. With reviewing the previous studies, present study employs decomposed TPB. Because fintech is an innovative financial transaction, adopting fintech would be determined by structural relations among attitudinal belief (PEOU and PU), normative belief (SN), and control belief (PBC).

2.2 Hypotheses

Fintech, as above-mentioned, is novel and innovative financial phenomenon in Korea. The incumbent government and the financial industry have introduced fintech to Korea with focusing on financial reform and groping for ways out of the difficulties of the financial industry, respectively. Both regard the spreading of fintech sooner as a success in the policy. Thus, we explore a model to help spread fintech in Korea, that is, we grope for the factors of spreading fintech through using variables in decomposed TPB into TAM. Based on the theoretical framework, we hypothesize:

H1: PEOU will have a positive effect on PU.
H2: PEOU will have a positive effect on attitude (ATT).
H3: PU will have a positive effect on ATT
H4: PU will have a positive effect on behavioral intention (BI).
H5: ATT will have a positive effect on BI
H6: Subjective norm (SN) will have a positive effect on BI.
H7: Perceived behavioral control (PBC) will have a positive effect on BI.

We illustrate the specific model examined in the study as shown in [Fig. 1].
3. Method

3.1 Sample

This study chose 161 Koreans in their twenties as participants through a convenient sampling. We administered the survey for three weeks from October 5 to October 25, 2015. Trained interviewers, majoring in communication study, administered the questionnaires. The participants were selected from Seoul and the Metropolitan area. The twenties are the conspicuous users of internet and social media. As shown by Korea Press Foundation, 98.7% and 80.1% of the twenties respectively have used internet and social media in Korea[19]. The twenties among all generations demonstrate the highest penetration of internet and social media. Accordingly, we could designate the twenties as the more active latent user of fintech due to SPS based on internet and social media. This study expects that the twenties would show significant implication regarding fintech spread in the early stage.

<Table 1> shows demographic profiles of participants. As shown in <Table 1>, 55.28% of the participants were male; 44.72% were female. In terms of educational level, 87.58% were current college students. The respondents with bachelor’s degree or higher were 9.94%. As for age, the mean is 22.75(S.D=2.58) with range aged between 20 and 29.

3.2 Survey administration

To examine the hypotheses, we employed a self-reported survey of Korean twenties with the experience of the digital banking such as internet banking and mobile banking services. Trained interviewers who major in communication study administered the questionnaires. It took three weeks, from October 5 through October 25, 2015, to administer the survey. During the second half of 2015, the discourse for financial reform was filled with Korea, the government was about to approve online-only bank preliminarily, and in turn, the press often covered fintech and frequently aired advertisements regarding SPS. When the survey was administrated, fintech was on the early stage in Korea and the concern about fintech was building up among Korean people.

3.3 Measurement

We suggest the decomposed TPB to understand the acceptance of fintech in Korea. Accordingly, this study employs constructs from TAM and TPB: PEOU, PU, ATT, SN, PBC, and BI. The constructs in this study were adapted from previous study[2, 10] with TAM and TPB constructs. With 5-point Likert scales, ranged from strongly disagree to strongly agree, this study measured the aforesaid constructs. Each item of the constructs appears in <Table 2>.
4. Findings

4.1 Measurement model testing

This research employed composite reliability to test the reliability of constructs because the composite reliability, which should be greater than 0.70, has been used to examine the reliability of survey[22, 26]. As shown in <Table 3>, the findings show each composite reliability is over 0.70. Every Cronbach’s alpha of the constructs is above 0.6, the threshold of Cronbach’s alpha. According to the findings, the reliability of this study is ensured.

|   | AVE | Composite Reliability | R Square | Cronbach’s Alpha |
|---|-----|----------------------|----------|-----------------|
| PEOU | .687 | .867 | .772 |
| PU | .705 | .940 | .330 | .914 |
| ATT | .789 | .918 | .297 | .867 |
| SN | .804 | .925 | .076 | .878 |
| PBC | .811 | .923 | .886 |
| BI | .867 | .951 | .573 | .923 |

Note: The diagonal shows the square root of AVE.

To test the validity of the research, we employed content and construct validity. This research secured content validity through literature review[27] on the constructs of TAM and TPB. Furthermore, the questionnaire items were derived from existing literature, which increases further content validity[28, 29]. Construct validity in this research was identified through assessing convergent and discriminant validity[30].

| (Table 4) Correlations between Latent Constructs |
|---|---|---|---|---|
| PEOU | PU | ATT | SN | PBC | BI |
| PEOU | .829 |
| PU | .575 | .892 |
| ATT | .343 | .544 | .889 |
| SN | .216 | .435 | .429 | .897 |
| PBC | .404 | .250 | .350 | .004 | .901 |
| BI | .338 | .547 | .695 | .470 | .389 | .931 |

Note: The diagonal shows the square root of AVE.

3.3 Analysis

Current study employed partial least square (PLS) path modeling to validate the research model. We utilized SmartPLS 2.0 M3 package[20] to examine the research model. SmartPLS is a software application for graphical path modeling with latent variables. The PLS path modeling is very helpful when theoretical information is insufficient[21] for exploratory study and suitable to estimate the validity and reliability of constructs[22]. Moreover, PLS is also appropriate to explore a new model and theory as it can be fair for confirmatory and exploratory research[23]. PLS is more advantageous than covariance-based SEM method such as LISREL and AMOS. PLS is good at dealing with small sample size whereas covariance-based SEM emphasize sample size[24, 25]. Because of testing a new model on fintech as novel service in Korea and using small sample size in the research, we employed PLS path modeling.
Average variance extracted (AVE) is an indicator to estimate convergent validity and should be above 0.50 \[22, 31\]. All AVE in <Table 3> are greater than 0.687, indicating that the latent constructs can explain at least 68.7% of the measured variance. Moreover, the correlations among each latent constructs are compared with the square root of AVE in parentheses to estimate discriminant validity \[24\]. As shown in <Table 4>, every square root of AVE is greater than the correlations between latent constructs, indicating the research’s discriminant validity.

Finally, we also check the factor loadings of each indicator to validate discriminant and convergent validity \[22\], which should be greater than the construct of them on any other factors. Furthermore, the factor loading should be above 0.70 threshold and be greater than their cross-loadings \[22, 24\]. In above <Table 5>, the factor loading of all indicators is greater than the construct of them on any other factors and then, each factor loading was greater than 0.70 threshold and their cross-loadings. Accordingly, the validity of this research fulfilled the requirements for analysis.

| Table 5 | Cross Loading |
|---------|--------------|
| PEOU  | PU | ATT | SN | PBC  | BI |
| PEOU1 | .877 | .425 | .307 | .153 | .418 | .244 |
| PEOU2 | .880 | .574 | .313 | .176 | .300 | .345 |
| PEOU3 | .742 | .425 | .223 | .216 | .171 | .277 |
| PU1  | .511 | .930 | .472 | .290 | .221 | .524 |
| PU2  | .426 | .893 | .475 | .425 | .176 | .536 |
| PU3  | .517 | .890 | .459 | .579 | .197 | .461 |
| PU4  | .588 | .863 | .530 | .290 | .200 | .442 |
| ATT1 | .297 | .472 | .897 | .381 | .339 | .639 |
| ATT2 | .286 | .514 | .898 | .405 | .281 | .641 |
| ATT3 | .333 | .463 | .870 | .355 | .314 | .569 |
| SN1  | .211 | .373 | .352 | .388 | .308 | .404 |
| SN2  | .165 | .330 | .327 | .391 | .056 | .406 |
| SN3  | .203 | .433 | .494 | .571 | .077 | .449 |
| PBC1 | .311 | .190 | .238 | .001 | .881 | .305 |
| PBC2 | .426 | .261 | .333 | .062 | .926 | .424 |
| PBC3 | .344 | .212 | .293 | .076 | .895 | .297 |
| BI1  | .310 | .556 | .488 | .448 | .308 | .917 |
| BI2  | .233 | .487 | .861 | .423 | .346 | .949 |
| BI3  | .342 | .514 | .652 | .441 | .432 | .927 |

4.1 Structural model testing

This research employed PLS path modeling to analyze the structural model. PLS does not the overall goodness-of-fit indices, whereas the validity of model is assessed with examining R squares and the structural paths \[32\]. [Fig. 2] and <Table 6> demonstrate the result of structural model test. The result of R square displays that 33% of the variance in PU was explained by PEOU. It means that PEOU was, as hypothesized, affected by PEOU. The R square for ATT means that 29.7% of the variance in ATT construct was explained by PU. Finally, the R square of BI demonstrates 57.3% of the variance in BI was explained by PU, ATT, SN, and PBC.

![Fig. 2] Results of the PLS Analysis

| Table 6 | Results of Hypothesis Testing |
|---------|-----------------------------|
| Hypothesis | Path Coefficient | t-value | Result |
| H1  | PEOU -> PU    | .575*** | 8.532 | supported |
| H2  | PEOU -> ATT   | .045   | .462 | rejected |
| H3  | PU -> ATT     | .518** | 4.873 | supported |
| H4  | PU -> BI      | .165*  | 1.767 | supported |
| H5  | ATT -> BI     | .451***| 4.465 | supported |
| H6  | SN -> BI      | .204** | 2.836 | supported |
| H7  | PBC -> BI     | .189** | 2.832 | supported |

Note: ***p<0.001, **p<0.01, *p<0.05, one-tailed test

The result of path coefficients indicates PEOU has a positive effect on PU (β=0.575, p<0.001, one-tailed test).
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PU affects ATT($\beta=0.518$, $p<0.001$, one-tailed test). Hence, BI is affected by PU($\beta=0.165$, $p<0.05$, one-tailed test), ATT($\beta=0.451$, $p<0.001$, one-tailed test), SN($\beta=0.204$, $p<0.01$, one-tailed test), and PBC($\beta=0.189$, $p<0.01$, one-tailed test). Accordingly, two hypotheses of TAM, H1 and H3 except H2(PEOU-ATT path) are supported and all hypotheses of TPB, H4, H5, H6 and H7, are supported as well.

5. Conclusion

Fintech is a novel financial service and a typical outcome of financial reform policy for the incumbent government in Korea. A policy goal for financial reform is the successful dissemination of fintech in the incumbent government. The study aims to explore an appropriate research model on explaining to accept fintech, concretely SPS, in Korea. For finding a model suited to accomplishing an end, we reviewed two reliable theoretical frameworks, TPB and TAM, to predict the acceptance of the new system, and then decomposed TPB into TAM. This study proposed and examined hypothesized paths in the research model. We employed PLS path modeling to test hypotheses on the research model.

In this study, the following findings were obtained. Each path except PEOU-ATT on the proposed research model is significant and supported. In TAM, ATT influences BI directly; PU affects BI directly and indirectly, mediated by ATT. Furthermore, on TPB, all antecedent constructs, SN, ATT, and PBC have predictive effect on BI. In terms of predictability on BI, ATT($\beta=0.451$, $p<0.001$) was the greatest, followed by SN($\beta=0.204$, $p<0.01$), PBC($\beta=0.189$, $p<0.01$), and PU($\beta=0.165$, $p<0.05$). The findings show that attitude has the greatest influence on the acceptance of fintech. Also, the proposed model showed a remarkably high explaining BI(57.3%). In conclusion, the decomposed TPB proposed in the study is valid for predicting and explaining fintech acceptance in Korea. Therefore, for the rapid spread of fintech, the government and banking should consider how to stimulate the attitude toward the technology. So, it is necessary to improve PU of consumer, which plays a major role as a predictor of ATT in this study. From this perspective, the communication strategy through the mass media, i.e. the advertisement and press release that emphasizes the usefulness of fintech services could facilitate the diffusion of fintech.

Finally, the following is some recommendation for future studies. We confirmed the validity of the decomposed TPB to understand the acceptance of the innovative financial service for financial consumers. Future studies should increase the explanatory power of the proposed model in this study and search a practicable theory for the field. Thus, we should employ perceived risk, self-efficacy, technology readiness, and use motivation which are frequently mentioned on the consumer selection studies.

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