

Evaluation of Mobile Application in User's Perspective: Case of P2P Lending Apps in FinTech Industry

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Abstract

Financial technology, also known as FinTech, is one of the fast growing global businesses in since its inception in 2008. Fintech is a new economic industry, comprised of companies that adopted the latest technologies to provide more efficient financial services than the traditional financial services. Fintech companies are generally small to medium sized startups trying to disintermediate existing financial systems. FinTech companies can be differentiated in several areas, based on its business solutions and target customers. In Korea, the Peer-to-Peer (P2P) lending companies are the most prominent in the FinTech sector. P2P lending is a method of borrowing or lending money to individuals through online services without the use of an official financial institution as an intermediary. The P2P lending companies operate their services entirely online or mobile environment. Consequently, mobile P2P lending application users are dramatically increasing. Thus, it is worth evaluating the acceptance of the mobile apps of the P2P lending companies from a user's perspective. This paper discusses user acceptance of the mobile P2P lending apps, guided by the Technology Acceptance Model. We conclude that the users' acceptance of mobile P2P lending apps are significantly influenced by perceived ease of use, perceived usefulness, and user satisfaction. These in turn influenced their attitude towards using mobile P2P lending apps and intention to use.

Keywords: APIC-IST 2016, FinTech, P2P Lending, Social Lending, P2P Lending Platform, P2P Lending Apps

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1. Introduction

Financial technology (hereafter FinTech) is one of the fast growing *global* businesses in since its *inception* in 2008. Fintech is a new economic industry, *comprised of* companies that adopted the latest technologies to provide more efficient financial services than the traditional financial services. As an emerging industry, most FinTech companies are startups trying to disintermediate existing financial systems. FinTech companies also challenge traditional finance companies that are less dependent on software [1]. The National Digital Research Centre in Dublin, Ireland, defined FinTech as "innovation in financial services". Noting that "the term has started to be used for broader applications of technology in the space - to front-end consumer products, to new entrants competing with existing players, and even to new paradigms such as Bitcoin" [2]. FinTech represents a new solution in the financial services industry that demonstrates innovative, progressive, or radical development of applications, processes, products or business models [3]. In short, FinTech companies use technology to shake up incumbent financial systems. FinTech's first opportunity arose in 2008, after the subprime mortgage bank bailouts in the U.S. Consequently, four of the largest banks in the U.S. and U.K. drastically reduced their total headcount since 2008 [4]. Global investment in financial technology increased from \$930 million in 2008 to \$12 billion in 2014 [5]. According to Accenture, the global investment in FinTech companies in the first quarter of 2016 reached \$5.3 billion, which is a 67 percent increase over the same period last year. The report also showed that global investment for FinTech companies grew 75 percent in 2015, and exceeded \$22 billion, compared that of 2014 [6]. The nascent FinTech industry has seen drastic growth over the past few years [7].

U.K. Trade and Investments divided the FinTech industry into two - Traditional and Emergent FinTech. Traditional Fintech referred to market players that are generally perceived as facilitators. They were typically large and incumbent technology vendors supporting the financial services sector. In case of Emergent Fintech, market players are rather disruptors and innovators who disintermediate incumbent financial services firms or offer new technology solutions to service existing requirements [8]. These new solutions can be found in several FinTech industry fields. Digital wallets, robo-advisor, crowdfunding, and peer-to-peer (P2P) lending companies are examples that are like this. Among them, peer-to-peer (P2P) lending has become one of the hottest service in FinTech industry. The market size of current global P2P lending industry is growing at more than 100% per year, and is expected to grow up to \$1 Trillion by 2025 [9]. The popularity of P2P lending is global but is noticeably prominent in Korea. According to Korea's P2P Finance Platform Association, the number of P2P lenders had increased to more than 100 as of the end of December 2016 from less than 10 at the end of 2014. The P2P lending market is growing fast in Korea by word of mouth that people could get a loan with relatively lower interest rate without having excellent credit ratings [10]. In addition, the widespread use of the smartphone has profoundly changed the behavior of mobile application users. Whether it is checking their online bank account or modifying the investment portfolios online, mobile application (mobile apps) users handle most financial affairs with ease. It is a great opportunity for businesses and financial companies will not succeed if the right FinTech services are not in place [11]. Since the number of mobile app users for P2P lending companies are steadily rising, it is worth investigating the acceptance of the mobile P2P lending applications from the user's perspective. After the global financial disasters in 2008, many researchers anticipated that P2P lending industry would emerge as one

of the most important financial service innovations [12]. However, most studies focused on the roles and impacts on social networks in P2P lending industry [13]. The literature noted that the social networks on Prosper, the U.S. P2P lending company, explained some soft information about borrower risks. But the studies had to compensate for the lack of hard information. Besides social networks, critical factors for funding success and default rates, such as the borrower's characteristics, borrower's demographic information, financial strength, credit ratings, and effort indicators, were investigated in prior researches [14-17]. There is no study that evaluated the user acceptance of mobile apps for P2P lending companies in Korea. Therefore, it is necessary to investigate the applicability of the existing mobile app evaluation model based on data collected from a P2P mobile app users. This need provides the motivation and the rationale for the conduct of this research

2. Related Work

According to U.K. Trade and Investments, the FinTech industry can be divided into two categories, Traditional and Emergent FinTech [8]. McAuley stated that the FinTech companies are generally startups [1]. But some researchers argued that FinTech companies should not be confined to startup companies. Investopedia clarifies this argument: "Since the end of the first decade of the 21st century, the term has expanded to include any technological innovation in the financial sector, including innovations in financial literacy and education, retail banking, investment and even crypto-currencies like bitcoin" [18].

2.1 Traditional vs. Emergent FinTech

Traditional Fintech referred to the market players that are generally perceived as facilitators, typically large and incumbent technology vendors supporting the financial services sector such as Infosys, FirstData. These traditional companies operate under established revenue models, which has a tendency to use cost per transaction, percentage of assets or license fees. Banks and other traditional financial services players can also leverage Fintech to improve products and services to their customers, making them Fintech players. Emergent Fintech companies are market players that disrupt and innovate companies that disintermediate incumbent financial services companies or offer new technology solutions to service existing needs such as Transferwise, Zopa [8].

2.2 FinTech Areas

New technology solutions can be differentiated in at least five areas: 1) the banking or insurance sector, 2) the solution with regards to their supported business processes, 3) the targeted customer segment, 4) the interaction form, and 5) the solutions that vary with regard to their market position [3]. For the solution in regards to the supported business processes, it can be divided again to several financial services such as payments (e.g., digital wallets), investments (e.g., P2P lending), financing (e.g., crowdfunding), insurance (e.g., risk management), financial advisory (e.g., robo-advisor), and cross process (e.g., big data analytics). As described, FinTech has created entirely new types of financial services such as robo-advisor, crowdfunding, and peer-to-peer (P2P) lending.

2.3 P2P Lending Industry

Peer-to-peer lending, also known as P2P lending or social lending, is a method of debt financing between individuals and businesses through online services without an official intermediary. It match lenders directly with borrowers by removeing the middleman from the process. However, the ease of use and lower cost comes with more risk than the general lending practices [19]. Since the P2P lending companies offer the services entirely through online, they can reduce the operational cost. Thus, they can provide the service with relatively lower prices than traditional financial institutions, which is their distintive competencies . As a result, lenders can earn higher returns compared to financial products offered by traditional financial institutions, and borrowers can also get a loan at lower interest rates compared to banks [20]. Everone seems to win. The P2P platforms themselves are also profitable by getting raising fees for successful transactions [21, 22]. The P2P lending industry in U.S. started in February 2006 with the launch of Prosper [23].

Originated from the U.S., the P2P lending market has been spreading around the world, notably in Korea. The number of P2P lenders has increased from five to six at the end of 2014 to almost 50 at the end of September 2015. For example, 8Percent, established in October 2014 and started their business in June 2015, has lent 6.5 billion Korean Won (KRW) in 204 cases for the past one year. Lee Hyo-jin, the president of the Korea P2P Finance Platform Association said, "Even though the P2P lending market remains at 10-20 billion KRW at best right now, it will grow into a market of more than 1 trillion KRW within a few years." It seems that the P2P industry in Korea holds enormous potential Unlike traditional banks that require documents like proof of employment or proof of income, P2P lending companies holds a great fascination for potential borrowers who are not qualified for a loan from a prime banks [10]. In short, the P2P lending companies do not lend their own funds to borrowers. They serve as facilitators to both the borrower and the investor.

3. Mobile Applications for P2P Lending Companies

Mobile app is a software application which is designed to run on mobile devices. Smartphones or tablet computers are kind of mobile devices. Such devices come with several applications bundled with pre-installed software, such as a web browser, scheduler, music pleyer, photo editor, and an app store that users can buy music or other media, etc [24, 25]. With the introduction of the App Store such as iTunes App Store or Google Play, many applications have been developed for smartphones, from games and utilities to instant messaging and word processors [26, 27]. The advantages of the mobile devices include personal, situated, authentic, spontaneous, informal, and continuous access [28]. There are three types of mobile apps, and those are native apps, web apps and hybrid apps. Native apps can be installed through an application store such as Google Play or Apple's App Store [29]. They can take full advantage of a device's functionality since they run on the device's operating system. For apps that are highly interactive, such as mobile games, or for enterprises that want their apps to have access to functions like push notifications, camera and address book options, GPS, offline access or SMS messaging, a native approach is likely the best option [30]. Web apps are websites that look and feel like native applications. Users have the option of installing the app onto their mobile devices' home screen by creating a bookmark to the webpage they accessed [30]. Hybrid apps are combination of native apps and web apps. Similar to native apps, they are available from the app stores and can take advantage of many device features available [29]. The biggest advantage of a hybrid app comes from its reduced cost to build and run. The result

is that hybrid apps enjoy the integration abilities of previous web-based apps while also still being able to take advantage of device capabilities. This means hybrids can apply a consistent look and feel across devices and platforms without the cost or time of having to write separate code for each device [30]. In summary, native apps, hybrid apps, and web apps are all the ways to meet the needs of the mobile users. There is no unique best solution. Since each of these apps has their strengths and weaknesses, the choice of one to the other depends on the unique needs of each company. A mobile version of the P2P Lending app provides users ubiquitous accessibility regardless of its type in contrast to desktop computer users who have limited access. The first mobile app, which is a native app, for P2P lending was developed by LendingRobot, and launched on April 2016. According to LendingRobot, the app tracks the overall status of an account and also provides insights to what is going on within a P2P lending portfolio. They found that 30% of their clients login several times a week with some logging in once a day. As some 20% of these users were already logging in from their smartphones using the website, the app was a natural addition to their offering. Thus, Lending Club, Prosper and Funding Circle investors can now manage their investments through a new mobile app offered by LendingRobot [31]. One important thing that should not be overlooked is that the new P2P mobile app is for investors, not the borrowers. The probable reason for this is that borrowers use the P2P platform when they apply for a loan. After applying for a loan and getting approved, payments come directly from the bank. Therefore, the P2P lending companies believe there is no incentive to develop mobile apps that would be used just once for the enrollment. On the other hand, investors might benefit from having an app, since their usage is repetitive. However, the goal is to make them deposit and use the diversification tools provided and let the company invest based on defined investment criteria, instead of hand-pick loans. That's probably the reason mobile apps for investors are not developed by platforms, however some third players had created apps with the tacit approval by companies [32].

The environment of Korean P2P lending companies are not that different from those in the U.S. The first mobile app for P2P lending in Korea was launched by HonestFund on April, 2016. The existing web based platform, which is a web app, provided just the basic information of the product for both the borrowers and investors. A recent article reported that most P2P lending companies in Korea is considering making changes to the platform to mobile apps – mostly to hybrid app, in order to provide investors a diverse information about their products [33]. However, most mobile apps for P2P lending companies in Korea have not yet been evaluated by the users since the mobile P2P lending app is relative new. As previously stated, the modern P2P lending companies started their businesses in late 2014. Since then, the P2P lending market has been growing rapidly. However, studies regarding user acceptance of the mobile apps for P2P lending companies are unavailable. Some studies focused on the factors, which influences the most on the borrowers when they select the P2P lending companies. Emekter et al. evaluated online P2P lending companies' credit risk and loan performance [34]. But, these studies used the cases of U.S. P2P lending companies. The case studies of evaluating P2P mobile apps in Korea have not been undertaken.

4. Evaluation of Mobile P2P Lending Applications

In order to build a conceptual model for evaluation of user's acceptance of the mobile applications, this study conducted a search for journal papers with the keyword of "mobile app evaluation", "user acceptance", "P2P lending app evaluation", and so on. However, studies on evaluation tools for user acceptance of P2P lending apps were nonexistent. Flood et al. examined the users' behavior during the mobile apps' lifecycle, but focused on user

interaction with the mobile apps having the case of spreadsheet apps [35]. Hanrahan et al. proposed several different rubrics and checklists to help users evaluate the relevance, quality, functionality, and security. But they validated the instruments for mobile medical apps only [36]. Choi developed an evaluation matrix for mobile applications to enhance usability and aesthetics. But this model seems to be valid only for graphic designers since she considered the design principles and factors for usability such as typography, visual hierarchy, grid-based layout, alignment, colors, etc [37]. The model developed by Pindeh and Suki [38], which was originally designed for mobile language learning app evaluation for Kadazandusun, seemed to be a appropriate candidate for evaluating the user acceptance of P2P lending apps. Even though the target users of their model is different from those of P2P lending apps, this model mainly focuses on user acceptance of mobile apps. Thus, instead of building a new conceptual model, this study decided to investigate the user's acceptance of mobile P2P lending apps using Pindeh and Suki (P&S) model since the objectives of both studies are investigating the user acceptance of the mobile apps. However, in the P&S model, all the data on the study was drawn from Kadazandusun language learners. Therefore, it is necessary to investigate the applicability of the P&S model based on data collected from a P2P mobile app users. Pindeh and Suki developed their evaluation model based on the Technology Acceptance Model (TAM), which was introduced by Davis [39]. Thus, for a better understanding of P&S model, it is necessary to first understand TAM.

4.1 Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) was developed by Davis et al. in 1989. The goal of TAM is “to provide an explanation of the determinants of computer acceptance that is general, capable of explaining user behavior across a broad range of end-user computing technologies and user populations, while at the same time being both parsimonious and theoretically justified” [39]. The elements of TAM had been extended by many other researchers even though the original TAM itself was useful [40]. The TAM2 extended the initial elements of the TAM by incorporating the concept of ‘Subjective Norm’ as another predictor of intent for mandatory system use [41]. The internal variables in the original TAM were: 1) perceived ease of use, 2) perceived usefulness, 3) attitude toward use, and 4) behavioural intention to use. The original TAM was illustrated in Fig. 1.

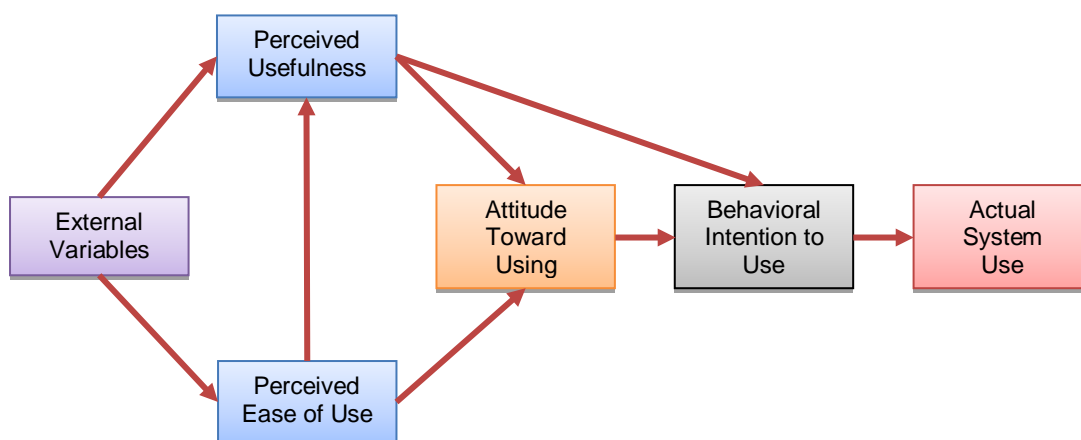


Fig. 1. Technology Acceptance Model [39]

TAM assumes that human behavioral intention is the result of a cognitive process that makes decisions [42]. This study applied the TAM model for the evaluation of users acceptance of P2P lending apps since it reflects the environment of the mobile apps usage in the related context. Hence, it is proposed that the users' acceptance of using mobile apps of P2P lending is influenced by their perceived ease of use, perceived usefulness, and user satisfaction. This in turn influenced their attitude towards using and behavioural intention to use the P2P mobile app.

4.2 Pindeh and Suki (P&S) Model

Apart from the variables of the TAM model, the additional variables used for P&S model are: 1) content richness, 2) user satisfaction, and 3) perceived playfulness. Pindeh and Suki stated that the widespread use of smartphones brought several mobile applications to language learners, but its acceptance has not been settled yet within the field. Thus, they built an user acceptance evaluation model by extending the original TAM model, and concluded that their conceptual model could be used to implement mobile apps for language learning [38].

4.3 Content Richness

Content richness is operationally defined as the inventory of resources that users can access to enhance their activity with a particular technology. The item measurement of content richness involves three dimensions: relevance, timeliness, and sufficiency [43]. In this study, the researcher accept the relevance and sufficiency definition but with the exception of credibility and timeliness. The researcher believes that, in the case of mobile app for language learning, credibility and also timelines is not practical in an individual's perceptive understanding of content. Several studies have showed that a higher perception of the content richness offered by a system leads to a higher perception of the usefulness of the system such as content quality [44] and information quality [45], two qualities that are closely related to the content richness were found to be major predictors of perceived usefulness. Mobile apps for P2P lending seemingly propose high perceptions of rich and new sources content. Collectively, it is expected that the degree to which users perceive that mobile apps of P2P lending content will influence its perceived usefulness.

4.4 User Satisfaction

User satisfaction is the degree to which users are satisfied and pleased with their prior use of an information system [46]. According to the previous studies, user satisfaction is a critical factor that affects the success and usage of the information system and most influential predictor of individual impacts such as user loyalty and intention [47]. The satisfaction intention suggests that the higher and lower user satisfaction, the more or less likely that the user will use the system. The standard version of the TAM did not consider the influence of user satisfaction on the acceptance of an information system. In continuance of this issue, the present study modifies the TAM by endeavoring to add user satisfaction into the construct's circle of concern.

4.5 Perceived Playfulness

Playfulness was defined by beliefs or reasons, that are formed by the individual's personal experience with the environment. It was stated that perceived fun, playfulness, and enjoyment are examples of essential motivation that are related to technology acceptance [48]. Cheong

and Park [49] verified that perceived playfulness helps people anticipate their intention to use the mobile Internet. This study investigates the importance of perceived playfulness as a predictor of the behavioral intention to use mobile apps for P2P lending. Therefore this study assumed that fundamental motivation in the form of perceived playfulness has a significant impact on intention to use mobile P2P lending apps.

5. Research Method and Hypotheses

5.1 Research Model

To verify the hypotheses, this research project used collection of data through a survey instrument, and performed a structural equation modeling (SEM) analysis. The SEM techniques include confirmatory factor analysis and path modeling. It can substitute factor-analysis and goodness-of-fit in regression analysis [39]. A goal of this study was to obtain insights into how P2P lending companies can plan and implement a successful mobile application that satisfies the user's intention to use. In order to do this, this study sought to validate the applicability of the P&S model. The four variables that were adopted from TAM are (i) Perceived Ease of Use (PEOU), (ii) Perceived Usefulness (PU), (iii) Attitude Toward Using, and (iv) Behavioral Intention to Use (IU). Another three variables which were added by Pindoh and Suki are (1) Content Richness (CR), (2) User Satisfaction (US), and (3) Perceived Playfulness. The conceptual framework of P&S model is shown in Fig. 2.

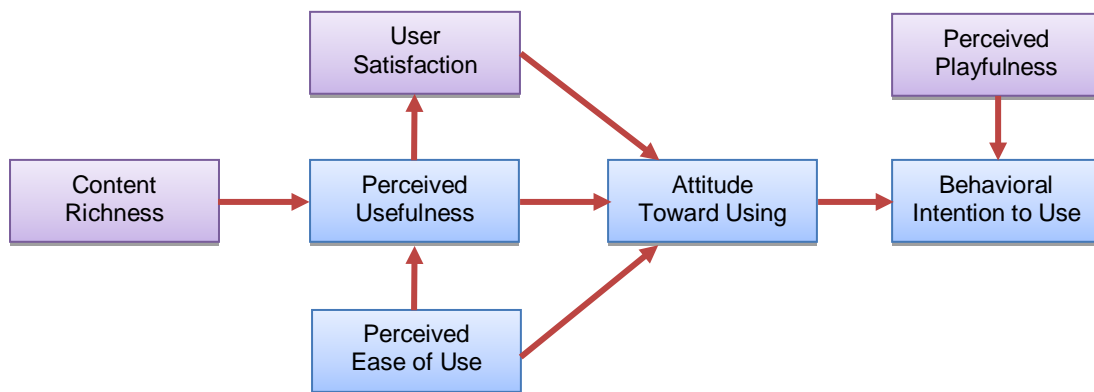


Fig. 2. Pindoh and Suki (P&S) Model [42]

5.2 Hypotheses

Based on the research framework that this study employed from P&S model, the following 8 hypotheses were proposed:

H1: Content richness of the mobile apps positively influences users' perceived usefulness of mobile apps of P2P lending.

H2: Perceived usefulness of the mobile apps positively influences users' satisfaction of mobile apps of P2P lending.

H3: Perceived ease of use of the mobile apps positively influences users' perceived usefulness of mobile apps of P2P lending.

H4: Perceived usefulness of the mobile apps positively influences users' attitude towards use mobile apps of P2P lending.

H5: Users' satisfaction of the mobile apps positively influences their attitudes towards use mobile apps of P2P lending.

H6: Perceived ease of use of the mobile apps positively influences users' attitude towards use of mobile apps of P2P lending.

H7: Attitude towards use of the mobile apps positively influences users' behavioural intention to use of mobile apps of P2P lending.

H8: Perceived playfulness of the mobile apps positively influences users' behavioural intention to use of mobile apps of P2P lending.

6. Data Analysis

6.1 Data Collection and Sampling Method

For the target population, participants had to have an experience of either borrowing or investing funds from P2P lending companies. In order to receive user data, we contacted M-bank, which was established on January, 2016. After obtaining users' contact information, each participants were contacted via email or phones asking to answer the survey questionnaire. As a result, we obtained responses from 112 people. The main survey was conducted on-line for a 30 day period of time (from June 1, 2016 to June 30, 2016).

6.2 Basic Analysis of the Sample

The collected sample was comprised of 57% female and 43% male subjects. For the age group, most of the respondents were 30-39 years old (44%). The second largest group fell into the 20-29 age range (31%). Respondents over the age of 50 comprised the smallest group of only 18% of respondents.

6.3 Reliability Analysis

The coefficient of Cronbach's alpha, so called internal consistency estimate of item scores, was measured to estimate the reliability of the item scores for the variables. A common rule of thumb for Cronbach's alpha is a rate of excellent if $\alpha > 0.9$, and good if $0.7 < \alpha < 0.9$. **Table 1** shows that the all the items' alpha were greater than 0.7. This indicates that all the items were internally strongly consistent. In other words, the survey questionnaire was solidly developed.

Table 1. Items and Reliability

Variable	# of Items	Items	Reliability (α)
1) Content Richness	4	cr1, cr2	0.83
2) User Satisfaction	2	us1, us2	0.90
3) Perceived Usefulness	2	pu1, pu2	0.87
4) Perceived Ease of Use	2	peou1, peou2	0.87
5) Attitude Toward Using	2	comp1, comp2	0.89
6) Perceived Playfulness	2	pp1, pp2	0.91
7) Intention to Use	4	iu1, iu2	0.96

6.4 Path Analysis

As previously stated, the SEM is a set of statistical techniques that include aspects of confirmatory factor analysis, regression, and path analysis. The path analysis was conducted using AMOS in order to get a path diagram, which is shown in [Fig. 3](#).

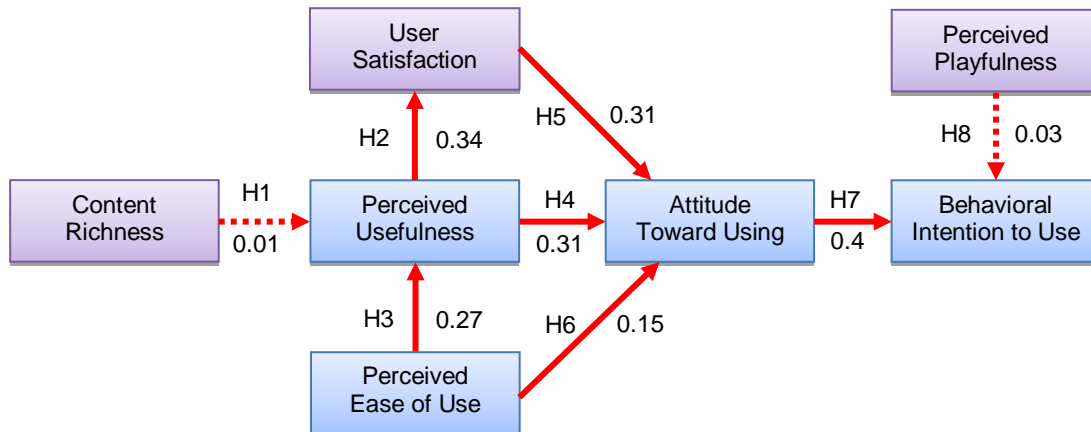


Fig. 3. Path Diagram for SEM Model

6.5 Results of Hypotheses Testing

As discussed in the previous section, two out of eight hypotheses were rejected. [Table 2](#) summarizes the results of hypotheses.

Table 2. Summary of Hypothesis Testing

No.	Alternate Hypothesis	Result
H1	Content Richness has positive impact on users' Perceived Usefulness.	Rejected
H2	Perceived Usefulness has positive impact on Users' Satisfaction.	Accepted
H3	Perceived Ease of Use has positive impact on Perceived Usefulness.	Accepted
H4	Perceived Usefulness has positive impact on Users' Attitude Toward Using.	Accepted
H5	Users' Satisfaction has positive impact on Users' Attitude Toward Using.	Accepted
H6	Perceived Ease of Use has positive impact on Users' Attitude Toward Using.	Accepted
H7	Attitude Toward Using has positive impact on users' Intention to Use.	Accepted
H8	Perceived Playfulness has positive impact on users' Intention to Use.	Rejected

As seen in [Table 2](#), all hypotheses except H1, and H8 were accepted. This implies that not all the variables in the model have significant impacts on user's usage behavior. Rejecting H1 indicates that the 'Content Richness' did not have an effect on 'Perceived Usefulness'. This implies that rich content with various and trendy information for the investment portfolio does not influence the users' perceived usefulness of the app. Similarly, rejecting H8 indicates that the 'Perceived Playfulness' did not affect the 'Intention to Use' implying that users does not regard mobile P2P lending app as a medium of fun, playfulness, and enjoyment. The variables that were employed from TAM were turned out to have a significant effect on other variables as they were in original TAM. Thus, it could be concluded that the variables that were adopted

from P&S model except the 'User Satisfaction' had no relationships with the users acceptance of the mobile P2P apps.

7. Conclusion

This study discussed user acceptance of the mobile P2P lending apps to investigate the mobile P2P lending app users to invest for profit making using the P&S model, which originally guided by the Technology Acceptance Model. [this is a run-on sentence and I don't know what this means at all. This study used a survey to obtain a better understanding of the users' behavioral intention to use, and analyzed the data using structural equation modeling technique. The data consisted of 112 people who had an experience of using mobile P2P lending platforms. This has been applied to examine the applicability of the P&S model in the mobile P2P lending apps. The result shows that the users' acceptance of mobile P2P lending apps are significantly influenced by perceived ease of use, perceived usefulness, and user satisfaction. These in turn influenced their attitude towards using mobile P2P lending apps and intention-to-use. This means that not all the factors in the P&S model were applicable for the users' acceptance of the mobile P2P lending apps. This shows that the P&S model is limited to language learning apps. Thus, the model is unhelpful in understanding users' acceptance of the mobile P2P lending apps.

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