# Integration Of Intention And Resistance In Adopting Near Field Communication-Based Mobile Payment Innovation

**Diananda Fitri Pitari, Gita Gayatri, Asnan Furinto, Sofjan Assauri**

**Abstract:** The purpose of this study is to determine the factors that influence the adoption behavior of NFC-based mobile payment. In exploring these factors, referring to the dual factor concept, this study enhances previous studies by integrating consumer intentions to adopt and resistance to adopt innovation in a research model. The research model was tested empirically using structural equation modeling (SEM) on data collected from 300 people targeting the market for NFC-based mobile payment products in Indonesia. Indonesia, which has the world's fourth-largest population, the second largest number of cash transactions in the world, and cellular phone penetration rates and unbanked bankable numbers that are still very high, is a promising market share for NFC-based mobile payment. Amid these conditions, the rate of adoption of NFC-based mobile payments in Indonesia is not yet satisfactory. From the results of empirical testing it is known that the behavior in adopting NFC-based mobile payment is influenced by consumers' intention to adopt, and resistance to adopt innovation. In addition to influencing innovation adoption behavior, consumer resistance to adopt innovation also influences consumer intentions to adopt the innovation. The consumer had perceptions that NFC-based mobile payment has advantages over existing innovations, by lifestyle and needs and are easy to use also need to be considered because it is proven to affect consumer intention to adopt NFC-based mobile payment.

**Index Terms**: adoption of innovation behavior; consumer intention to adopt innovation; consumer resistance to adopt innovation; NFC-based mobile payment; dual factor concept

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## 1.  INTRODUCTION

The high level of competition in the market encourages companies to innovate (Dubickis and Gaile-Sarkane, 2015 ). Innovation is an effort to display new combinations, either in the form of launching new products or services, implementing new methods, opening new markets, using new raw materials or creating or destroying monopolistic organizations (Schumpeter, 1934). The success or failure of an innovation depends on the level of adoption by consumers (Venkatesh, Morris, Davis, and Davis, 2003). The dependence of innovation success on the level of consumer adoption encourages marketers to ensure that innovation can be adopted by consumers (Hess, 2009).
When receiving information about innovations, consumers will go through a series of processes before deciding whether or not to adopt the innovation (Shim, Kim, and Altman, 2015). In this process, consumers first integrate their knowledge and beliefs and information in the environment to form new knowledge and beliefs (Peter and Olson, 2008). This knowledge and belief will be used in the evaluation process, which ultimately shapes consumer attitudes towards certain behaviors (Peter and Olson, 2008). This attitude further influences consumer intention to behave and is likely to become consumer behavior (Peter and Olson, 2008; Fishbein and Ajzen, 1975). Based on the process of forming these behaviors, the intention of most research on innovation

adoption is to adopt innovation as the dependent variable in the research (Hauser, Tellis, and Griffin, 2006; Rogers, 2003). In spite of the fact that there have been many studies of consumer intentions to adopt the innovation, the level of innovation that has been successfully introduced in the market has been very low and shown no signs of improvement (Andrew and Sirkin, 2003; Gourville, 2006). The low level of innovation adoption in the market raises the awareness of researchers in examining consumer resistance to adopt innovation, which can result in consumers deciding not to adopt an innovation (Cornescu and Adam, 2013). Consumer resistance to adopt innovation gets relatively less attention in studies on innovation adoption (Cornescu and Adam, 2013; Kuisma, Laukkanen, and Hiltunen, 2007; Kleijnen, Lee, and Wetzels, 2009; Heidenreich and Kraemer, 2015), with various contexts of innovation being investigated, while some researchers have tried to examine consumer resistance to adopt innovation (Talke and Heidenreich, 2014; Amaro and Duarte, 2015; Liébana-Cabanillas, Sanchez-Fernandez, and Munoz-Leiva, 2014; Laukkanen, 2016). From this description, it can be seen that in previous studies, consumer intentions to adopt, and resistance to adopt innovation were analyzed in separate research models. Whereas when innovation is present, consumers can respond with different reactions (Laumer and Eckhardt, 2010). Consumers may be resistant to the presence of innovation (Laumer and Eckhardt, 2010) or accept the presence of these innovations, wherein previous studies is expressed as an intention to adopt an innovation (Cornescu and Adam, 2013). Intention and resistance are known as the two extremes of reaction to innovation (Lapointe, Lamothe, and Fortin, 2002). Intention means being pro or supporting the presence of innovation. On the other hand, resistance refers to the persistence of someone in fighting the presence of innovation (Szmigin and Foxall, 1998). By only examining consumer intentions to adopt innovation, companies become too focused on the positive things about innovation, believing that the innovations they release are good and will be adopted by consumers, and their marketing

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strategies give less anticipation to hampering things (Cornescu and Adam, 2013; Kuisma et al., 2007; Kleijnen et al., 2009). Conversely, by only examining consumer resistance to adopt innovation, a company will focus on marketing strategies that anticipate negative things that hinder adoption, and ignore the advantages of these innovations in their strategies (Cronin, Brady, and Hult, 2000; Chemingui and Ben Iallouna, 2013). Based on this description, this study provides a more comprehensive research model than previous studies by integrating consumer intentions to adopt innovation with consumer resistance to adopt innovation in a research model to predict innovation adoption behavior. Near field communication-based mobile payment (NFC-based mobile payment) is one form of innovative mobile payment that allows consumers to turn their cell phones into digital wallets (Pham and Ho, 2015). This innovation is in line with conditions in the market where the number of cellular telephone users in the past few years has increased significantly (Liébana-Cabanillas et al., 2014) and mobile services are increasingly becoming a part of consumers' daily lives, especially regarding payments (Chang, Hwang, Hung, and Li, 2007). The NFC-based mobile payment organizer has a high desire to develop it, and is optimistic about doing so, as payment technology in the future and can create a variety of new business opportunities (Mullen, Riley, Husson, Glass, and McDavid, 2012). Behind this optimism, the application of NFC-based mobile payment is still very limited (Tan, Keng-Boon, Siong-Choy, and Teck-Soon, 2014). Consumers still have doubts about adopting NFC-based mobile payments (Pham and Ho, 2015). In other words, the development of NFC innovation is experiencing a paradoxical condition, where on the one hand researchers and NFC-based mobile payment companies are highly optimistic about this innovation, while on the other, consumers are still hesitant to use the mobile payment method (Pal, Vanijja, and Papasratorn, 2015; Madureira, 2017). Viewed from the level of cellular telephone penetration, it reached 67.17% in Indonesia in 2018 (Indonesia Digital Landscape, 2018). This figure is far greater than the penetration of bank accounts, which only reached 36% (Indonesia Digital Landscape, 2018). This gap shows that the opportunity to use NFC-based mobile payment as an Indonesian consumer payment method is quite high. This high opportunity is also seen by the three largest cellular operators in Indonesia. They feel optimistic that the innovation of NFC-based mobile payment can continue to grow. Unfortunately, to date, the number of NFC-based mobile payment users is still very small compared to the predicted market potential (Suharto, 2015). Based on the model developed, this study aims to examine consumer intentions to adopt innovation and the resistance of consumers to adopt innovation in the behavior of adopting NFC-based mobile payments in a single framework. Also, this research also investigates the factors that influence consumer intention to adopt innovation and the factors that shape consumer resistance to adopt innovation, so that it can provide a complete picture regarding the factors that influence the adoption of NFC-based mobile payment behavior. The next section will provide a general description of NFC-based mobile payment along with the theories underlying the model developed. The explanation will be followed by the hypotheses to be tested, a detailed explanation of the research methodology, test results, discussion, implications for both scientific and managerial and a conclusion.

## 2. THEORETICAL FRAMEWORK

### 2.1. NFC-based Mobile Payment

NFC technology was born from a combination of RFID technology and contactless smart cards (Madlmayr et al., 2008). NFC devices can operate in the frequency range of 13.56 MHz and can process data exchange with speeds of 106, 212 or 424 Kbit/s (Azhari, 2014). Azhari (2014) stated that NFC is usually identified with the process of exchanging data using "touch," "close wave" methods and "tap" methods (Volpentesta, 2015). NFC allows two adjacent pieces of hardware (no more than 10 centimeters apart) to communicate with each other (Luo, Yang, and Huang, 2016). The technology initiated the creation of NFC-based mobile payment innovations that enable consumers to make payments by simply shaking their smartphone near the reader or point of sale (Leong, Hew, Tan, Garry, and Ooi, 2013). The NFC-based mobile payment innovation was introduced to address the shortcomings of previous mobile payment methods such as the Wireless Application Protocol (WAP), Unstructured Supplementary Data Services (USSD), Short Messaging Services (SMS) and General Packet Radio Service (GPRS), which tend to be difficult to use (Ondrus and Pigneur, 2007) and require considerable effort and time to learn how to use them (Ooi and Tan, 2016). NFC-based mobile payment is here to meet consumer needs for offline purchases, which cannot be met by its predecessor mobile payment methods (Slade, Williams, and Dwivedi, 2013) Indonesia is a potential market share for financial technology (Fintech) companies to develop NFC-based mobile payment services. This is because, based on the research of Indonesia Digital Landscape in 2018, it is known that only 36% of the bankable population in Indonesia have a bank account (Indonesia Digital Landscape, 2008), while the percentage of cell phone ownership in Indonesia, whether smartphone or not, reaches 90% of the bankable population. NFC-based mobile payment services can empower cellular phones owned by unbanked bankable populations to work on their financial transactions. The three largest telecommunication operators in Indonesia also looked at the market potential and developed their fintech business by launching NFC-based mobile payment products in 2015. In 2016, Statista predicted that the NFC-based mobile payment market share in Indonesia in 2018 would reach 1.1 million customers (Statista, 2016). In fact, in 2018, there were no more than 500,000 NFC-based mobile payment users. To increase the number of NFC-based mobile payment users, this research is expected to be able to provide input to NFC-based mobile payment service providers regarding the factors that influence NFC-based mobile payment consumer adoption behavior.

### 2.2. Consumer Intention to Adopt Innovation

One of the outputs of decisions made by consumers on innovation is accepting or adopting the innovation. In previous studies, the acceptance of these innovations was a manifestation of consumer intentions to adopt the innovation. Consumer intention to adopt innovation shows the extent to which consumers are consciously interested in adopting, or willing to adopt, innovation (Venkatesh et al., 2008). Previous studies state that several variables influence consumer intentions to adopt the innovation, with relative advantages, complexity, compatibility, trialability, and observability, as in

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the Innovation Diffusion Theory (IDT) concept (Rogers, 2003), being the main variables that do so. These main variables are also used by this study to reflect the variety of consumer intentions to adopt innovations, except for the trialability and observability variables. The dating of the two variables is done because it is not by the innovation under study. Consumers tend to conduct financial transactions in a private and nontrial manner (Tan-Thao and Jonathan, 2015). The same conclusion was also drawn by Tan and Teo (2000) and AL-Majali and Mat (2011) in the analysis of Internet banking innovation adoption. Relative advantage shows the extent to which an innovation is considered something better or more beneficial than existing ideas (Rogers, 2003). Compatibility indicates the consistency between innovation and the values, lifestyles, and needs of potential users (Rogers, 2003). Complexity is defined as the extent to which an innovation is considered difficult to understand and use (Rogers, 2003).

## 2.3. Consumer Resistance to Adopt Innovation

In addition to accepting or adopting innovations, the output of decisions made by consumers on innovations can be in the form of rejection or not using innovation. Refusal to use innovation is a manifestation of consumer resistance to adopt the innovation (Szmigin and Foxall, 1998). Consumer resistance to adopt an innovation is a negative attitude on the part of consumers towards innovation formed by functional barriers and psychological barriers based on consumer evaluation of the characteristics of innovation (Heidenreich and Handrich, 2014). Ram and Sheth (1989) divide functional barriers into usage barriers, value barriers, and risk barriers, while psychological barriers are specifically divided into tradition barriers and image barriers. A usage barrier is an obstacle that arises due to the incompatibility of innovation with consumer habits (Ram and Sheth, 1989). Unlike a usage barrier, a value barrier is a barrier that arises due to the performance and monetary value of innovation compared to existing products (Ram and Sheth, 1989). In conjunction with functional barriers, barriers arising from uncertainty about innovation are referred to as risk barriers (Ahmad & Ahmad, 2018). Risk itself is a variable formed from a multidimensional construct (Crespo, Rodríguez del Bosque, and Sanchez, 2009; Mitchell and Harris, 2005), where for financial products, financial risk, privacy/security risk, and performance risk are included in the dimensions of risk (Lee, 2009). In terms of psychological barriers, tradition barriers are obstacles that arise as a result of changing habits as an impact of the use of innovation. Unlike a tradition barrier, an image barrier is an obstacle that arises due to factors related to the origin of an innovation such as product class, technology, industry or company name (Ram and Sheth, 1989). The image has a function as an extrinsic signal from an innovation that can be the basis of consumer adoption and rejection decisions (Kleijnen et al., 2009). The negative image of innovation can cause consumer resistance to adopt the innovation (Ahmad & Ahmad, 2019). Based on the grouping resistance forming the consumer adopts the innovations above, then in this study consumer resistance to adopt an innovation is measured by making it the first order of the constructs of usage barriers, value barriers, risk barriers, tradition barriers, and image barriers. The mechanism for measuring resistance is also used in research into the adoption of innovative wireless financial transactions such as Internet banking adoption research (Kuisma et al., 2007), mobile financial services (Chemingui

and Ben Lallana, 2013) and wireless finance (Kleijnen et al., 2009).

## 2.4. The Integration of Consumers' Intention and Resistance in Adopting Innovation

Cenfetelli (2004) argued that consumer intentions and resistance regarding adopting an innovation are in line with the dual factor concept, namely intentions and user behavior, where perception itself can be grouped into two categories, namely enablers and inhibitors. Enablers encourage consumers to adopt the innovation, while inhibitors of consumer innovation encourage consumers to reject innovation. Inhibitors can be distinguished from enablers. Inhibitors are not just the opposite of coworkers. Inhibitors and regulators have different consequences and causes of user adoption decisions (Cenfetelli, 2004). The dual factor concept, integrating consumer intentions to adopt innovation and consumer resistance to adopt the innovation, is also in line with the theory of change behavior developed by Lewin (1947). In this theory, it is explained that changes in a person's behavior are influenced by his intention to change and the resistance that impedes change. Behavior changes shown by consumers are a dynamic balance between the two (Lewin, 1947). The process of adopting innovation itself can be identified as a change in behavior because it can make major changes in the lives of consumers, changing the routines and habits of consumers in their daily lives (Cornescu and Adam, 2013).

## 3. Model and Hypotheses

Consumer decisions about innovations can be in the form of rejection or not using innovation, or acceptance, which means using innovation (Rogers, 2003). Rejection is a behavior that is formed from consumer resistance to adopt the innovation (Szmigin and Foxall, 1998), while acceptance is a behavior formed from consumer intentions to adopt the innovation (Venkatesh et al., 2008). When innovation is present, consumers will evaluate its attributes and characteristics (Heidenreich and Spieth, 2013; Rogers, 2003). If their perceptions of certain attributes possessed by an innovation do not meet their expectations (Ram, 1987), then barriers will arise, lead to consumer resistance to adopt the innovation, and result in reduced consumer intention to adopt the innovation as well as adoption behavior from innovation (Kuisma et al., 2007; Kleijnen et al., 2009; Heidenreich and Spieth, 2013). By making the consumer expectations variable adopt innovation a predictor of innovation adoption behavior, it can be hypothesized as follows: H1: Consumer resistance to adopt innovation will negatively affect: (a) consumer intention to adopt NFC-based mobile payment; (b) consumer expectations to adopt NFC-based mobile payment. Consumer intention to adopt an innovation is a precursor to the formation of consumer expectations regarding adopting the innovation (Warshaw and Davis, 1984; Venkatesh et al., 2008). Furthermore, it is explained that when consumer intentions to adopt an innovation are high, consumers' expectations of adopting an innovation are also increasingly high (Warshaw and Davis, 1984; Venkatesh et al., 2008). The positive influence of consumer intentions to adopt innovation on consumer expectations of adopting an innovation is also noted by Sheppard, Hartwick, and Warshaw (1988) and Maruping, Bala, Venkatesh, and Brown (2017).

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H2: Consumer intention to adopt innovation positively influences consumer expectations to adopt NFC-based mobile payment.

When consumers see that new products are more profitable than existing products, they will feel that the products are useful for them. The positive effect of relative advantages on consumer intentions to adopt innovation is revealed by previous research (Heidenreich and Spieth, 2013; Amaro and Duarte, 2015; Kim, Ma, and Kim, 2006; Wong and Law, 2005; Tan and Teo, 2000); Lu, Yang, Chau, and Cao, 2011; Yang, Lu, Gupta, Cao, and Zhang, 2012). Being free from the long cashier queue and free from the unavailability of the right change are the advantages of NFC-based mobile payments that consumers feel compared to cash and card payment methods. Consumers also feel the benefits of practicality because they can make payments with cellphones, which they always carry everywhere, compared to cash and cards in the wallet (Liébana-Cabanillas et al., 2014; Mallat, 2007).

H3: Relative advantage positively influences consumer intention to adopt NFC-based mobile payment.

Complexity is defined as the extent to which an innovation is considered difficult to understand and use (Liébana-Cabanillas et al., 2014; Lee, 2009). Innovations that are easier to use will be considered more useful and will form consumer intentions to adopt them (Ozkan and Kanat, 2010). Compared to the various existing methods of mobile payment, NFC-based mobile payment adoption requires less effort in terms of the learning process and its use, and this encourages potential users to like it (Ooi and Tan, 2016). The payment process is done by bringing the cellular phone closer to the NFC reader, without the need to swipe the card; this is a convenience offered by NFC-based mobile payment compared to other mobile payment methods (itbusinessedge, 2015). The absence of a complicated registration process before being used makes NFC-based mobile payment easier to use, and when perceived as easy to use and learn, consumers tend to have the intention to adopt it (Ooi and Tan, 2016).

H4: Complexity negatively affects consumer intentions to adopt NFC-based mobile payment. Compatibility is defined as the consistency of innovation with the values, lifestyles, experiences, and needs of potential users (Rogers, 2003). Compatibility is one of the determinants of innovation adoption, where high compatibility will accelerate the process of adopting an innovation (Rogers, 2003; Agarwal and Prasad, 1997; Hanafizadeh, Behboudi, Koshksaray, and Shirkhan, 2014; Howard, 2004). Several previous studies confirmed the positive influence of compatibility on the adoption of innovations, such as Tan and Theo (2000), Yang et al. (2012) and Wong, Tan, Tan, and Ooi (2015). In the context of NFC-based mobile payment, the more suitable the mobile payment service is in regard to general habits and consumer lifestyle, the more consumers tend to have the intention to adopt these innovations, because in the context of mobile payment services, people's lifestyles will greatly influence their decision to adopt (Lu et al., 2011). Thus, it can be hypothesized that:

H5: Compatibilty positively influences consumer intention to adopt NFC-based mobile payment.

Based on the description above, the research model proposed in this study can be described as follows:
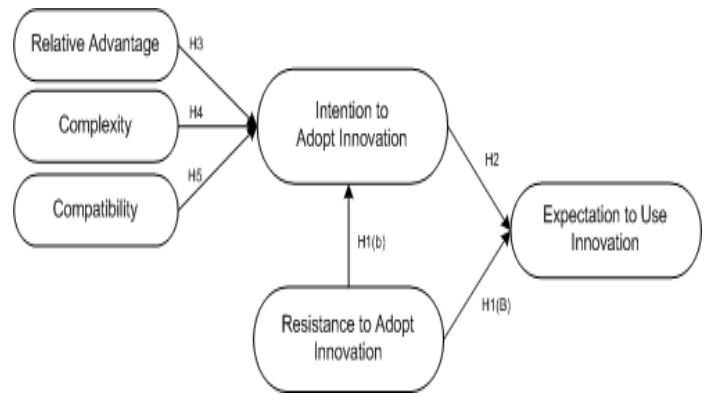


*Figure 1.* Research Model.

In answering this hypothesis, this research refers to the dual factor concept (Cenfetelli, 2004), innovation diffusion theory (Rogers, 2003) and consumer resistance to innovation (Ram and Sheth, 1989).

## 4. METHODOLOGY

### 4.1. Instrument Development
The survey instrument used in this study was a questionnaire. The question items used in the survey instrument were based on our review of existing and past literature relevant to the research model. The question items were derived from various types of coverage, which represented sufficient coverage of the variables within the context of the study. Some of the words were modified and rewritten to fit the context of NFC-based mobile payment. The research was anchored on a five-point Likert-type scale measurement varying from "1 (strongly disagree)" to "5 (strongly agree)." Relative advantage items for measuring were adapted from Chemingui and Ben Lallouna (2013) and Khan and Hyunwoo (2009). Complexity was measured using items that originated from Leong et al. (2013). Compatibility with scale was derived from the studies by Chemingui and Ben Lallouna (2013) and Holak and Lehmann (1990). The measurements of usage barriers and value barriers were developed and validated by Heidenreish and Spieth (2013). Items for measuring risk barriers were adapted by Veloutsou and Bian (2008). Resistance barriers were measured using items originating from Chemingui and Ben Lallouna (2013). Image barriers from a scale were derived from studies by Chemingui and Ben Lallouna (2013) and Laukkanen (2016). About the intention to adopt an innovation, the construct measured from items was derived from Venkatesh et al. (2008). Finally, the measurements for the expectation of adopting innovation were also taken from Venkatesh et al. (2008). A pretest was also carried out to ensure that the questionnaires had no semantic problems. Some of the questions and lengths of the questions, lengths of instruments and the completeness of the content. The instruments were then further tested with 30 NFC-based mobile payment targets to test their validity and reliability, before finally being used in the test game (Malhotra, 2007). The questionnaire is composed of two subsections. The first is focused exclusively on the respondents' demographic characteristics. The second is focused on the main constructs of the model with 32 questions asked.

## 4.2. Sampling Procedure and Data Collection

The three major operators in Indonesia who are providers of NFC-based mobile payment services make cellphone for users aged 17 and over, with a minimum education level of junior high school, whose monthly expenditure is more than Rp. 500,000 (for students, excluding school-related needs) or more than Rp. 1.5 million (for nonstudents), and who have not used NFC-based mobile payment as their target market. The target market is the population of this study. From this population, there were as many as 30 respondents to the pilot test and as many as 300 respondents to the main test, selected by nonprobabilistic convenience sampling. Of the 300 respondents who were selected for the main test, the composition of respondents who were male was balanced with women. The majority are in the village and aged 31–40 (45%). As regards the highest level of academic qualification, the results also show that a large number of respondents have at least a senior high school education. Noticeably, 43.3% of respondents work as employees/civil servants/private employees, and 40% of respondents are students. Of the respondents who are students, 74.167% have an allowance of Rp. 500,000, - s.d. Rp. 1,000,000, whereas among the non-student respondents, the majority of their incomes are more than 2.1 million (> Rp. 2,100,000). The process of collecting data from respondents was carried out using a paper-based survey conducted in Jakarta. Jakarta was chosen because, according to Deloitte (2015), it represents over 10% of Indonesia's GDP. Jakarta is not only the wealthiest province but also the political and cultural capital of the country. The capital region provides a diversified base for economic activity in various sectors, such as financial services (Deloitte, 2015). The penetration rate of cellphone users in Jakarta reaches 100% (Deloitte, 2015). Thus this would give fair presentational characteristics of the general population in Indonesia and NFC-based mobile payment target users, which are relevant to the context of this study. Before the respondents filled out the questionnaire, the respondents who had been selected were asked to gather in designated rooms, given an explanation of the purpose of this study along with guarantees of anonymity of answers and personal data they included, as well as the absence of correct or incorrect judgments on the answers expressed by respondents. Furthermore, to harmonize the similarity of understanding of the innovation of NFC-based mobile payment, respondents were asked to watch a video about NFC-based mobile payment services. This approach has been widely adopted in recent years by international researchers (Tan et al., 2014b). The video used in explaining the previous NFC-based mobile payment service had gone through a process of evaluation of physical aspects, including viewability, timing and duration, cognitive aspects, which include describability, accuracy, completeness and being easy to follow, as well as effective aspects including engagement, as Carliner's Three-part Framework for Information Design (Carliner, 2000). The evaluation process was carried out by multimedia experts, NFC-based mobile payment service managers and NFC-based mobile payment users.

# 5. DATA ANALYSIS

## 5.1. Reliability and Validity

Validity testing was done using data collected from 30 respondents to the pilot test. The testing was performed by using confirmatory factor analysis (CFA), while reliability testing was done using Cronbach's alpha coefficient. Both tests are carried out using SPSS 23.0 tools. As shown in Table 1, it was known that all items in the questionnaire are valid. This was indicated by the Kaiser-Meyer-Olkin value (KMO) > 0.5, the value of measure of sampling adequacy (MSA) >0.5, the value of communalities (comm) >0.5 and the component matrix (comp matrix) > 0.5 (Malhotra, 2007), while for reliability analysis, a Cronbach's alpha test had shown that all construct values ≥ 0.70 (Hair et al., 2006), hence all constructs used in this research were reliable.

*TABLE 1*
*The Result of the Pilot Test*

| Construct | Item | KMO | MSA | Comm | Comp Matrix | Cronbach's Alpha |
|---|---|---|---|---|---|---|
| RA | RA1 | 0.709 | 0.701 | 0.753 | 0.868 | 0.828 |
|  | RA2 |  | 0.771 | 0.691 | 0.831 |  |
|  | RA3 |  | 0.672 | 0.788 | 0.888 |  |
| COB | COB1 | 0.697 | 0.690 | 0.729 | 0.854 | 0.807 |
|  | COB2 |  | 0.763 | 0.660 | 0.812 |  |
|  | COB3 |  | 0.657 | 0.776 | 0.881 |  |
| COX | COX1 | 0.705 | 0.772 | 0.732 | 0.856 | 0.863 |
|  | COX2 |  | 0.717 | 0.775 | 0.880 |  |
|  | COX3 |  | 0.650 | 0.851 | 0.923 |  |
| UB | UB1 | 0.668 | 0.895 | 0.700 | 0.837 | 0.901 |
|  | UB2 |  | 0.625 | 0.891 | 0.944 |  |
|  | UB3 |  | 0.606 | 0.921 | 0.960 |  |
| VB | VB1 | 0.717 | 0.713 | 0.798 | 0.893 | 0.870 |
|  | VB2 |  | 0.667 | 0.847 | 0.920 |  |
|  | VB3 |  | 0.795 | 0.738 | 0.859 |  |
| RB | RB1 | 0.626 | 0.610 | 0.587 | 0.624 | 0.825 |
|  | RB2 |  | 0.737 | 0.530 | 0.636 |  |
|  | RB3 |  | 0.667 | 0.745 | 0.740 |  |
|  | RB4 |  | 0.689 | 0.772 | 0.727 |  |
|  | RB5 |  | 0.596 | 0.790 | 0.843 |  |
|  | RB6 |  | 0.554 | 0.897 | 0.809 |  |
| TB | TB1 | 0.704 | 0.716 | 0.719 | 0.848 | 0.817 |
|  | TB2 |  | 0.744 | 0.693 | 0.833 |  |
|  | TB3 |  | 0.663 | 0.784 | 0.886 |  |
| IB | IB1 | 0.615 | 0.642 | 0.692 | 0.832 | 0.826 |
|  | IB2 |  | 0.572 | 0.871 | 0.933 |  |
|  | IB3 |  | 0.656 | 0.670 | 0.819 |  |
| IUI | IUI1 | 0.654 | 0.604 | 0.837 | 0.915 | 0.817 |
|  | IUI2 |  | 0.652 | 0.738 | 0.859 |  |
|  | IUI3 |  | 0.752 | 0.628 | 0.792 |  |
| EUI | EUI1 | 0.701 | 0.746 | 0.741 | 0.861 | 0.859 |
|  | EUI2 |  | 0.646 | 0.849 | 0.921 |  |
|  | EUI3 |  | 0.732 | 0.752 | 0.867 |  |

## 5.2 Model and Hypotheses Analysis

Using data collected from 300 respondents to the main survey, testing the research model and hypotheses was conducted using the structural equation modeling (SEM) method using LISREL. In Table 2, it can be seen that all constructs used in this study are valid. This is expressed by the t-values of ≥ 1.96 and the standardized factor loading (SFL) of 0.5 (Wijanto, 2015). Besides being valid, all indicators used in this study are also stated as being reliable. This is indicated by the amount of construct reliablity (CR), 70.7, and variance extracted (VE), 50.5 (Wijanto, 2008). By looking at the value of the test results for all the goodness-of-fit criteria (Table 3), it can be seen that the processed data were declared to fit the research model. This is indicated by the value of the test results for each criterion exceeding the critical value. From the value of the t-value shown in Fig. 4, it is known that the overall research hypothesis is supported by the collected data.
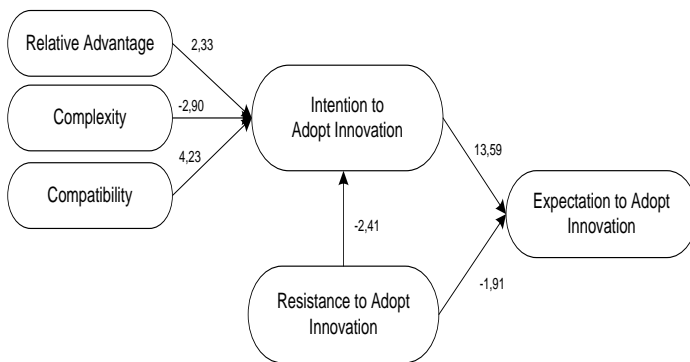
*Figure 2. The Result of Hypothesis Testing.*

**TABLE 2**
*The Results of Validity Testing and Model Reliability*

| Construct | Item | SFL | t-values | CR | VE |
|---|---|---|---|---|---|
| RA | RA 1 | 0,76 | 13,93 | 0,766 | 0,523 |
| | RA 1 | 0,66 | 8,43 | | |
| | RA 1 | 0,73 | 11,17 | | |
| COB | COB 1 | 0,84 | 16,55 | 0,789 | 0,556 |
| | COB 1 | 0,69 | 12,97 | | |
| | COB 1 | 0.70 | 13,32 | | |
| COX | COX 1 | 0,83 | 16,55 | 0,891 | 0,732 |
| | COX 1 | 0,89 | 12,87 | | |
| | COX 1 | 0,84 | 13,32 | | |
| RUI | UB | 0.58 | 9,22 | 0,794 | 0,513 |
| | VB | 0,73 | 21,97 | | |
| | RB | 0,65 | 3,36 | | |
| | IB | 0,74 | 5,57 | | |
| | TB | 0,73 | 12,39 | | |
| IUI | IUI 1 | 0,95 | 22,06 | 0,904 | 0,762 |
| | IUI 2 | 0,91 | 20,33 | | |
| | IUI 3 | 0,74 | 14,86 | | |
| EUI | EUI 1 | 0,72 | 15,71 | 0,861 | 0,673 |
| | EUI 2 | 0,82 | 17,03 | | |
| | EUI 3 | 0,85 | 17,52 | | |

**Table 3**
*Goodness-of-Fit*

| Goodness of Fit Measure | Critical Point | Result |
|---|---|---|
| Probabilitas dan statistik *Chi-Square* | ≥ 0,05 | X² = 215,42; p=0,12 |
| The Root Mean Square Error of Approximatian (RMSEA) | ≤ 0,08 | 0,057 |
| Goodness of Fit Index (GFI) | ≥ 0,9 | 0,95 |
| Adjusted Goodness-of-Fit Index (AGFI) | ≥ 0,9 | 0,94 |
| Normed Fit Index (NFI) | ≥ 0,9 | 0,97 |
| Comparative Fit Index (CFI) | ≥ 0,9 | 0,98 |

## 6. DISCUSSION

This study contributes to the adoption of NFC-based mobile payment index literature by implementing the dual factor concept (Cenfetelli, 204), which enables evaluation of the factors that influence overall NFC-based mobile payment adoption behavior, in terms of supporting NFC-based consumers' mobile payment, and those that prevent consumers from adopting NFC-based mobile payment. There are still very few studies that examine those two simultaneously in the literature on adoption of NFC-based

mobile payment. With regard to the result of hypothesis testing reflected as H1 (a) and H2, it can be concluded that consumer behavior in adopting NFC-based mobile payments is simultaneously influenced by instances of adopting innovation and resistance to adopt innovation, where consumer intention to adopt innovation influences NFC-based consumers to adopt mobile payment behavior that is positive, whereas consumer adoption influences consumer behavior adopting negative NFC-based mobile payments. This result is in line with Warshaw and Davis's research (1985), as well as that of Venkatesh et al. (2008) and Mahardika et al. (2009), which prove that intention is one of the determinants of behavior, which positively influences consumer expectations to adopt innovation, and this is also in line with the research by Kuisma et al. (2007). Laukkanen, Sinkkonen, Kivijarvi, and Laukkanen (2007) concluded that resistance was able to deter consumers from innovation adoption. In addition to influencing consumer behavior to adopt NFC-based mobile payment and in line with the results of testing hypothesis H1, it was found out that (b), resistance also influences intention to adopt an innovation, as consumer intention to adopt NFC-based mobile payment will increase when consumer resistance adopts declining innovation in NFC-based mobile payment. These findings corroborate the research of Heidenreich and Spieth (2013), which revealed that resistance is formed after consumers evaluate the attributes of an innovation, resulting in a decrease in consumer intention to adopt the innovation, in addition to reducing the likelihood of consumers adopting the innovation. As regards the factors of consumer intentions to adopt the innovation, referring to the results of testing hypotheses H3 and H5, the perception that NFC-based mobile payment is better and more useful than existing payment methods (relative advantage). Furthermore, the perception that NFC-based mobile payment is consistent with consumer lifestyle and needs exerts a positive, important influence on consumer intentions to adopt NFC-based mobile payment. In the context of mobile financial technology, research from Yang et al. (2012) and Brown et al. (2003) also concluded the same thing, namely that when a mobile financial technology is perceived to be better than existing financial technology and is in accordance with the lifestyle and needs of consumers, consumer intention to adopt mobile financial technology will increase. Other studies outside the context of mobile financial technology, such as Amaro and Duarte (2015), Kim et al. (2006) and Wong and Law (2005), also prove the positive influence of relative advantage and compatibility on consumer intentions to adopt the innovation. Still related to the factors affecting the intention of consumers to adopt the innovation, in contrast to the relative advantages and compatibility that give a positive influence on consumer intentions to adopt the innovation, the perception that NFC-based mobile payment is difficult to understand and use has a negative influence on consumer intention to adopt NFC-based mobile payment. The results of the study from Laukkanen and Lauronen (2005) related to the adoption of mobile banking innovations also provide similar conclusions, namely the more innovation is perceived to be difficult to use, the lower the consumer's intention to adopt it in the future. Thus, to increase consumer intention to adopt the innovation, the perception of relative advantage and compatibility needs to be improved, while the perception of complexity needs to be suppressed. In terms of consumer resistance to adopt innovation, referring to the results of validity and reliability and the goodness of fit of the

results in Tables 2 and 3, it can be concluded that this is in line with the theory of consumer resistance (Ram and Sheth, 1989), stating that the perception that NFC-based mobile payment is not in accordance with which is run by consumers (usage barrier), has no performance or monetary value that is better than the existing payment method (value barrier), has a high risk (risk barrier), demands the existence of a significant habit change (tradition barrier), and has a less good image, both in terms of products and technology and its implementation by companies (image barrier). These are the factors forming consumer resistance to adopt NFC-based mobile payment. As factors forming resistance, the five barriers need to be considered when managers of NFC-based mobile payment services want to suppress the resistance of consumers to adopt these services.

# 7. IMPLICATION

### 7.1. Theoretical Implication
Referring to the results of the hypothesis test, this research provides a theoretical contribution in the form of a combination of the expansion of theory in a new context and the application of theory in a new context. This contribution is shown by proving that both consumer resistance to adopt innovation and consumer intention to adopt innovation have a concurrent role in determining innovation adoption decisions, wherein the majority of previous studies their influence on innovation adoption decisions was considered to be something separate so that it was not examined simultaneously. The empirical test results of this study prove the application of the dual factor concept of Cenfetelli (2004), which states that consumer behavior not to adopt an innovation is influenced by resistance to adopt the innovation, while consumer behavior to adopt an innovation is influenced by consumer intention to adopt the innovation. In other words, the intention to adopt innovation as well as resistance to adopt innovation have different consequences for the behavior of innovation adoption. Intention to adopt innovation and resistance to adopt innovation also have different causes, so to explain consumer adoption behavior both must be examined simultaneously in a research model (Cenfetelli, 2004). By integrating both, this study provides a more comprehensive model in understanding the adoption of NFC-based mobile in comparison with traditional adoption models.

### 7.2. Managerial Implication
NFC-based mobile payments service providers should take these findings into account if they want to increase the number of consumers who adopt NFC-based mobile payment. They must consider the factors that influence consumer intention to adopt NFC-based mobile payment as well as the factors that influence consumer resistance to adopt NFC-based mobile payment because both simultaneously influence the adoption decision regarding NFC-based mobile payment. To increase consumer intentions to adopt NFC-based mobile payment, they must be able to communicate the relative advantages of NFC-based mobile payment compared to other payment methods, indicating that they use uncomplicated NFC-based mobile payment and NFC-based mobile payment according to payment requirements. This is done because, based on the results of the study, it is known that these factors have a positive influence on consumer intentions to adopt NFC-based mobile payment. Still to increase the number of consumers

who adopt NFC-based mobile payment, NFC-based mobile payment service providers need to be convinced in their marketing communication that using NFC-based mobile payment does not require a significant change of habits on the consumer side. The lack of risk that consumers will encounter when adopting NFC-based mobile payment along with the excellent performance and monetary value of NFC-based mobile payment compared to other payment methods is also something that needs to be highlighted in the socialization of NFC-based mobile payment service providers to consumers. The reliability of NFC in carrying out its role as a payment method is also an important point that needs to be conveyed to consumers in addition to the reliability of mobile telecommunication operators and service providers in managing NFC-based mobile payment products. These points are important to convey because they can suppress consumer resistance to adopt NFC-based mobile payment based on research results.

# 8. Limitations and Future Directions
Although this study has used the variable consumer expectations to adopt innovation in predicting innovation adoption behavior, the variable is proven to predict better the behavior of adoption of innovation than just the interest in adopting an innovation. This prediction will be even better if it is continued by research that is longitudinal so that it is not limited to predictions but is actually in the form of behavior. The spread of sampling to a wider area can produce conclusions that better describe the situation of consumers in Indonesia. Several variables, such as trust and perceived enjoyment, can be included in the model and tested for their role.

# 9. CONCLUSION
Based on the presentation of the results of the discussion in the discussion section, with the knowledge that the consumer intention to adopt innovation and resistance to adopt innovation towards the adoption of NFC-based mobile payment behavior, the role of relative advantages, compatibility and complexity in consumer intentions to adopt innovation, and the effect of usage barriers, value barriers, tradition barriers, risk barriers and image barriers on consumer resistance to adopt innovation, this study is able to fulfill the purpose of this study, which is to provide a more comprehensive picture regarding the factors that influence the adoption of NFC-based mobile payment behavior. Referring to the dual factor concept, this study can fill the gaps in previous research related to the adoption of NFC-based mobile payment, through a model that integrates factors that support consumers adopting NFC-based mobile payment as well as factors that prevent consumers from adopting NFC-based mobile payment. By considering the supporting factors and behavioral barriers to adopt NFC-based mobile payment, the results of this study provide input for NFC-based mobile payment service managers to be able to increase the number of consumers who adopt NFC-based mobile payment. The emphasis of marketing communication on the formation of perceptions that NFC-based mobile payment is better and more useful than existing payment methods, by customer needs, and uncomplicated use can be done as an effort to increase consumer intention to adopt the innovation. The emphasis is also accompanied by the formation of perceptions

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that the use of NFC-based mobile payment does not require large changes in habits, has minimal risk, is supported by reliable technology and service providers, and is able to provide higher monetary value to consumers, in order to suppress consumer resistance to adopt NFC-based mobile payment. Future studies may explore two broad directions: first, adding other variables, such as trust and perceived enjoyment, to improve the explanatory power; and second, making this research a longitudinal study, so that the accuracy of predicting adoption behavior can be improved. Also, the expansion of sampling areas can help increase the knowledge of researchers and practitioners regarding consumer acceptance of NFC-based mobile payments.

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