

The Moderating Role of Gender in Digital Wallet Usage for Payment Services

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Abstract

This study aims to analyze the factors influencing the intensity of e-wallet usage in Indonesia. The study population comprises respondents who use digital wallets. The research employs the Partial Least Square Structural Equation Modeling (PLS-SEM) approach. Using data from 98 respondents, this study evaluates the impact of economic benefits, transaction speed, convenience, security risks, financial risks, and operational risks on users' perceived benefits and perceived risks, and their subsequent effect on the intensity of e-wallet usage. Additionally, the study examines the role of gender as a moderating factor in the relationship between perceived benefits and perceived risks and the intensity of usage. The results reveal that economic benefits, transaction speed, and convenience have a positive influence on perceived benefits. Security risks, financial risks, and operational risks positively influence perceived risks. Subsequently, perceived benefits have a positive effect on usage intensity, while perceived risks negatively affect usage intensity. Gender moderates the relationship between perceived benefits and usage intensity, with the influence of perceived benefits being stronger among female users. However, gender does not moderate the relationship between perceived risks and usage intensity. The managerial implications of this study indicate that e-wallet service providers need to develop more specific marketing strategies to cater to the preferences of female users.

Keywords:

Digital Wallet; Perceived Benefits; Perceived Risks; Gender Moderation; Usage Intensity.

1. INTRODUCTION

The recent revolution in financial technology has rapidly evolved, offering various conveniences for conducting transactions. The widespread penetration of mobile devices such as smartphones, tablets, and smart gadgets like smartwatches has played a significant role in this development (Lee et al., 2020). Over the past five years, the use of wearable smart devices for purposes such as activity tracking and mobile connectivity has grown exponentially (Ali & Li, 2019; Beh et al., 2021). The integration of wireless connectivity into smart devices has further facilitated the use of fintech applications (Lee et al., 2020), dominating financial services that are now more effective, efficient, and economical. Fintech refers to the application of technology in financial services that has transformed traditional business models into more modern ones, going beyond cash or credit card transactions to mobile payments (Choi et al., 2020).

The advancement of digital technology has led to significant transformations across various aspects of life, including the financial sector. One innovation emerging from this trend is the digital wallet (e-wallet), which offers benefits such as transaction speed, convenience, and economic advantages. E-wallets represent a category of financial products and services where mobile devices are used as a medium to complete transactions, acting as an interface among customers, merchants, and banks (Choi et al., 2020; Oliveira et al., 2016). The adoption of this technology is increasing globally, contributing to the growth of cashless payment transactions (Sifhowngh & Sinha, 2020). The expanding market penetration and advancements in Internet of Things (IoT) technologies have enabled users to pay for goods and services anytime and anywhere (Lee et al.,

2020; Niknejad et al., 2020). These developments allow users to make and confirm electronic payments efficiently, effectively, conveniently, and quickly (Leong et al., 2013).

Indonesia provides a particularly relevant setting for examining digital wallet usage because of the rapid expansion of its digital payment ecosystem. Bank Indonesia (2026) reported that the volume of digital payment transactions reached 14.82 billion in the first quarter of 2026, representing year-on-year growth of 37.69%. Transactions conducted through mobile and internet applications also increased by 11.82% and 17.13%, respectively, while QRIS transactions grew by 116.43%. At the industry level, Ipsos (2026) found that digital wallets have become embedded in users' daily financial activities, including online shopping (86%), food and beverage purchases (77%), routine bill payments (69%), and bank transfers (68%). These developments demonstrate that digital wallets are increasingly used across diverse transaction contexts, making it important to understand the benefits and risks that shape the intensity of their usage.

Understanding the factors that influence the adoption of digital wallets is essential, as it can provide insights into how such services can better meet user needs. In line with Alalwan et al., (2017), the intensity of digital payment service usage depends on how well the service fulfills consumer needs. Inhibiting factors may also play a crucial role in preventing users from adopting new technologies and therefore must be addressed (Hoehle et al., 2012; Leong et al., 2013; Liu et al., 2019). This study thus combines the analysis of enabling factors (economic benefits, transaction speed, and convenience) and inhibiting factors (security risks, financial risks, and operational risks) to investigate users' intentions in adopting digital wallets.

Furthermore, this research aims to ensure that the development and implementation of digital wallets can be carried out in a more inclusive, effective, and equitable manner, allowing all user groups to benefit without exception. Analyzing gender as a moderating factor in the use of digital wallets as a digital payment service is of particular significance. Understanding how gender influences the use of these services can help identify potential differences in usage patterns and preferences, thereby informing more effective product development and marketing strategies (Leong et al., 2013; Liu et al., 2019). To date, no research has thoroughly examined the extent to which gender affects the intensity of digital wallet usage in terms of perceived benefits and risks. This study seeks to explore the moderating role of gender in the relationship between perceived benefits and risks and the intensity of digital wallet usage.

1.1. Economic Benefits

In the context of fintech application usage, perceived benefits and potential adoption tend to produce positive outcomes (Ryu, 2018). Economic benefits associated with digital wallet usage include reduced transaction costs and financial gains. Fintech services offer lower transaction fees compared to traditional financial institutions, enabling users to save on expenditures (Mackenzie, 2015). Furthermore, fintech platforms provide higher returns for lenders and lower interest rates for borrowers compared to conventional financial institutions (Lee et al., 2020). These economic advantages serve as one of the key extrinsic motivational factors intensively considered by digital wallet users.

1.2. Transaction Speed

Transaction speed enhances consumer confidence regarding the benefits of online financial transactions, including digital wallets (Junadi & Sfenrianto, 2015). Digital wallets offer fast transaction services (Prawira et al., 2024; Suryanto, 2023). In this context, the quick processing capability of digital wallet systems reassures users of their benefits, particularly in saving transaction time. Technological advancements have enabled near real-time transactions (Chishti, 2016). Consequently, it is reasonable to assume that the faster the transaction process, the more likely users are to adopt digital wallet systems.

1.3. Convenience

Fintech usage, including digital wallets, is associated with portability and accessibility that users experience during transactions (Lee & Teo, 2015; Ryu, 2018; Sharma & Gutiérrez, 2010). Users can access digital wallet services anytime and anywhere, which provides added convenience in managing financial transactions. Respondents in this study acknowledged the ease and comfort provided by digital wallets in conducting various financial activities (Suryanto, 2023). Therefore, the higher the level of perceived convenience, the stronger the user's intention to continue using digital wallets. Perceived convenience plays a critical role in fostering loyalty and continuous use.

1.4. Security Risk

Despite the numerous advantages of digital wallets, they carry significant security risks (Suryanto, 2023). Fintech platforms are vulnerable to fraud and cyberattacks that can compromise the security of digital payment transactions, including digital wallets (Ryu, 2018). Credential information is an asset that must be protected by both users and service providers. Such information is susceptible to threats from both internal and external sources (Prawira et al., 2024). Users may suffer financial and reputational losses if personal data is compromised or misused. Consequently, higher perceived security risks decrease users' likelihood to adopt digital wallet systems.

1.5. Financial Risk

Financial risk refers to the potential monetary loss that may arise when using digital payments, including digital wallets (Forsythe et al., 2006; Ryu, 2018). Users may face fraud, transaction system failures, or unexpected fees. These risks create negative perceptions of digital wallet services. If users believe the system may cause financial losses or lacks financial benefits, their intention to continue using the service diminishes. Many users still perceive online payments as high-risk activities (Kee et al., 2021).

1.6. Operational Risk

Operational risk refers to losses resulting from inadequate or failed internal processes, personnel, systems, or from external events, including legal risks, but excluding strategic and reputational risks (Barakat & Hussainey, 2013). It also includes system vulnerabilities and potential disruptions in the digital transaction process (Mishchenko et al., 2022). Operational risk also refers to system vulnerabilities and the potential for disruptions or failures during transactions (Abramova & Böhme, 2016). If the operational system of a digital payment service is weak or experiences malfunctions during user transactions, consumer trust in digital payments may decline. In this context, users' negative perceptions regarding the operational risk of the service provider can reduce their intention to use the system. When users feel that the digital payment provider may cause harm or inconvenience, their willingness to engage with the platform decreases. Therefore, operational risks in digital payment systems can diminish individuals' interest in conducting transactions through such systems.

1.7. Perceived Benefits

Benefits can be classified as extrinsic or intrinsic factors, both of which influence perceived value and behavioral intention (Ryu, 2018). Extrinsic factors relate to utilitarian motivations, such as economic benefits, transaction speed, and convenience. Perceived benefits refer to an individual's evaluation of the advantages expected from performing a specific behavior (Amoroso & Ackaradejruangsri, 2024; Nikita, 2015). In digital payment contexts, they are defined as the belief that such platforms can deliver positive outcomes (Ryu, 2018). Perceived benefits influence the intensity of digital wallet usage, particularly about extrinsic factors like economic value and speed, and intrinsic aspects such as usability. The greater the perceived benefit, the higher the intention to continue using digital payment systems.

1.8. Perceived Risks

Despite offering numerous advantages, digital wallets are inherently associated with certain risks (Truc, 2024). Perceived risk is defined as the uncertainty or potential negative consequences users associate with adopting a new technology or system (Nawi et al., 2024). Park (2020) emphasized perceived risk as a critical factor influencing consumer behavior in digital payments. According to Kim et al. (2008), perceived risk is a belief in the possibility of adverse and uncertain outcomes from online transactions. Benlian & Hess, (2011) further described it as the uncertainty linked to potential negative consequences of adopting a service. Perceived risk negatively affects digital wallet usage, particularly through security, financial, and operational dimensions. The greater the perceived risk, the lower the intention to continue using digital wallets.

1.9. Economy and Digital Wallet Usage

In the context of perception and potential adoption of fintech, a study by Ryu (2018) revealed that fintech adoption has the potential to generate positive outcomes. The economic benefits associated with digital payment usage include reduced transaction fees and financial gains. Economically, digital payment services offer more competitive rates than traditional financial services, which can lead to significant savings for users (Lee et al., 2020). In terms of usage intensity, economic benefit serves as an extrinsic motivational factor considered by users when adopting and continuously using digital payment applications. Additionally, contactless payment transactions demonstrate improved service outcomes, offering responsive and efficient benefits at lower costs (Gupta & Arora, 2020; Hussain et al., 2019; Koenig-Lewis et al., 2015; Penney et al., 2021).

H1: Economic benefits have a positive effect on perceived benefits of digital wallet users.

1.10. Transaction Speed and Digital Wallet Usage

Consumers' confidence in the benefits of digital wallet services can be influenced by various factors, one of which is transaction speed. Transaction speed is a key aspect that enhances the perceived utility of digital payment systems, particularly by saving time. The faster a transaction can be completed, the more likely a user is to adopt the system. Transaction speed plays a vital role in promoting fintech usage, including digital wallets, particularly in markets such as Korea (Junadi & Sfenrianto, 2015; Ryu, 2018). Digital wallets allow transactions to be completed quickly via portable and smartphone-accessible applications (Penney et al., 2021). Mobile payments can be broadly categorized into three types: peer-to-peer (P2P) payments via mobile devices (Lara-Rubio et al., 2021), remote payments, and in-store technologies such as mobile wallets and QR codes (Liébana-Cabanillas et al., 2021; Singh & Sinha, 2020).

H2: Transaction speed has a positive effect on perceived benefits of digital wallet users.

1.11. Convenience and Digital Wallet Usage

Flexibility is a key indicator in the adoption of new technologies (Chen & Zhou, 2016). Digital payment systems are closely associated with portability and accessibility during financial transactions (Ryu, 2018). The intention to use fintech is driven by its ease of use and compatibility with wearable devices like smartphones (Lee et al., 2020). Users are more likely to adopt digital wallets when the service is perceived as simple and hassle-free (Kumar et al., 2021). Convenience is a major benefit perceived by users (Junadi & Sfenrianto, 2015). The ability to conduct transactions anytime and anywhere enhances perceived ease, increasing the likelihood of adoption (Rahardja et al., 2023). Previous studies have shown that convenience is a major driver of digital payment usage, particularly in Korea (Ryu, 2018).

H3: Convenience has a positive effect on perceived benefits of digital wallet users.

1.12. Security Risk and Digital Wallet Usage

Security concerns are central to users' perceived benefits of digital wallets (Junadi & Sfenrianto, 2015). Trust, confidence, and consistent security in new technologies are critical to building user adoption (Mehmet, 2016). Customers must be protected from hackers and malicious actors (Penney et al., 2021). Ensuring security is paramount for customer retention in digital payments (Alalwan et al., 2017; Syah et al., 2021). Due to the lack of physical interaction during online shopping, both buyers and sellers rely heavily on secure platforms (Hasyim, 2019). Therefore, the intention to adopt new financial technologies must be grounded in a strong sense of trust and perceived safety (Mehmet, 2016; Prasetya & Syah, 2020).

H4: Security risk has a positive effect on perceived risk of digital wallet users.

1.13. Financial Risk and Digital Wallet Usage

Hedonic motivation reflects intrinsic utility such as satisfaction and enjoyment, which may also introduce financial risk when users prioritize convenience over caution (Thong et al., 2006; Venkatesh et al., 2015). Financial risk in fintech contexts refers to the potential monetary loss users might face while interacting with the system (Ryu, 2018). Users may encounter fraud, transaction failures, or hidden fees. Such risks foster negative perceptions toward fintech services. If users perceive little to no financial benefit—or even potential financial harm—from using fintech payments, their usage intention will likely decrease.

H5: Financial risk has a positive effect on perceived risk of digital wallet users.

1.14. Operational Risk and Digital Wallet Usage

System vulnerability and operational disruptions in digital payments can erode consumer trust and reduce adoption rates (Abramova & Böhme, 2016). Operational risks significantly increase perceived risk among fintech users, including those using digital wallets (Grant & Hogan, 2015; Ryu, 2018). Users who perceive that a provider's operational infrastructure is unreliable may become hesitant to use the system. Concerns over provider competence or platform stability diminish users' willingness to transact digitally.

H6: Operational risk has a positive effect on perceived risk of digital wallet users.

1.15. Perceived Benefits and Usage Intensity

User motivation can be classified into extrinsic and intrinsic factors, both influencing perceived benefit and behavioral intention (Ryu, 2018). Extrinsic motivations relate to utilitarian aspects such as cost savings, speed, and convenience. Perceived benefit refers to a user's evaluation of the advantages associated with a specific behavior (Nikita, 2015). In fintech contexts, it reflects the belief that digital payment systems will yield favorable outcomes (Ryu, 2018). The stronger the perceived benefit, the greater the likelihood of sustained digital wallet usage (Junadi & Sfenrianto, 2015).

H7: Perceived benefits have a positive effect on the intensity of digital wallet usage.

1.16. Perceived Risks and Usage Intensity

Risk is a negative aspect that influences consumers' decisions to adopt digital payment systems. Perceived risk is a key factor in user behavior (Park, 2020), defined as the belief in uncertain and potentially negative outcomes from online transactions (Kim et al., 2008). It is typically associated with uncertainty about negative consequences related to product or service adoption (Benlian & Hess, 2011). Perceived risk—including concerns about security, financial loss, and operational issues—negatively impacts digital wallet usage intensity.

H8: Perceived risk has a negative effect on the intensity of digital wallet usage.

1.17. Gender, Perceived Benefits, and Usage Intensity

The perception of benefit increases user interest in digital wallet usage. The effect of perceived benefits on usage intensity may vary by gender. Prior studies have shown that technology adoption is influenced by gender, even though not always specific to digital wallets (Hossain, 2019; Hwang, 2010; Malaquias & Hwang, 2016; Rouibah et al., 2016; Wang & Sun, 2016). Other research indicates that women are more likely to be satisfied and loyal when they perceive higher benefits, especially in mobile payment adoption.

H9: Gender moderates the relationship between perceived benefits and digital wallet usage intensity.

1.18. Gender, Perceived Risks, and Usage Intensity

Technology usage is affected by users' perceptions of ease and usefulness. In the context of digital payments, users who believe the system is difficult or unproductive may refrain from using it. Gender may moderate the relationship between perceived risk and usage intensity (Malaquias & Hwang, 2016; Rouibah et al., 2016). Some studies found that men are more risk-tolerant and thus more likely to continue using digital wallets despite risks, while women tend to be more skeptical and cautious (Chawla & Joshi, 2020; Hossain, 2019; Liébana-Cabanillas et al., 2021; Shao et al., 2019).

H10: Gender moderates the relationship between perceived risks and digital wallet usage intensity.

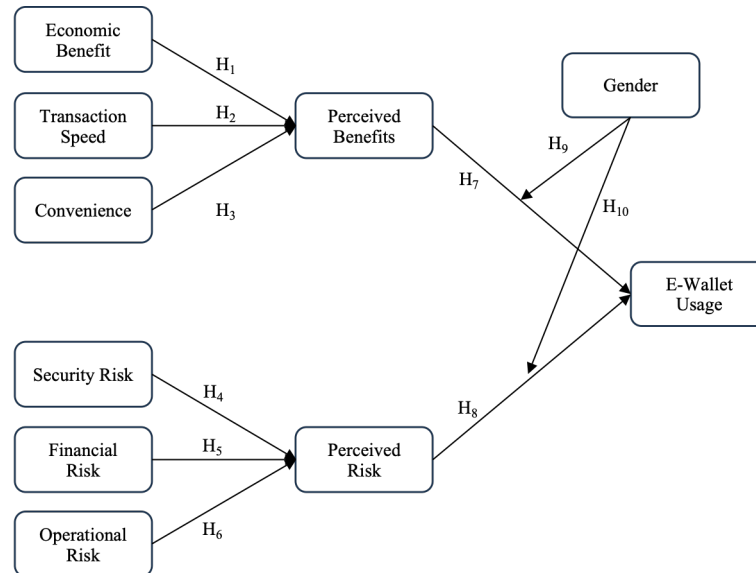


Figure 1 Research Model

2. RESEARCH METHOD

This study adopts a quantitative approach using a survey method to collect data from digital wallet users. It is explanatory in nature, aiming to explain the relationships between benefit, risk, and usage intensity variables with gender as a moderating factor. Gender is coded as 1 for female and 0 for male.

The target population of this study consists of individuals who use digital wallets. The sample was drawn specifically from GoPay users because recent industry evidence identifies GoPay as the leading e-wallet brand in Indonesia. The Indonesia Banking & Financial Services Report 2026, based on a survey of 5,995 respondents, ranked GoPay first in the e-wallet category, with a penetration rate of 87.1%, substantially higher than DANA at 66.5% (Wibowo, 2026). The report also indicates that GoPay combines broad market penetration with strong user retention, making it particularly relevant for examining the intensity of digital wallet usage. The age range of respondents is between 18 and 40 years, chosen because Gopay is predominantly used by Millennials and Gen Z, who mostly fall within this age bracket (Kumparan, 2020). The minimum age of 18 was selected to ensure that respondents are legally recognized as adults capable of making decisions.

Data were collected through a questionnaire measuring variables including economic benefits, transaction speed, convenience, security risks, financial risks, operational risks, digital wallet usage intensity, and gender. The sample was selected using purposive sampling to represent active Gopay users in Jakarta aged 18–40. The survey employed a 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree).

The independent variables include economic benefits (EK), transaction speed (KC), convenience (KY), security risk (KN), financial risk (KG), and operational risk (OP), which influence users' perceptions. The dependent variable is the intensity of digital wallet usage (IP), reflecting how frequently and consistently users utilize the service. Perceived benefits (MN) and perceived risks (RK) serve as mediating variables that bridge the influence of the independent variables on usage intensity. Meanwhile, gender (GD) functions as a moderating variable to examine whether the effects of perceived benefits (MN) and risks (RK) on usage intensity differ between male and female users.

For data analysis, this study employs the Partial Least Square Structural Equation Modeling (PLS-SEM) approach. PLS-SEM is predictive in nature and does not rely on strict assumptions. This method is suitable for confirming theories, explaining relationships among latent variables, and analyzing constructs measured with reflective and formative indicators.

Validity and reliability tests were initially conducted on a pilot group of 35 respondents. Items that did not meet validity and reliability criteria were removed. Subsequently, a full-sample validity and reliability test was carried out. Validity was assessed using factor loading values, where items were considered valid if their

loading factor ≥ 0.70 (Hair et al., 2021). Reliability was assessed using Cronbach's alpha, where items were deemed reliable if Cronbach's alpha ≥ 0.60 (Hair et al., 2021).

Finally, primary data analysis was conducted using the full sample. Hypothesis testing (inner model) was performed by examining path coefficient results. A relationship was considered significant if the p -value < 0.05 or the T -statistic $> T$ -table (1.960) at a 5% significance level. The direction of the relationship was interpreted based on the original sample estimate (Hair et al., 2021).

3. RESULTS AND DISCUSSION

This study involved 98 respondents who are users of digital wallets, based on completed questionnaires collected via Google Form. In terms of gender, the majority of respondents were female, totaling 57 individuals (58.16%), while male respondents numbered 41 (41.84%). Regarding age, the largest group consisted of respondents aged 26–30 years, with 37 individuals (37.8%). This was followed by the 18–25 age group with 34 respondents (34.7%), the 31–35 age group with 21 respondents (21.4%), and the 36–40 age group with 6 respondents (6.1%). These findings align with Matthew et al. (2020), who state that the development of contactless payment technologies tends to attract the interest of dynamic younger generations, and with Kumar & Lim (2008), who highlight the dominance of younger generations in adopting advanced technologies.

In terms of usage duration, most respondents had been using digital wallets for more than two years, with 75 users (76.5%). Respondents who had been using digital wallets for less than six months totaled 10 individuals (10.2%), followed by 8 users (8.2%) who had used them for 6 to 12 months, and 5 users (5.1%) who had used them for 1 to 2 years. These data indicate a strong tendency toward user loyalty in digital wallet usage. This loyalty may be driven by the convenience, security, and attractive promotions offered by digital wallet providers (Kumar & Lim, 2008).

The study emphasizes the importance of understanding user characteristics when designing marketing strategies and developing financial technology products. Thus, digital wallet services must continue to innovate and tailor their offerings to meet the needs and preferences of their primary user groups namely millennials and female users.

An initial test was conducted using responses from 35 early participants. The results of the validity test indicated that most indicators were valid in measuring the intended constructs, except for item MN5, which had a loading value of 0.611 and was thus deemed invalid (Appendix 6). MN5 was removed to improve construct validity. The reliability test using Cronbach's Alpha showed good internal consistency. All constructs had Cronbach's Alpha values of ≥ 0.7 , with most exceeding 0.8, indicating that the instrument used was highly reliable. This suggests that the items within each construct were consistent in measuring the same concept and could be used for further analysis (Appendix 6).

Subsequently, a second round of testing was conducted using the full dataset of 98 respondents. The validity test results showed that all items had outer loading values above 0.7. Similarly, the reliability test confirmed that all items had Cronbach's Alpha values exceeding 0.7. The results of the structural model analysis, shown in the form of path coefficients, are presented in Figure 2.

Figure 2 illustrates support for most of the hypotheses proposed in this study. Overall, the findings indicate that factors such as economic benefits, transaction speed, convenience, security risks, financial risks, and operational risks significantly influence perceived benefits and perceived risks, which in turn affect the intensity of digital wallet usage. Perceived benefits have a positive impact on usage intensity, whereas perceived risks negatively affect it. Gender plays a moderating role in the relationship between perceived benefits and usage intensity. However, gender does not moderate the relationship between perceived risks and the intensity of digital wallet usage.

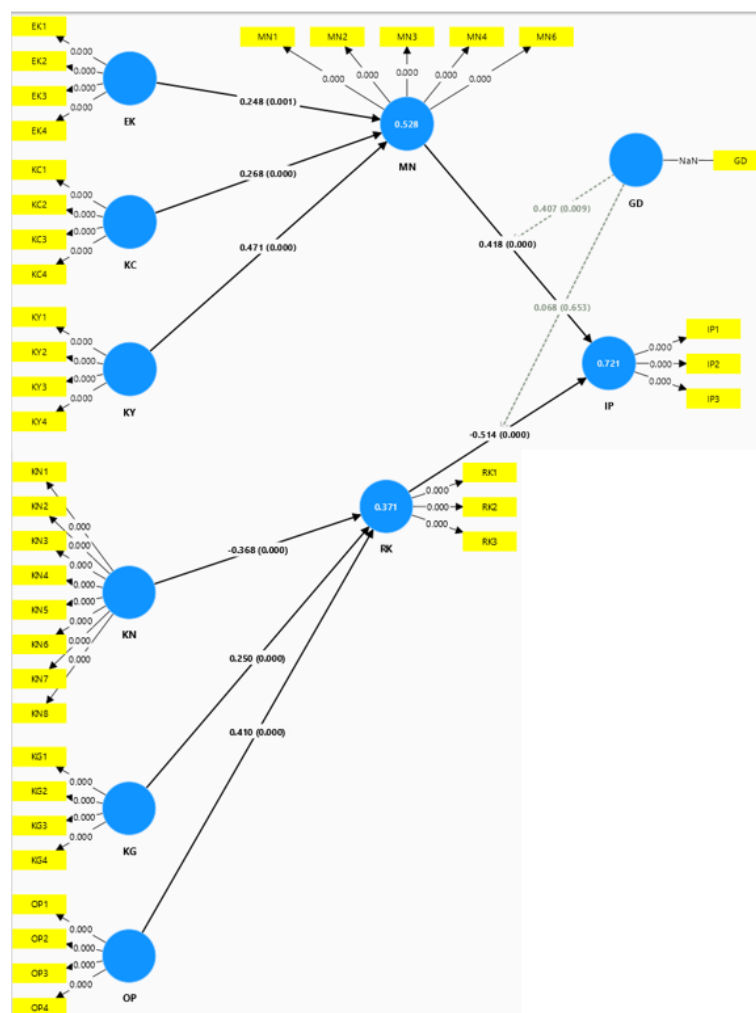


Figure 2 Estimation Result

Based on the results above, each hypothesis was tested to determine the significance of the relationships between variables. This analysis provides an overview of which hypotheses are supported, and which are rejected within the research model. A summary of the hypothesis conclusions is presented in the table below.

Table 1. Research Hypothesis Testing Results

Hypothesis	Hypothesis Statement	P-value	Conclusion
H1	Economic benefits have a positive effect on perceived benefits of digital wallet users	0,001	Hypothesis supported by data
H2	Transaction speed has a positive effect on perceived benefits of digital wallet users	0,000	Hypothesis supported by data
H3	Convenience has a positive effect on perceived benefits of digital wallet users	0,000	Hypothesis supported by data
H4	Security risk has a positive effect on perceived risk of digital wallet users	0,000	Hypothesis supported by data
H5	Financial risk has a positive effect on perceived risk of digital wallet users	0,000	Hypothesis supported by data
H6	Operational risk has a positive effect on perceived risk of digital wallet users	0,000	Hypothesis supported by data
H7	Perceived benefits have a positive effect on the intensity of digital wallet usage	0,000	Hypothesis supported by data
H8	Perceived risk has a negative effect on the intensity of digital wallet usage	0,000	Hypothesis supported by data
H9	Gender moderates the relationship between perceived benefits and the intensity of digital wallet usage	0,009	Hypothesis supported by data
H10	Gender moderates the relationship between perceived risk and the intensity of digital wallet usage	0,653	Hypothesis not supported by data

The analysis results indicate that economic benefits significantly influence perceived benefits in the intensity of digital wallet usage. This aligns with the findings of Lee et al. (2020), who stated that fintech, including digital wallets, offers higher returns that attract consumers. Digital wallets operate efficiently and responsively (at a low cost), motivating users to adopt them (Gupta & Arora, 2020; Hussain et al., 2019; Koenig-Lewis et al., 2015). In this study, most respondents felt that using a digital wallet significantly reduced transaction cost. They also perceived Gopay as a cost-effective solution, especially for small-value transactions. Features such as financial tracking help users manage their expenses and budgets, enabling better financial decision-making. Additionally, competitive transaction fees make digital wallets more attractive than traditional payment methods. These findings highlight the importance of marketing strategies focused on economic incentives to encourage usage intensity. Therefore, digital wallet providers should continue to develop value-added programs such as targeted discounts and promotions aligned with users' preferences.

Moreover, transaction speed plays a vital role in enhancing users' perceived benefits. This supports Ryu (2018) finding that speed is one of the key benefits consumers associate with digital wallet services. Respondents reported that their devices were compatible with digital wallets and that they had sufficient resources to use them effectively. Clear usage guides and accessible technical support also contributed to faster transactions. This underscores the need for digital wallet providers to continuously improve their technological infrastructure to ensure fast and efficient transactions. Companies should also invest in the development of financial technology infrastructure to maintain optimal transaction speed.

Convenience is another critical factor influencing the intensity of digital wallet usage. Ease of transactions, service accessibility, and user-friendly interfaces contribute to users' preference for digital wallets over other payment methods. Respondents in this study felt that digital wallets enabled fast, easy, and enjoyable payments anytime and anywhere. Flexibility is a key determinant in technology adoption (Chen & Zhou, 2016). This reflects the ability of digital wallets to create a positive user experience. These results are in line with prior studies highlighting convenience as a perceived benefit (Koenig-Lewis et al., 2015; Ryu, 2018). By focusing on enhancing user convenience, digital wallets can increase user interest and encourage more frequent usage.

Security risks significantly contribute to perceived risks among digital wallet users. This is consistent with previous studies indicating that security risks positively affect perceived risk (Ryu, 2018). Users expressed concerns about misuse of financial and personal information by digital wallet systems. The policy implication is that providers must continuously strengthen their security systems to protect user data and transactions. Lim et al. (2024) recommend that digital wallet providers prioritize data security, which directly affects long-term usage. Companies should enforce stringent security standards and monitor implementation to ensure compliance, especially given the increasing threat of cyberattacks (Kominfo, 2024).

Financial risks also increase perceived risk. This aligns with prior research showing that consumers fear the potential loss of funds stored in digital wallets (Ryu, 2018). To address this, providers should be transparent in communicating the costs and financial risks associated with using their services.

Similarly, operational risks were found to positively influence perceived risk. This finding supports earlier research indicating that users worry about service providers' ability to resolve loss-related issues efficiently (Ryu, 2018). Therefore, digital wallet providers must ensure smooth operational systems and develop robust technological infrastructures to minimize service disruptions.

Perceived benefits positively influence the intensity of digital wallet usage. The greater the benefits perceived by users, the higher the frequency of usage. This is consistent with previous studies that found satisfaction and perceived value enhance usage loyalty (Bahri-Ammari & Bilgihan, 2017; Hossain, 2019; Ram & Wu, 2016). Users who perceive significant advantages; ease of use, cost-efficiency, and superiority over alternative services are more likely to continue using digital wallets. Providers should focus on offering relevant and meaningful benefits to increase user engagement.

In contrast, perceived risks negatively affect usage intensity. The higher the perceived risk, the less frequent the usage. This aligns with existing literature suggesting that risk perception reduces technology adoption (Lim et al., 2024; Ryu, 2018). Respondents who perceive high risk and uncertainty tend to avoid using digital wallets. This underscores the importance of minimizing perceived risks by enhancing the reliability and security of the service.

Gender was found to moderate the relationship between perceived benefits and usage intensity. Female users showed a stronger correlation between perceived benefits and the desire to use digital wallets. This finding is supported by Kalinić et al. (2020), who highlight gender as a significant moderating factor. Digital wallet providers should consider gender differences when designing marketing strategies. Tailored campaigns for female users, such as offering relevant promotions and personalized features, could boost engagement. Understanding user behavior by gender can also inform better product development, improve satisfaction, and strengthen user loyalty. A gender-sensitive approach can help providers attract and retain a more diverse user base and increase market penetration.

However, gender did not moderate the relationship between perceived risk and usage intensity. This suggests that both male and female users react similarly when exposed to perceived risks, resulting in reduced usage regardless of gender. Concerns about security, financial, and operational risks are experienced uniformly across genders. Therefore, providers should focus on general risk reduction strategies rather than gender-

specific approaches. Enhancements such as data encryption, two-factor authentication, and fraud protection should be universally applied. This is consistent with research indicating that improved security and risk protection increase user trust in fintech services overall (Sar & Singgih, 2023).

Additionally, public education campaigns on safe digital wallet usage and risk avoidance should be broadly targeted, without gender segmentation. Risk mitigation strategies, combined with improved customer support, can alleviate user concerns, increase trust, and enhance user loyalty.

4. CONCLUSION

This study examines the influence of various factors on perceived benefits and risks in digital wallet usage, as well as the moderating role of gender in these relationships. The findings reveal that economic benefits, transaction speed, and convenience significantly affect users' perceived benefits. Meanwhile, security risks, financial risks, and operational risks influence users' perceived risks. Perceived benefits have a positive impact on the intensity of digital wallet usage, while perceived risks have a negative effect. Furthermore, gender moderates the relationship between perceived benefits and usage intensity, with the effect being stronger among female users than male users. However, gender does not moderate the relationship between perceived risks and usage intensity.

The managerial implications of these findings are highly relevant for the development of digital wallet business strategies. First, digital wallet providers should continue developing attractive economic incentive programs and promotions that align with users' needs and preferences to increase user loyalty and usage intensity. Second, to ensure optimal transaction speed, providers need to invest in technologies that can accelerate transaction processes, such as upgrading server infrastructure and adopting advanced technologies. This technological improvement must be supported by government efforts to ensure fast and stable internet infrastructure across regions. Third, digital wallets must be easily accessible anytime, anywhere while offering a fast, convenient, and enjoyable experience. Enhancing these aspects will improve user comfort and encourage more frequent usage. Fourth, the finding that gender moderates the relationship between perceived benefits and usage intensity suggests the need for more gender-specific marketing strategies that address the unique preferences of female users.

On the other hand, the finding that gender does not moderate the relationship between perceived risks and usage intensity implies that both male and female users respond similarly to perceived risks. In other words, risk perception in digital wallet usage is not influenced by gender. This study is limited by its relatively small sample of 98 GoPay users in Jakarta, which restricts the generalizability of the findings. The use of a quantitative survey also does not fully capture the experiences underlying users' perceptions of benefits and risks. Future studies should involve larger samples across different regions and digital wallet platforms and adopt mixed methods by combining surveys with interviews or focus groups. Future researchers should use longitudinal designs to examine how users' perceptions of benefits and risks and their digital wallet usage intensity change over time.

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