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Research paper

Understanding Behavioural Intention to Adopt E-Invoicing in The Case of Malaysia Small and Medium Enterprises (SMEs): A UTAUT2

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Abstract

This study examines the behavioral intention to adopt e-invoicing among small and medium-sized enterprises (SMEs) in Malaysia, utilizing the UTAUT2 framework. E-invoicing provides benefits that enable businesses to exchange invoices electronically, enhancing operational efficiency and compliance while reducing costs. This research aims to examine the factors influencing SMEs' intention to adopt e-invoicing and identify the most significant factors. A quantitative survey was conducted among SME owners who were preparing for the early adoption of e-invoicing. The questionnaire measured seven factors, including performance expectancy, effort expectancy, social influence, facilitating conditions, trust, security, and perceived risk. The findings revealed that social influence is the strongest positive factor influencing adoption intention, which may involve the roles of peer, professional, and regulatory pressures. In contrast, security concerns and perceived risk negatively influence behavioural intention, highlighting the importance of addressing data protection and system reliability for e-invoices developed by the government. Performance expectancy, effort expectancy, facilitating conditions, and trust were not significant factors in the Malaysian context. The study contributes theoretically by extending UTAUT2 to incorporate security and risk factors in the e-invoicing context. It offers practical insights for policymakers and software developers to support SME digital adoption effectively.

Keywords: *E-Invoice; Unified Theory of Acceptance and Use of Technology 2; SMEs; Malaysia; technology adoption*

1. Introduction

E-invoicing refers to standardised invoices that are issued, transmitted, and received electronically via the Internet. This system enables business operators to exchange invoices seamlessly, thereby reducing costs and enhancing operational efficiency. By allowing organisations to go paperless, e-invoicing not only improves productivity but also contributes to environmental protection. Besides the advantages, Lian (2015) highlighted that security concerns and the potential risk of fraud remain important considerations (Lian, 2015). While Ali (2016) mentioned e-invoicing as the automated digital transmission of information between companies, customers, suppliers, and tax authorities in a unified electronic format. Such standardisation ensures transparency, accuracy, and compliance across all stakeholders involved in the invoicing process (San et al., 2023). From the Malaysian perspective, the implementation of e-invoicing is structured into three main stages. The first, known as the preliminary phase, involves a limited number of companies testing the system to identify and resolve technical or operational issues. The second stage, referred to as the partial rollout, expands e-invoicing adoption to more businesses, often prioritising specific industries or transaction types. This stage is supported by training and assistance to ensure a smooth transition. Finally, in the full implementation stage, e-invoicing becomes mandatory for all relevant companies. At this stage, the system is fully functional, and most prior challenges have been resolved. Businesses are expected to comply completely, receiving ongoing updates and support. This phased approach enables gradual adjustment, facilitates stakeholder feedback, and promotes effective problem-solving throughout the transition process (Ali & Singh, 2025).

Chen, Wu, and Miau (2015) highlighted that the e-invoice initiative in Taiwan has been under development for more than a decade. In its early stages, acceptance was relatively low, with only a small percentage of users opting for electronic receipts. Instead, the transitional paper-based receipt continued to dominate, accounting for 94% of e-invoice transactions. A major challenge identified was the expectation for businesses to integrate e-invoicing with their existing enterprise systems, which posed significant barriers to adoption. Similarly, Linh and Phuong (2020) noted that inconsistent regulatory frameworks across different jurisdictions present obstacles to e-invoicing adoption. In some countries, e-invoicing is mandated, particularly for public procurement, whereas in others, it remains voluntary, resulting in uneven levels of implementation. In Malaysia, the push for digitalisation has also included the development of e-invoicing as part of national policy

frameworks. Both the 12th Malaysia Plan and the Malaysia Digital Economy Blueprint (MyDIGITAL) emphasise integrating digital solutions across sectors, with e-invoicing positioned as a key component of this broader digital transformation (Ali & Singh, 2025). In Malaysia, awareness of e-invoicing varies significantly depending on the type and size of companies. According to Xero & Malaysia SME (2025, May), there are notable differences in how businesses perceive and understand e-invoicing, with larger companies often demonstrating higher levels of awareness compared to smaller enterprises. This disparity suggests that company characteristics play a crucial role in shaping the overall awareness landscape. Furthermore, PricewaterhouseCoopers (2024, July 29) has highlighted the Malaysian government's proactive efforts to promote awareness and ensure preparedness among businesses. The introduction of comprehensive e-invoice guidelines is intended to support companies as they transition to digital invoicing. However, despite these initiatives, the state of readiness among businesses remains uneven, with preparedness levels differing across various business categories. These observations highlight the importance of targeted outreach and support in addressing the diverse needs of businesses as Malaysia progresses with e-invoicing implementation.

1.1. Problem statement

Previous studies have primarily examined the UTAUT2 from the context of entertainment, such as mobile payments (Wu & Liu, 2023), e-learning (Rudhumbu, 2022), and digital wallets (Lakshmanan & Shanmugavel, 2025), as well as the e-invoice cloud (Lian, 2015). The current study aims to apply UTAUT2 with the factors related to four critical antecedents (performance expectance, effort expectancy, social influence, and facilitating conditions) and incorporate three extended factors that are related to the adoption of e-invoice (trust, security, and risk), which are more related to e-government and not the entertainment context. Additionally, many studies concern the adoption from the perspective of organisational adoption (Kumar & Krishnamoorthy, 2020; Damali, Kocakulah, & Ozkul, 2021; Tiwari, Marak, Paul & Deshpande, 2023) only, but this current study has focused attention on individuals who represent as owners of the SMEs on the intention to adopt e-invoice in their organisation. In addition, there are limited studies that focus on e-invoices from the SMEs' perspective, such as in Australia (Hoblos et al., 2024) and Egypt (Soliman, 2024). Thus, this current study is concerned with the acceptance of e-invoices among SME owners in Malaysia, before their widespread adoption by SMEs, and which UTAUT2 factors can help refine the model in the real world for the e-invoice context. Therefore, the research objectives are to examine the factors influencing the behavioural intention to adopt e-invoicing among SMEs using an extended UTAUT2 model and to determine the most significant factors among all the studied factors.

2. Literature Review

2.1. E-invoicing in the context of SMEs

2.1.1. Benefits of e-invoicing

In the Malaysian context, Ali and Singh (2025) emphasised several benefits of e-invoicing for businesses, including cost savings, faster invoice processing, and reduced human errors. E-invoicing also enhances cash flow management, improves accuracy, and integrates seamlessly with accounting systems, which supports better decision-making and scalability. Harianto, Mus, and Lannai (2020) highlighted that one advantage of using e-invoicing is the automatic recording of each transaction that allows errors to be quickly identified and corrected, thereby improving efficiency and reliability. They further noted that e-invoicing serves as valid proof of VAT collection, strengthening compliance with tax regulations. According to BDO Malaysia (2025, August 21), the adoption of e-invoices brings multiple benefits, including improved accuracy in invoicing and more precise tax submissions. The transition from manual to electronic processes reduces the need for physical paperwork, leading to lower costs and streamlined payment procedures. Additionally, e-invoicing supports a transparent and simplified audit process, enhances data security, and enables real-time data analysis. For small and medium-sized enterprises (SMEs), San et al. (2023) identified further advantages. These include substantial cost savings of up to 80%, increased accuracy and transparency, and a reduction in opportunities for fraud. Notably, e-invoicing helps to curb shadow economy activities and prevents tax evasion, fostering fairer and more accountable business practices. Research from China (Weiqun & Xing, 2025) indicates that the implementation of e-invoices has promoted higher levels of digitalization among firms, resulting in incentive effects, efficiency improvements, and additional cost-saving benefits. In Peru, studies have shown a connection between the perception of e-invoice adoption and tax allocation, although challenges such as limited understanding of the tax system and inadequate preparation persist (Mogollón García et al., 2025). In the context of Italy, Heinemann & Stiller (2025) have observed that the use of e-invoices helps to reduce cross-border fraud, subsequently decreasing VAT losses and tax evasion. Similarly, findings from Latin America suggest that e-invoice adoption enhances tax monitoring and reduces tax evasion (Muquis, Ortega, & Arias, 2024).

Despite the many benefits, several challenges have been identified during the e-invoice adoption process. These include limited skills among employees, diverse regulatory frameworks, insufficient technology integration, and reluctance to embrace new technologies (Hoblos et al., 2024; Soliman, 2024; Qi & Che Azmi, 2021). San et al. (2023) further note that employee readiness in small businesses remains moderate, with concerns about risk, failure, benefits, and the usefulness of e-invoices contributing to a sense of insecurity. FocusMalaysia (2024, December 4) reports that KPMG has highlighted additional hurdles faced by potential adopters, such as the extra costs associated with IT upgrades and training. There is also a need for clearer guidelines and increased government support to facilitate a smoother transition to e-invoicing. Therefore, the integration of UTAUT2 is used to identify the factors that may influence the intention to adopt e-invoice.

2.2. UTAUT2 Factors

The Unified Theory of Acceptance and Use of Technology 2 (UTAUT2), developed by Venkatesh, Thong, and Xu (2012), is based on the original UTAUT framework by incorporating additional factors such as Hedonic Motivation, Price Value, and Habit, making it particularly suitable for studying technology adoption in consumer and non-organisational contexts. UTAUT2 posits that Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI), Facilitating Conditions (FC), Hedonic Motivation, Price Value, and Habit influence behavioural intention and use behaviour. Among past studies in technology adoption, PE, EE, SI, and FC have consistently demonstrated significant predictive power across diverse technological domains, including mobile payments (Wu & Liu, 2023), e-learning (Rudhumbu, 2022), and digital wallets (Lakshmanan & Shanmugavel, 2025). Performance Expectancy (PE), the belief that using a technology will provide benefits in performing certain activities, is often the strongest factor of behavioural intention (Herzallah et al., 2025; Namatovu & Kyambade, 2025). For mobile wallet and e-invoicing adoption, users are motivated by the anticipated improvements in efficiency,

convenience, and task performance. Additionally, PE's influence may vary in emerging or hedonic contexts such as the metaverse and the entertainment sector (Kalınkara & Özdemir, 2024; Aranyossy, 2022). Effort Expectancy (EE), also known as perceived ease of use, refers to the degree to which individuals expect the technology to require minimal effort (Venkatesh et al., 2003). This construct remains relevant, particularly for technologies that involve new experiences (Lian, 2015; Lakshmanan & Shanmugavel, 2025). Social Influence (SI) captures the impact of social pressure and normative beliefs on technology adoption, acknowledging that individuals often consider the opinions of family, peers, and authorities when forming their behavioral intentions (Venkatesh et al., 2003). While SI has shown positive influences in various contexts, including mobile payment (Herzallah et al., 2025) and educational technologies (Grassini et al., 2024), its influence may be moderated by user characteristics at the adoption stage, as indicated by mixed findings in ChatGPT and e-invoicing adoption (Namatovu & Kyambade, 2025; Nguyen et al., 2020). Facilitating Conditions (FC) refer to the availability of organisational and technical support infrastructure that enables the use of technology. Numerous studies have demonstrated a positive correlation between facilitating conditions and system usage intention (Du & Liang, 2024). This factor highlights the role of enabling environments in adoption, particularly for institutionalized systems such as e-government services and digital wallets (Lakshmanan & Shanmugavel, 2025).

2.3. Extended factors

Trust is a critical factor in the adoption of digital technology, as it requires users to have confidence in accepting a transformative technology (Khazaei, 2020). Trust reduces users' uncertainty and is essential for transactions in blockchain (Ala'a & Ramayah, 2023; Lian, 2015). Research on e-government services consistently demonstrates that trust has a positive influence on behavioural intention (Belanger & Carter, 2008). Security Concerns reflect users' perceptions of potential threats to the confidentiality, integrity, and availability of their information during technology use (Lian, 2015; Mahusin & Prilliadi, 2024). The higher the security concerns regarding e-government, the lower the degree of trust in e-government, and the lower the level of intention to use the e-invoice system. In contrast, some studies suggest that Security is one of the requirements that must be complied with when an e-invoice is developed. Therefore, security is a necessary characteristic of e-invoice, which cannot be omitted. Likely, users are not concerned about this factor, given the essential nature of e-invoices (Nguyen et al., 2020). Perceived Risk (PR) refers to the subjective evaluation of potential adverse outcomes associated with technology use, including financial loss, privacy violations, or operational failures (Lian, 2015). Elevated perceived risk tends to inhibit adoption unless mitigated by trust or effective security mechanisms (Belanger & Carter, 2008; Mahusin & Prilliadi, 2024). Hence, PR serves as an important barrier that can overshadow the positive influences of UTAUT2 factors, especially in early adoption phases or contexts involving regulatory compliance.

2.4. Hypothesis development

2.4.1. Performance expectation (PE)

First, according to Venkatesh et al. (2003), the performance expectancy (PE) refers to users' belief that using a particular technology will help them achieve gains in job or task performance. Numerous studies have confirmed the positive influence of PE on behavioral intention, including VR technology (Du & Liang, 2024), Google Classroom (Kumar & Bervell, 2019), mobile learning systems (Arain et al., 2019), and blended learning (Rudhumbu, 2022). In digital financial services, PE consistently predicts intention to adopt mobile payment systems (Hussain et al., 2019; Al-Saedi et al., 2020; Shin & Lee, 2021) and digital wallets (Herzallah et al., 2025). In some emerging technologies, such as the metaverse, studies have reported nonsignificant influences of PE on behavioral intention (Kalınkara & Özdemir, 2024; Yang et al., 2022), potentially due to the technology's early stage of adoption, including the influence of hedonic motivation (Aranyossy, 2022). In contrast, on virtual reality tour platforms, PE remains significant (Chiao et al., 2018). Therefore, the first hypothesis is as follows:

H1: Performance expectation has a positive and significant influence on behavioral intention to adopt e-invoicing.

2.4.2. Effort expectation (EE)

Second, Effort Expectancy (EE) was established by Venkatesh et al. (2003) as a vital determinant of behavioural intention (BI) to use technology. Many subsequent studies have validated this relationship across various contexts of technology adoption, as seen in Rahman et al. (2020), who found that EE significantly predicted the adoption of mobile financial services among bKash agents. Similarly, Du and Liang (2024) observed that EE, alongside performance expectancy and other UTAUT2 factors, had a significant positive impact on continued usage intention. In educational technology, EE has also demonstrated a strong influence on the intention to adopt, as Studies by Hu, Laxman, and Lee (2020) and Raza et al. (2021) have confirmed its importance in the adoption of mobile learning and learning management systems. In the case of ChatGPT, Grassini et al. (2024) and Namatovu and Kyambade (2025) reported that students' expectations of use significantly influenced their intention to adopt the tool, as did Surya Bahadur et al. (2024) in the context of AI-based learning tools. In digital payment systems, EE is a critical factor of behavioral intention. Herzallah et al. (2025) reported a positive relationship between the adoption of e-wallets and the use of mobile wallet applications. Wu and Liu (2023) emphasised that EE received inconsistent findings across various contexts and countries. In driverless buses, He et al. (2025) demonstrated that higher EE increased future usage intention. Lian (2015) found that EE, along with social influence and trust, significantly influences the adoption of e-invoicing systems. However, not all studies found EE to be significant for adoption. For instance, Kalınkara and Özdemir (2024) and Yang et al. (2022) concluded that EE did not significantly impact behavioral intention in metaverse usage among students. Therefore, the second hypothesis is as follows:

H2: Effort expectation has a positive and significant influence on behavioural intention to adopt e-invoicing.

2.4.3. Social influence (SI)

Social influence (SI) reflects the extent to which individuals perceive that important others, such as family, friends, peers, teachers, or colleagues, encourage or expect them to adopt a new technology (Venkatesh et al., 2003; Du & Liang, 2024). It is a crucial factor shaping behavioural intentions across various contexts of technology adoption. In the media, Patil et al. (2020) demonstrated that social influence has a significant impact on consumer intentions to use mobile payment applications. Within educational settings, SI is a critical factor in students' adoption of technologies. Studies confirm its influence on mobile learning (Nikolopoulou, Gialamas, & Lavidas, 2020) and e-learning platforms (Samsudeen & Mohamed, 2019). However, some research suggests that Grassini, Aasen, and Møgelvang (2024) found that social influence did not significantly affect university students' behavioral intention to adopt ChatGPT, indicating that external social

pressures might have less influence on highly educated users. Aligned with driverless buses, SI operates through perceptions of approval by important others and through status and normative pressures (He et al., 2025; Chaveesuk et al., 2023; Zheng & Gao, 2021). Social influence has a positive influence on behavioural intentions in digital wallet and mobile payment contexts (Hammouri et al., 2023; Herzallah et al., 2025). Gen Z users, in particular, are more likely to adopt mobile wallets in response to social approval from family, friends, or colleagues. Research on the metaverse presents mixed findings. Kalınkara and Özdemir (2024) reported a positive influence of SI on students' behavioural intentions to use the metaverse, whereas Yang et al. (2022) and Sunardi et al. (2022) found no significant influence, possibly due to the technology's developmental stage or specific application context. Studies by Menon and Shilpa (2023), Bilos and Budimir (2024), Strzelecki (2024a, 2024b), and Foroughi et al. (2024) confirm that students are more likely to adopt ChatGPT if others have already done so. Namatovu and Kyambade (2025) corroborate these findings, emphasising the influence of peers and instructors on adoption. Social influence also significantly shapes acceptance of blended learning environments (Abu Gharrah & Aljaafreh, 2021; Huang & Kao, 2015; Rudhumbu, 2022). Rudhumbu (2022) demonstrated that social influence has a significant impact on university students' intentions to adopt blended learning. Similarly, in mobile payment systems (MPS), SI has been consistently shown to influence behavioural intention positively (Hussain et al., 2019; Lee et al., 2019; Al-Saedi et al., 2020). Wu and Liu (2023) confirmed this influence in Chinese and Belgian contexts, aligning with earlier research. Lastly, Lian (2015) identified social influence as one of the key factors influencing citizens' intention to adopt e-invoice systems, alongside effort expectancy, trust, and perceived risk. Therefore, the third hypothesis is as follows:

H3: Social influence has a positive and significant influence on behavioural intention to adopt e-invoicing.

2.4.4. Facilitating conditions (FC)

Venkatesh et al. (2003) and Rahman et al. (2020 mentioned that FC refers to the extent to which individuals perceive that organisational and technical infrastructures are available to support their use of a technology. Numerous studies have established a positive relationship between FC and usage behavior or behavioral intention, particularly in digital payments (Herzallah et al., 2025; Tusyanah et al., 2021), mobile learning (Faqih & Jaradat, 2021; Osei et al., 2022), e-wallets (Lakshmanan & Shanmugavel, 2025), and emerging technologies like AI, ChatGPT, and the metaverse (Kwak et al., 2022; Kalınkara & Özdemir, 2024) while Du & Liang (2024) confirm the significant impact of FC alongside other UTAUT2 factors in predicting continued technology use. However, inconsistencies in findings have been found in some studies, which found no significant influence of FC on behavioural intention (Khalil et al., 2023; Namatovu & Kyambade, 2025; Wu & Liu, 2023). In addition, FC's influence is prominent in educational settings. Studies show that learners are more motivated to adopt technologies like blended learning, ChatGPT, and metaverse tools when they perceive sufficient support and ease of access (Rudhumbu, 2022; Alam et al., 2020; Chiao et al., 2018). In addition, a lack of such support may suppress intention to adopt despite positive attitudes toward the technology (Budhathoki et al., 2024). Therefore, the fourth hypothesis is as follows:

H4: Facilitating conditions have a positive and significant influence on behavioral intention to adopt e-invoicing.

2.4.5. Perceived trust (PT) in the e-invoicing system

For the extended factor, Khazaei (2020) suggested trust in technology, which refers to users' confidence that the system will function reliably and securely, and plays a crucial role in the acceptance of digital technology. Trust is a critical factor in technology adoption, with security and risk perceptions closely interrelated (Belanger & Carter, 2008; Gilbert et al., 2004). Shin (2013) and Lian (2015) emphasised that factors such as availability, access, security, and reliability are essential for users' acceptance of cloud-based e-government services. In the blockchain, Ala'a and Ramayah (2023) emphasised trust as essential for user acceptance, supported by extensive evidence across various contexts (Almajali et al., 2022; Gao & Li, 2021). Lian (2015) highlighted trust as a central factor in e-government adoption, where it mitigates perceived risks related to security and privacy (Belanger & Carter, 2008; Gilbert et al., 2004). Therefore, the fifth hypothesis is as follows:

H5: Trust in the e-invoicing system has a positive and significant influence on behavioral intention.

2.4.6. Perceived security (PS)

Another extended factor (Cimperman et al., 2016), such as perceived security, refers to users' beliefs about the safety and protection provided by a technology, particularly regarding the management of sensitive information, such as in electronic health record (EHR) systems. In online transactions, security can foster increased trust among users, which positively influences their adoption decisions (Ooi et al., 2021). Studies by Ala'a and Ramayah (2023), Kumar et al. (2022), and Asadi et al. (2017) confirm that perceived security significantly influences indirect through perceived usefulness (PU), perceived ease of use (PEOU), and perceived trust (PTR). Security concerns are often the barrier to adopting cloud computing (Subashini & Kavitha, 2011; Zissis & Lekkas, 2011). Lian (2015) observed that higher trust in e-government reduces perceived risk in cloud-based e-invoicing systems, while raised security concerns will reduce trust and subsequently lower the intention to adopt such systems. In addition, Lian (2015) also found that security concerns do not show direct influence on behavioural intention. Similarly, Nguyen, Nguyen, and Dang (2020) found no significant positive relationship between perceived security and attitude toward behaviour in the context of e-invoicing. This aligns with findings by Jun and Jaafar (2011), suggesting that users regard security as a fundamental need that they expect to be a factor influencing their adoption attitudes. Therefore, the six hypotheses are as follows:

H6: Perceived security concerns have a negative and significant influence on behavioural intention to adopt e-invoicing.

2.4.7. Perceived risk (PR)

Perceived risk, often conceptualised as the belief in uncertainty regarding potential adverse outcomes or dangers (Thakur & Srivastava, 2014), has been extensively studied as a critical factor influencing behavioural intention to adopt new technologies. In the context of mobile payment systems (MPS), perceived risk has consistently been shown to have a negative influence on users' intention to adopt these platforms (Liebana-Cabanillas et al., 2021a, 2021b; Pal et al., 2021). While perceived risk is often correlated with behavioural intention and actual use, Wu and Liu (2023) found that although perceived risk and personal innovativeness related as expected to behavioural intention and use behaviour, their finding did not improve the influencing power of the UTAUT2 model. Several studies have explored these relationships, indicating that increased security concerns elevate perceived risk and reduce trust, which in turn lowers the intention to adopt

technology (Nicolaou & McKnight, 2006). In the specific domain of e-government and cloud-based e-invoicing systems, Lian (2015) demonstrated that higher trust in e-government reduces perceived risk, leading to greater intention to adopt e-invoicing. Regarding small and medium enterprises (SMEs), while all participants recognised the advantages of e-invoicing, they differed in their perceptions of associated risks, reflecting diverse experiences and concerns (Sandberg, Wahlberg, & Pan, 2009). Therefore, the seven hypotheses are as follows:

H7: Perceived risk has a negative and significant influence on behavioural intention to adopt e-invoicing.

3. Methodology

3.1. Research design

The current study employs a quantitative survey-based design to investigate the perception of representatives from SMEs in Malaysia before the full adoption of E-Invoice. This approach will help to collect data that can be used to analyse hypothesis development between variables at the exploratory phase of research. In addition, this study employs a cross-sectional design, which enables the investigation of current perceptions and intentions related to this e-invoice and is also suitable for exploratory research. This also helps researchers identify factors that influence the adoption.

3.2. Instrument development

The source of questionnaire items in Table 1 has been adopted from UTAUT2 and an extension of past articles that investigated cloud e-invoices in Taiwan (Lian, 2015). The first part of the questionnaire is the respondent profile, the second part gathered information related to experience to adopt e-invoice and third part for eight variables that comprises of performance expectancy (PE), effort expectation (EE), social influence (SI), facilitating conditions (FC), perceived trust (PT), perceived security (PS), perceived_risk (PR) and behavioral_intention (BI) with 5-point scale.

Table 1: Questionnaire Items

Factors	Items
Performance Expectation (PE)	6
Effort Expectation (EE)	6
Social Influence (SI)	3
Facilitating Conditions (FC)	4
Perceived Trust (PT)	4
Perceived Security (PS)	9
Perceived Risk (PR)	2
Behavioral Intention (BI)	3

3.3. Sampling and data collection

Despite extensive recruitment efforts, the study obtained 49 valid responses from SME owners. The relatively small sample size reflects the nascent stage of e-invoicing implementation in Malaysia, the limited public awareness among SMEs, and restricted accessibility, which was primarily achieved through connections with SMEs that attend a tax webinar on e-invoices, organized by an accounting association and a consultant. Given that e-invoicing had not yet been fully mandated during the data collection period (March to June 2025), many potential respondents were still unfamiliar or reluctant to participate. These factors, combined with the voluntary nature of participation and the online distribution mode, contributed to the modest response rate. Although the response rate was modest, it remains consistent with similar exploratory studies on technology adoption in SMEs, which align with earlier research on e-invoices in Sweden that involved 20 small companies to ensure SMEs are ready for e-invoicing acceptance (Sandberg et al., 2009). Given that this study focuses on the early adoption phase for e-invoicing, the primary objective was to obtain initial insights rather than statistical generalisation. Therefore, the sample size was considered adequate for exploratory correlation and regression analysis. Data collection relied on online surveys disseminated via Google Forms. Furthermore, confidentiality concerns and data privacy regulations limit the ability to obtain official contact lists of SMEs. The snowball approach was therefore adopted to reach respondents through professional networks and accounting associations, ensuring voluntary and ethical participation.

3.4. Data analysis techniques

This study employs correlation analysis to determine the direction of the relationship among variables and identify the strongest relationship to adopt e-invoices. While this study utilises regression analysis to identify the influence of each factor on behavioural intention, it is suitable for testing the hypotheses developed for this study.

4. Results and Discussion

4.1. Respondent profile

The majority of respondents are in the 41–50 years age group (53.1%), indicating that SME ownership is primarily concentrated among middle-aged individuals who likely have substantial work and business experience. The second largest group is 31–40 years (26.5%), followed by 22–30 years (12.2%), followed by 51–60 years (8.2%). The sample is dominated by females (67.3%), compared to 32.7% male respondents. This is an interesting finding, as it highlights the significant role of women in SME ownership within the study context, potentially reflecting an increase in female participation in business activities in Malaysia. In terms of education level, the majority of respondents hold a Bachelor's degree (73.5%), followed by Diploma holders (12.2%), Certificate/Professional certificate holders (8.2%), and a small number with a master's degree (6.1%). This suggests that most SME owners in the sample are relatively well-educated, which may influence their awareness and readiness to adopt e-government services, such as e-invoicing.

Table 2: Respondent Profile

		Frequency	Percent
What age category do you belong to:	22 – 30 years	6	12.2
	31 – 40 years	13	26.5
	41 – 50 years	26	53.1
	51 – 60 years	4	8.2
Gender	Female	33	67.3
	Male	16	32.7
Education	Certificate / Professional certificate	4	8.2
	Diploma	6	12.2
	Degree	36	73.5
	Master's degree	3	6.1
	Total	49	100.0

4.2. Reliability analysis

This study uses reliability analysis to ensure the internal consistency and reliability of the measurement instruments used in this study, as shown by the Cronbach's Alpha (α) values. The results, presented in Table 3, indicate that all variables achieved acceptable to excellent levels of reliability, suggesting that the items used for each variable were consistent in measuring the respective variables. Cronbach's Alpha values above 0.70 are generally considered acceptable, values above 0.80 are considered good, and values above 0.90 indicate excellent internal consistency (Hair et al., 2010).

Table 3: Cronbach's Alpha

	Cronbach's Alpha	N of Items
Performance Expectation (PE)	0.938	6
Effort Expectation (EE)	0.970	6
Social Influence (SI)	0.906	3
Facilitating Conditions (FC)	0.835	4
Perceived Trust (PT)	0.927	4
Perceived Security (PS)	0.917	9
Perceived Risk (PR)	0.788	2
Behavioral Intention (BI)	0.927	3

4.3. Descriptive statistics

Table 4 in this section presents respondents' attitudes and future intentions regarding the use and adoption of e-invoicing systems, based on five key questions. The findings offer insight into the level of awareness, exposure, and readiness among SME owners. Interestingly, nearly all respondents expressed a willingness to investigate further or learn more about the related technologies. Specifically, 51.0% stated they will investigate, and 49.0% indicated they probably will. This strong positive response reflects a high level of curiosity and openness to digital adoption. A significant majority (63.3%) had attended training or courses related to e-invoicing or related digital technologies, while 36.7% had not. This suggests that many participants are already engaged in upskilling or professional development, which is essential for the effective implementation and use of e-invoicing systems. However, the 36.7% without training highlights the need for broader educational outreach and capacity-building programs, as well as training related to e-invoice.

Organisational readiness and intention to adopt have revealed that 65.3% believe their organisation should adopt e-invoicing, 18.4% indicated it is already adopted, and 16.3% reported ongoing implementation. This reveals a strong agreement (nearly 100%) that e-invoicing is necessary, either now or in the near future, indicating widespread institutional support or interest. However, the relatively low current adoption rate (18.4%) suggests that many small enterprises are still in the early stages of adopting this technology. The majority of respondents (69.4%) planned to adopt an integrated accounting system with e-invoicing, while only 6.1% opposed the idea. While 16.3% were unsure, and 8.2% reported it was already in progress. These findings suggest a high perceived value of integration, as respondents appear to favour streamlining invoicing with accounting processes, a critical step for automation and digital transformation in their existing software or system.

Table 4: Respondents for Knowledge, Training, and Adoption Intentions

		Frequency	Percent
Do you intend to further investigate and gain more knowledge about all these factors in the near future?	Yes, I will investigate	25	51.0
	Yes, I will probably investigate	24	49.0
Have you attended any courses on any of these technologies before this survey?	Yes	31	63.3
	No	18	36.7
Do you think that your organisation should adopt E-Invoicing in the future?	Yes, should adopt	32	65.3
	Already adopting	9	18.4
	Currently in the process of adopting	8	16.3
Do you plan to use an integrated accounting system with E-invoices in the future?	Yes, should adopt	34	69.4
	No, should not adopt	3	6.1
	I do not know	8	16.3
	Currently in the process of adopting	4	8.2
	Total	49	100.0

4.4. Correlation analysis

Based on Table 5, social influence is the strongest correlation in the model. It implies that peer influence, professional norms, or social expectations have a substantial impact on behavioural intention to adopt e-invoicing. This result indicates that he stronger the perceived

social support or pressure, the higher the likelihood of adoption, which is also aligned with Patil et al. (2020). In addition, the effort expectation is strongly correlated with the adoption of e-invoices, suggesting that if SMEs believe the e-invoicing system is easy to learn and operate, they are significantly more motivated to adopt it, as noted by Lian (2015). While performance expectation shows that when SMEs believe e-invoicing will enhance their efficiency, job performance related to the computation of e-invoice, they are more likely to intend to adopt it, as suggested also by Herzallah et al. (2025). Trust in the system of e-invoice, offering it, plays an important role in encouraging adoption among SMEs in Malaysia. This result suggests that users who trust the system's reliability and credibility are more likely to adopt e-invoices (Khazaei, 2020). This is also facilitated by conditions that play a crucial role in enhancing the intention to adopt, as noted by Du & Liang (2024). Surprisingly, perceived security concerns are negatively correlated with BI among SMEs, indicating that greater concerns over data privacy or system vulnerability reduce the willingness to adopt, which may be due to inadequate protections or perceived system weaknesses. Aligned with the PS, higher perceived risks are associated with lower behavioural intention.

Table 5: Correlation Analysis

Correlations									
		PE	EE	SI	FC	PT	PS	PR	BI
PE	Pearson Correlation	1	.900**	.841**	.819**	.735**	-.615**	-0.267	.829**
	Sig. (2-tailed)		0.000	0.000	0.000	0.000	0.000	0.064	0.000
	N	49	49	49	49	49	49	49	49
EE	Pearson Correlation	.900**	1	.876**	.822**	.774**	-.713**	-.361*	.871**
	Sig. (2-tailed)	0.000		0.000	0.000	0.000	0.000	0.011	0.000
	N	49	49	49	49	49	49	49	49
SI	Pearson Correlation	.841**	.876**	1	.787**	.796**	-.649**	-0.183	.907**
	Sig. (2-tailed)	0.000	0.000		0.000	0.000	0.000	0.207	0.000
	N	49	49	49	49	49	49	49	49
FC	Pearson Correlation	.819**	.822**	.787**	1	.750**	-.492**	-0.172	.722**
	Sig. (2-tailed)	0.000	0.000	0.000		0.000	0.000	0.236	0.000
	N	49	49	49	49	49	49	49	49
PT	Pearson Correlation	.735**	.774**	.796**	.750**	1	-.576**	-0.232	.722**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000		0.000	0.109	0.000
	N	49	49	49	49	49	49	49	49
PS	Pearson Correlation	-.615**	-.713**	-.649**	-.492**	-.576**	1	.496**	-.781**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000		0.000	0.000
	N	49	49	49	49	49	49	49	49
PR	Pearson Correlation	-0.267	-.361*	-0.183	-0.172	-0.232	.496**	1	-.393**
	Sig. (2-tailed)	0.064	0.011	0.207	0.236	0.109	0.000		0.005
	N	49	49	49	49	49	49	49	49
BI	Pearson Correlation	.829**	.871**	.907**	.722**	.722**	-.781**	-.393**	1
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.005	
	N	49	49	49	49	49	49	49	49

***. Correlation is significant at the 0.01 level (2-tailed).*
**. Correlation is significant at the 0.05 level (2-tailed).*

4.5. Preliminary Analysis

Table 6: Bootstrapping Analysis

	B	Bias	Std. Error	Sig. (2-tailed)	BCa 95% Confidence Interval	
					Lower	Upper
(Constant)	2.652	-0.061	0.418	0.002	1.895	3.219
PE	0.169	-0.046	0.203	0.319	-0.28	0.395
EE	-0.002	0.005	0.234	0.988	-0.81	0.44
SI	0.694	-0.007	0.147	0.005	0.438	0.97
FC	-0.005	-0.004	0.18	0.972	-0.294	0.423
PT	-0.128	0.068	0.18	0.349	-0.371	0.655
PS	-0.326	0.028	0.119	0.015	-0.654	-0.064
PR	-0.169	-0.023	0.121	0.037	-0.482	-0.018

Given the relatively small sample size (n = 45) and the potential for violating normality assumptions, a bootstrapping approach was employed to enhance the reliability of the regression estimates. Specifically, 1,000 resamples were generated, as recommended by Byrne (2010), Field (2018), and Hayes (2022), to yield robust standard errors and bias-corrected 95% confidence intervals for the model coefficients. This method is particularly useful for small samples and provides a stronger basis for assessing parameter significance and the robustness of the results. The outcomes of the bootstrapping analysis are detailed in Table 6. Social Influence emerged as a significant and positive predictor of SMEs' behavioral intention to adopt e-invoicing (B = 0.694, p = 0.005, 95% BCa CI [0.438, 0.970]). This finding suggests that social factors play a crucial role in encouraging SMEs to embrace e-invoicing solutions. In contrast, Perceived Security (B = –0.326, p = 0.015, 95% BCa CI [–0.654, -0.064]) and Perceived Risk (B = –0.169, p = 0.037, 95% BCa CI [–0.482, –0.018]) demonstrated negative effects, implying that concerns about security and perceived risks may act as barriers to adoption. Other variables included in the analysis did not reach statistical significance. The bias values associated with all coefficients were minimal, and the bias-corrected and accelerated (BCa) confidence intervals were relatively narrow. This indicates that the bootstrap estimates are stable and robust, which supports the reliability of the findings despite the modest sample size and possible deviations from normality. According to Chen, Wu, and Miau (2015), Byrne (2010), Field (2018), and Hayes (2022), the absence of zero within the confidence intervals further confirms the stability and robustness of these results.

4.6. Regression Analysis

Table 7: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.953[a]	0.908	0.892	0.32814

a. Factors: (Constant), PR, FC, SECURITY, TRUST, PE, SI, EE

Table 8: ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	43.409	7	6.201	57.593	<.001[b]
	Residual	4.415	41	0.108		
	Total	47.823	48			

a. Dependent Variable: BI
b. Factors: (Constant), PR, FC, SECURITY, TRUST, PE, SI, EE

Table 9: Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.652	0.536		4.948	0.000
	PE	0.169	0.139	0.142	1.217	0.231
	EE	-0.002	0.160	-0.001	-0.009	0.993
	SI	0.694	0.117	0.686	5.918	0.000
	FC	-0.005	0.123	-0.004	-0.038	0.970
	PT	-0.128	0.117	-0.092	-1.091	0.282
	PS	-0.326	0.104	-0.238	-3.126	0.003
	PR	-0.169	0.074	-0.134	-2.287	0.027

a. Dependent Variable: BI

Based on Table 7, the model explains 90.8% of the variance in behavioural intention to adopt e-invoicing, indicating an excellent fit. This fit is explained by the combined influence of performance expectation, effort expectation, social influence, facilitating conditions, trust, security, and perceived risk. Based on Table 8, the F-statistic is 57.593 with a p-value < 0.001, indicating that the overall regression model is statistically significant. This suggests that the combination of independent variables significantly explains the variance in behavioural intention for e-invoicing among SMEs. In Table 9, Social Influence (SI) is the strongest positive factor of behavioural intention ($\beta = 0.686$, $p < 0.001$). This result suggests that when SMEs perceive that each business considers e-invoicing important and needs to support it, their intention to adopt it increases significantly. This empirical evidence corroborates studies conducted in other contexts of technology adoption, such as driverless buses (He et al., 2025) and m-wallets (Herzallah et al., 2025). Security is a significant negative factor ($\beta = -0.238$, $p = 0.003$), suggesting that greater concerns about security reduce the likelihood of adopting e-invoicing. This implies that addressing security concerns is critical to improving adoption. This finding is not shown to have a direct influence on intention in other research, which has generally shown mixed relationships with trust (Cimperman et al., 2016) and with PEOU, PR, and PU (Ala'a & Ramayah, 2023). Perceived Risk (PR) is also a negative factor ($\beta = -0.134$, $p = 0.027$), as higher levels of perceived risk related to data misuse are associated with lower behavioral intention. The current finding is consistent with previous findings reported by Liebana-Cabanillas et al. (2021a, 2021b) and Pal et al. (2021).

Performance Expectation (PE), Effort Expectation (EE), Facilitating Conditions (FC), and Trust did not show a significant individual influence ($p > 0.05$), despite being positively correlated with BI in the correlation analysis. For PE, this study aligned with Kalınkara and Özdemir (2024), who showed that there is no influence of students' behavioural intentions to use the metaverse, which is different from the other studies that showed a positive influence (Wu & Liu, 2023; Rudhumbu, 2022; Namatovu & Kyambade, 2025). While the result of EE that shows no influence on intention also aligns with research done by Kalınkara & Özdemir (2024) and Yang et al. (2022), even though most of the past studies indicate that EE is one of the strongest factors that may influence the intention to adopt technology (Herzallah et al., 2025; Grassini et al., 2024). For FC, the current study indicates that organisational resources and conditions do not influence the intention to adopt e-invoices, as aligned with Khalil et al. (2023) and Grassini et al. (2024). While trust showed no influence on the intention to adopt the e-invoice, this may indicate that the system provided by IRB has a higher confidence level than SMEs perceive, unlike other research (Ala'a & Ramayah, 2023; Lian, 2015). In conclusion, analysis revealed that social influence emerged as the most influential positive factor ($\beta = 0.686$, $p < .001$), followed by security concerns ($\beta = -0.238$, $p = .003$) and perceived risk ($\beta = -0.134$, $p = .027$), both of which had significant negative influences on behavioural intention. Other factors, such as performance expectations, effort expectations, facilitating conditions, and trust, were found to be statistically insignificant factors in the context of e-invoicing adoption among SMEs.

5. Conclusion

This study examined seven hypothesised relationships between various factors and the intention to adopt e-invoicing. The findings reveal that social influence has a positive influence on adoption intention, indicating that recommendations and perceptions from peers, colleagues, and industry networks, such as accounting practitioners, accounting professional bodies, and tax consultants, are related to the adoption of e-invoicing. Therefore, Hypothesis 3 is accepted. The result for SI is due to peer pressure, professional accounting network, and encouragement from the regulator, which may influence potential adopters. Conversely, perceived security and perceived risk were found to have negative influences, suggesting that concerns over data protection, system reliability, and potential misuse related to the e-invoice system may impact the intention to adopt e-invoices. Therefore, Hypotheses 6 and 7 are accepted as summaries in Table 10. This is no surprise since SME owners are concerned about data privacy and trust. Additionally, for SME owners unfamiliar with digital tax, this will increase security concerns. The SMEs' willingness to adopt the e-invoice will be reduced due to uncertainty and concerns about data security. SMEs have a low adoption rate of e-invoices due to a limited amount of technical support.

Performance expectation, effort expectation, facilitating conditions, and trust did not significantly influence adoption intention. These results challenge prior studies in the UTAUT2 model, which often emphasise perceived usefulness, ease of use, and enabling conditions as key drivers in most past studies. Therefore, hypotheses 1, 2, 4, and 5 were rejected and may not influence the adoption of e-invoice as summarised in Table 9. For PE, this result suggests that there are no efficiency benefits due to the system's early stage of rollout and limited experience. For EE, in the Malaysian scenario, at an early stage, most SMEs utilise the MyInvois Portal without encountering technical issues. For FC, due to limited awareness of technical support, SMEs rely on an external accounting software provider, and do not have their own software to incorporate for e-invoice. At the same time, PT indicates that SME owners have not developed confidence since the introduction of new technology for e-invoices.

From a practical perspective, policymakers, such as IRB, and software and system developers should prioritise awareness among SMEs as users to encourage adoption. From the model's perspective, it extends the model's application to the context of e-invoicing adoption among SMEs by integrating perceived security and perceived risk, which highlights the negative perceptions and trust-related concerns as critical determinants that can improve the UTAUT2 from the context of e-invoicing. This has been supported by Mahusin and Prilliadi (2024), who have also proposed policy suggestions within the ASEAN region for e-invoices, including the mandate of encryption, secure authentication protocols, and regular security audits for e-invoice users to address security concerns and perceived risk.

This study is subject to several limitations that should be acknowledged. First, the use of a cross-sectional design captures perceptions and intentions at a single point in time, which has limited the ability to assess how perceptions and intentions toward e-invoicing may evolve before and after full regulatory implementation. Longitudinal studies would provide deeper insights into changes in adoption behavior over time once the e-invoice has been widely adopted among SMEs. Second, the sample size is relatively small (n = 49) and obtained through snowball sampling, which may not fully represent the broader population of SMEs in Malaysia. Future research should employ larger, randomly selected samples to enhance external validity. Finally, while this research draws on the UTAUT2 framework and its extensions, other influential factors related to organisational context, such as regulatory compliance pressure, industry-specific requirements, or macroeconomic conditions, top management support, and talent development, were not examined. Future research could expand the model to integrate with technological, organisational, and environmental factors.

Table 10: Summaries of Hypotheses

Hypotheses		Factors	Current study	Result
1	Performance Expectation (PE)	Performance expectation - intention to adopt e-invoicing.	No influence	Rejected
2	Effort Expectation (EE)	Effort expectation - intention to adopt e-invoicing.	No influence	Rejected
3	Social Influence (SI)	Social influence - intention to adopt e-invoicing.	Positive influence	Accepted
4	Facilitating Conditions (FC)	Facilitating conditions for the intention to adopt e-invoicing.	No influence	Rejected
5	Perceived Trust (PT)	Trust- intention to adopt e-invoicing.	No influence	Rejected
6	Perceived Security (PS)	Perceived security - intention to adopt e-invoicing.	Negative influence	Accepted
7	Perceived Risk (PR)	Perceived risk - intention to adopt e-invoicing.	Negative influence	Accepted

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