

**THE ANTECEDENTS AND CONSEQUENCES OF ELECTRONIC  
INVOICE IN CHINA FROM A TAX PERSPECTIVE**

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CHINA FROM A TAX PERSPECTIVE**

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**Field of Study: IT adoption and taxation**

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## **ABSTRACT**

The purpose of this study is to examine the factors that affect the adoption of electronic invoice and in return the consequences of these factors on tax compliance process efficiency of companies in China. A questionnaire survey was distributed to 276 users who adopted electronic invoice and partial least squares regression was used to analyze the data. This study found that perceived benefits and trust in e-government had a positive influence on the adoption of electronic invoice. Furthermore, we also found that the adoption of electronic invoice have a positive impact on the efficiency of the tax compliance process. Moreover, the factors affecting adoption of electronic invoice can have a mediating effect between adoption and tax compliance process efficiency. This study has some limitations because it only explores these influencing factors on companies that has adopted electronic invoice. Future research will be carried out to distinguish between adopters and non-adopters. The results of this study can guide tax authorities and other electronic invoice suppliers to promote the adoption of electronic invoice. This study contributes to the electronic adoption literature by examining antecedents that have consequences on tax compliance processes efficiency.

**Keywords** – Technological, organizational, and environment (TOE) framework, electronic invoice adoption, e-government, tax compliance process efficiency.

## ABSTRAK

Tujuan kajian ini dilaksanakan adalah untuk mengkaji faktor-faktor yang mempengaruhi penggunaan invois elektronik dan kesannya terhadap faktor-faktor dalam proses kecekapan pematuhan cukai oleh syarikat-syarikat di China. Oleh itu, borang tinjauan soal selidik telah diedarkan kepada 276 orang pengguna yang telah menggunakan invois elektronik dan data-data daripada borang tersebut telah dianalisis menggunakan teknik Regresi Kuasa Dua Terkecil Separa. Kajian ini telah mendapati bahawa aspek manfaat yang dijangkakan dan kepercayaan terhadap e-Kerajaan telah memberikan pengaruh positif terhadap penggunaan invois elektronik. Pada masa yang sama, kajian ini juga telah menunjukkan bahawa penggunaan invois elektronik boleh memberikan impak positif terhadap proses kecekapan pematuhan cukai. Tambahan pula, faktor-faktor yang mempengaruhi penggunaan invois elektronik boleh mewujudkan kesan pengantaraan antara aspek penggunaan dan proses kecekapan pematuhan cukai. Walau bagaimanapun, kajian ini masih mempunyai pelbagai kekangan kerana faktor-faktor pengaruh tersebut hanya dijalankan di syarikat-syarikat yang mengamalkan penggunaan invois elektronik. Kajian selanjutnya boleh dilakukan kepada para pengguna dan bukan pengguna invois elektronik. Hasil kajian ini boleh menjadi panduan kepada pihak berkuasa dan pengedar-pengedar elektronik invois untuk mempromosikan penggunaannya. Kajian ini turut menyumbang kepada literatur penggunaan elektronik dengan mendalami faktor-faktor yang memberi kesan kepada proses kecekapan pematuhan cukai.

**Kata Kunci:** Kerangka TOE, penggunaan invois elektronik, e-Kerajaan, proses kecekapan pematuhan cukai.

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## **List of Abbreviations**

EA: Electronic invoice adoption

PB: Perceive benefits

PC: Process Compatibility

PS: Perceived Security

TR: Technology Readiness

TE: Trust in E-government

TCPE: Tax Compliance Process Efficiency

B2B: Business to Business

B2C: Business to Consumer

B2G: Business to Government

IBPS: Inter-organizational business process standards

RFID: Radio frequency identification

ICT: Information and communication technology

EDI: Electronic data interchange

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## **CHAPTER ONE: INTRODUCTION**

This chapter falls into seven sub-sections. It begins with the background including global electronic invoice adoption, electronic invoice adoption in China, and the reasons for China's electronic invoice adoption. This is followed by discussing the problem statement, research gap, research questions, research objectives and research implications. Lastly, an overview of the organization of this thesis is presented.

### **1.0 Introduction**

This chapter provides an overview of the research. It outlines the background and problem statement, research questions, objectives of the study, significance of the research, and organization of the thesis.

### **1.1 Background**

Electronic invoice is defined by European Commission as “an invoice that has been issued, transmitted, and received in a structured electronic format which allows for its automatic and electronic processing”. Since the early 1970's the first electronic invoices were sent by using electronic data interchange (EDI), companies have begun to develop and apply the new technology in business. From then on, the adoption of electronic invoice has expanded slowly yet continuously in the last few years. In the early days, the main weakness of electronic invoice adoption used to be the cost of EDI technology, while today the high development of data exchange makes the electronic invoice widely affordable. However, the main new driver or even barrier behind electronic invoice adoption has come from governmental level. Government's promotion plays a key role

in creating the most active electronic invoice market in Europe. Many other countries in the world have also started to adopt electronic invoice. Almost each country has developed its own set of regulations, which has brought complicated compliance issues for organizations with transactional business.

### **1.1.1 Global electronic invoice adoption**

The electronic invoice market has been in operation for over 20 years. The maturity of the electronic invoice market varies from continents to countries on each continent due to the heterogeneous legislation, languages, cultures differences. The adoption of electronic invoice is mainly concentrated in North America, Latin America, European region (shown in figure 1). The very advanced regions in the Asia-Pacific region that adopt electronic invoices are mainly Kazakhstan, Singapore, China Hong Kong, China Taiwan and South Korea. During the development of electronic invoice, electronic documents have gradually replaced paper-based invoices. As part of the first phase, the European market was developed mainly by private industry. It was advanced globally by high-volume industries. Nowadays, however, the main driver is an increasing number of governments which require organizations to exchange invoices electronically. In this regard, Latin America is very advanced, followed by a number of countries in Europe and Asia. Thanks to this additional governmental impetus, the market for solution providers and integrators is rapidly growing.

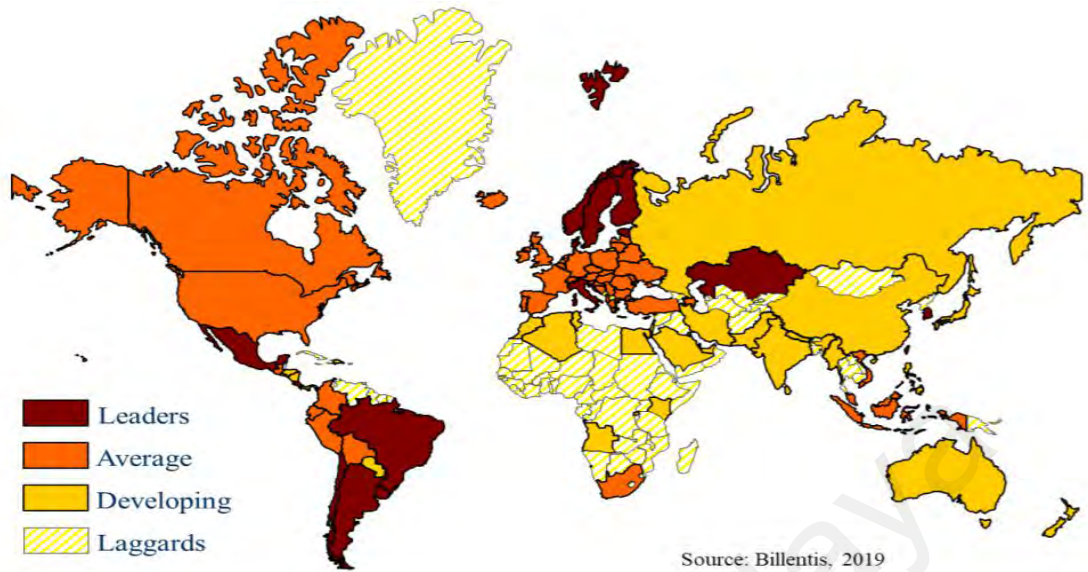
According to the research of Billentis (2020), it summarized the classic evolution pattern in most countries for electronic invoice adoption, see Figure 2. In the beginning

stage, under the pressure of high printing and delivering cost, large organizations introduce electronic invoice and offer to their customers. As more customers accepted electronic invoice, to improve process efficiency and share the cost, a business to customer (B2C) network service which has access to all the suppliers is more needed than private portal, leading to the 2nd stage. As the significant benefits of electronic invoice being recognized by issuers and recipients, the adoption in business to business (B2B) and business to government (B2G) is clearly more successful and valuable than in B2C. In this stage large corporates become promoters as soon as legislation permits paperless invoices in their countries, while a number of medium and small companies are still hesitating. The following mass market adoption stage is mainly driven by the government and initiated by public sectors. The legislation adjustment is a key to push electronic invoice adoption, especially in some Latin America and Asia countries, including China.

According to the investigation of Billentis (2020), the global market is forecast to encompass 550 billion invoices annually. It is expected to quadruple in size by 2035. In 2019, only around 55 billion invoices are exchanged on a paperless basis. We estimate that the size of the global electronic invoice and enablement market in 2019 amounts to EUR 4.3 billion, and that it will reach approximately EUR 18 billion in 2025.

Figure 1 displays an overview of global electronic invoice market from research in 2020





**Leaders** (evolution stage 4): North Europe, Mexico, Brazil, Chile

**Average** (evolution stage 3-4): North America, Europe, Australia

**Developing** (evolution stage 2-3): Russia, Asia

**Laggards** (evolution stage 1-2): most of Africa and some other countries

Note: Term ‘Laggards’ in the chart above does not mean that there was no electronic invoice activity in these countries. It just expresses that they are typically in a very early stage. ‘Developing’ means that countries have already some electronic invoice activities, typically in in the B2C segment and/or EDI between larger businesses.

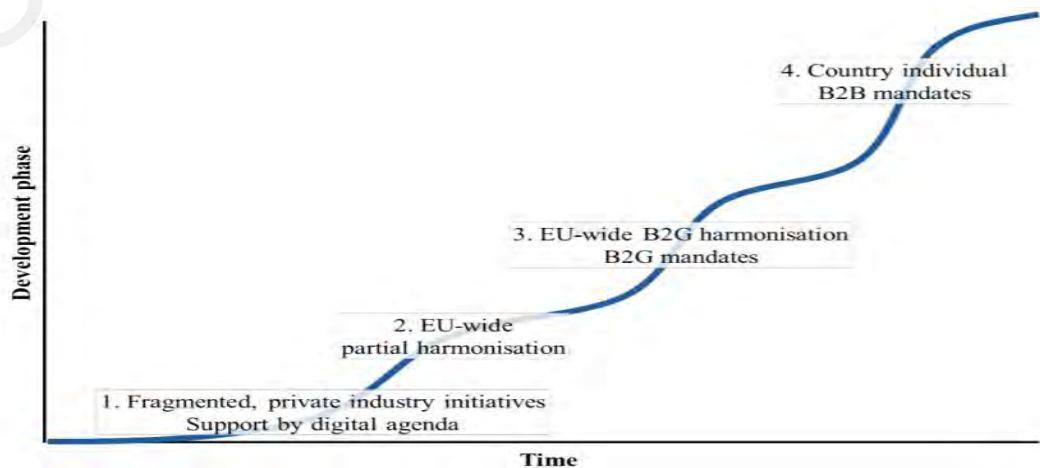


Figure 2: Classic evolution pattern in most countries (Bruno Koch, Billentis, 2020)

## **1.1.2 Background of electronic invoices adoption in China**

### **1.1.2.1 The development process of adopting electronic invoices in China.**

China's electronic invoices started later than those developed overseas regions. In recent years, the development of electronic invoices has experienced rapid development driven by multiple factors such as economy, policy, technology, and market. At present the digital economy has become a new driving force for China's economic development, and the voice of promoting digital transformation in the traditional field is increasing. As an important carrier of taxation information in China and an effective tool to help enterprises achieve digital transformation, thus, the promotion and application of electronic invoice is imperative (iiMedia Research, 2019). Since the launch of the "Golden Taxation Plan" (GTP) by the State Administration of Taxation (SAT) in 1994, China has invested much energy in the application of information technology in tax control over the years. The purpose of GTP is to strengthen tax control through the use of information systems, especially the tax collection and management process for Value-added tax. In the first phase of GTP, the State Administration of Taxation developed a Value-added tax (VAT) anti-counterfeiting tax control system to shift the VAT taxation process from manual to a digital information management system. By the end of the second phase of the GTP in 2007, the coverage of all general taxpayers in China and the cancellation of all manually edited special VAT invoices were all completed. At present, GTP is in the third stage, and its primary goal is to establish a

national tax service platform (Winn and Zhang, 2010). Online invoices are part of the third phase of GTP and were launched in 2009. It is still a paper invoice, but it is issued online. In 2012, an electronic invoicing system was developed. It was first used in Beijing in 2013 and then expanded to other major cities in China. In June 2014, a Beijing e-commerce company, Jing Dong Mall, issued China's first B2B electronic invoice to the insurance company PISS as a trial. In November 2015, the State Administration of Taxation clarified the legal effect of electronic invoice. In June 2016, the "Thirteenth Five-Year Plan" outline officially proposed the implementation of electronic invoice. On August 10, 2018, Shenzhen issued the first blockchain electronic invoice. In 2019, China will further deepen its digital development strategy and vigorously promote the application of electronic invoice in railways and medical fields (iiMedia Research, 2019).

According to the investigation of ZhiYan consultant (2018), it shows that emerging technologies are also being tested. A pilot project for blockchain-based electronic invoice is in progress and the system is being implemented by Shenzhen Taxation Bureau and Tencent.

#### **1.1.2.2. Industry distribution and number of adopting electronic invoices in China.**

In terms of using scenarios, e-commerce platform is the most important online scenarios, while restaurant is the most commonly used offline scenario. According to iiMedia Research data, 70.5% of the netizens surveyed who used electronic invoices said they used electronic invoices on e-commerce platforms, and 25.9% said they used electronic

invoices on online car-hailing platforms. iiMedia Consulting analysts believe that electronic invoices are developed from online invoices, and their original purpose is to solve the problem of taxation of e-commerce, which is the first to be popularized on e-commerce platforms under the policy promotion. On behalf of JD.com, Suning, and Guomei, self-operated e-commerce companies will issue electronic invoices by default after the completion of consumer transactions, which indirectly increases the utilization rate of netizens on e-commerce platforms. Among the interviewed netizens who have used electronic invoices, restaurants and hotels are the most common offline use scenarios that use electronic invoices, accounting for 40.2% and 33.0%, respectively. iiMedia Consulting analysts believe that restaurants and hotels are scenes with high invoice demand rates, but the traditional way of issuing paper invoices takes time and effort. Cost savings and improved consumer experience have become the main driving forces for the use of electronic invoices in these areas.

In recent years, with the support of policy promotion, technology development and capital, the electronic invoice industry has gradually expanded from electronic commerce and telecommunications to insurance, retail, catering, transportation, public utilities and other industries. Geographically, it has also been extended from individual pilot areas to the whole country. Electronic invoice will accelerate penetration, and players with high technical strength and service ability are expected to take the lead in development, and the Matthew effect of the industry is gradually formed.

According to the data of iiMedia Research, 1.31 billion electronic invoices were issued in 2017 in China, resulting in service market revenues of approximately EUR 32 million. The number of electronic invoices issued nationwide in 2018 was 3.27 billion, an increase of 257.1% compared with 2017, and the market is expected to reach 50 billion electronic invoices by 2021.

### **1.1.2.3 Analysis of the reasons for adopting electronic invoices in China.**

Despite of the general benefits of electronic invoice, such as cost reduction, greater efficiency, accuracy and transparency of process, better cash management, there're some specific reasons for China (Zhou et al.,2016). The reasons are summarized as follows.

#### **(1) Save enterprise costs and benefit environmental protection**

In the process of using paper invoices, the main costs incurred include the cost of invoice purchase, including the printing cost of paper invoices, the road expenses and labor costs incurred by enterprises to purchase invoices; the cost of invoice issuance, mainly including the purchase of tax-controlled printers and maintenance tax control printers, billing staff labor costs, etc .; invoice circulation costs, mainly including postage and labor costs incurred during the invoice delivery process; invoice storage costs, mainly including the direct costs incurred by the purchaser and the seller to keep the invoice. Since there is no paper carrier for electronic invoices, the data is stored in the database in the form of electronic records, and electronic invoices can be circulated on the Internet, so it can better save enterprise costs. At the same time, since electronic

invoices do not need to be printed and are circulated in electronic form, it not only saves resources in China, but also is environmentally friendly.

## **(2) Improve the efficiency of enterprises and tax authorities**

Since there is no paper form for electronic invoices, enterprises only need to apply in the electronic invoice information system when purchasing electronic invoices, indicating the required invoice type and the number of invoices, and the tax office staff can approve and allocate the invoices. This not only simplifies the invoice purchase process, but also improves the efficiency of the business and tax authorities. At the same time, when issuing paper value-added tax invoices, enterprises need to obtain VAT invoicing information from the purchaser, and then issue VAT invoices based on relevant information. After the implementation of electronic issuance, enterprises can obtain the invoicing information of the purchaser in the electronic invoice information system when issuing VAT electronic invoices, which not only ensures the accuracy of invoicing information, but also improves work efficiency.

## **(3) Eliminate false invoices from the source, which is more conducive to supervision by the tax authorities.**

A large number of invoices are circulating in the market every day. How to ensure the authenticity of each invoice has become an important problem faced by the tax authorities. The tax authorities' inspection of invoices generally checks the authenticity of the invoices through mutual inspection. The tax authorities do not have the

manpower and financial resources to verify the authenticity of each invoice, so there will be false invoices on the market. Compared with paper invoices, electronic invoice data is easier to analyze. Tax authorities can use advanced computer technology to classify a large number of electronic invoice information and even verify the authenticity of each electronic invoice. Tax authorities can also use network technology to implement real-time monitoring of the process of issuing electronic invoices by enterprises to eliminate false invoices from the source.

#### **(4) Help consumers protect their rights**

Due to the arbitrariness of consumers, it is easy to cause the loss of paper invoices. When the quality of the purchased goods has problems, the invoices of the consumers to buy the goods are lost, which may cause economic losses for consumers who want to better protect their rights. Electronic invoices are stored in a network database, and consumers do not need to keep them. When electronic invoices are needed, the corresponding electronic invoice information can be found on the website according to the transaction content, which is more conducive to protecting consumer rights.

#### **1.1.2.4 The potential barriers of adopting electronic invoices in China.**

Considering all the benefits to be obtained, the penetration rate of electronic invoices in China is still not high. which means there could be several barriers to the adoption of electronic invoice. This section will reveal the barriers of implementation electronic invoice that every business could cope with.

The deployment of an electronic invoice system is a complex process that requires confirmation by the invoice issuer and receiver. Some relevant research conclusions are as follows (Gall & Holland, 2005; Harald, 2009; Thomson, 2010). The researchers divide the barriers to the adoption of electronic invoices into two categories, namely the barriers of the company itself (internal) and the barriers caused by partners (external). The former focuses on factors that hinder the company's ability to computerize invoices, while external factors explain why adopting electronic invoices is not attractive to outsiders.

**The internal factors are summarized as follows:**

- Enterprises switched from paper invoices to paperless invoices, which initially required large capital expenditures. Because companies must invest in IT and training, this will increase the company's additional costs.
- In fact, electronic invoices are sent and received by different electronic invoicing vendors in multiple formats. Insufficient IT infrastructure can hinder the ability to accept digital invoices.
- Redistribution of human resources or training of staff to take on the special responsibility of adopting electronic invoices requires a lot of time and effort.
- Employees are accustomed to using old systems, and they are reluctant to learn and accept new technology models.



- Although the application of electronic invoices is considered to be fast and sustainable, it is a complicated process compared to traditional methods.
- Due to the multidisciplinary nature of electronic invoices, companies must have strong internal capabilities.

### **The external factors are summarized as follows**

- Neither the biller nor the payer wants to take the first step of the pilot program. Therefore, buyers are often reluctant to recognize electronic invoices.
- By sharing the data used for bill reminders, both the biller and the payer may face the risk of exposing the confidentiality and privacy of financial information.
- Lack of national standards: different pilot cities / provinces have established their own electronic invoicing platforms and regulations. These systems operate independently and are not interconnected. This makes the process of uniformly adopting electronic invoices nationwide quite difficult.

### **1.2 Problem statement**

E-government is a kind of government improvement initiatives that utilizes information technology systems and the Internet to improve access and delivery of government services and operations, thereby improving the quality of people living and a country's national economic development (Layne and Lee, 2001; Teo et al., 2008; Bughin et al., 2010; Li et al., 2020). Since the late 1990s, many governments have begun using information and communication technologies to improve the engagement of the citizens in government activities so that it can enhance the quality of government services

(Bughin et al., 2010). To improve the administrative efficiency of transaction process and taxation, the electronic invoice adoption as one of its key e-government policies had been developed in the past decade. Electronic invoicing is an information system service that is used to collect transaction information and transfer that information via the Internet (Hernandez-Ortega, 2012). In the current era of rapid development of e-commerce and the digital economy, this kind of invoicing plays a key role in maintaining business information throughout the entire supply chain (Chang et al., 2013). Electronic invoice automatically transfers billing information between the company and the tax authority. The adoption of electronic invoice has changed the way tax administrations operate, helping to improve process efficiency and service delivery (Gupta et al., 2017). Electronic invoice can also enable both companies and governments to reduce the administrative costs of issuing, distributing, and keeping invoices. Many developed countries, especially in Sweden, Denmark, and Finnish, have implemented electronic invoice for streamlining transaction procedures, improving business environment, taxation process, and public service (Chang et al. 2013; Partland and Afriyie 2013; Wall, 2016). Europe is now the main region for the development of electronic invoicing (Korkman et al., 2010). In 2001, European governments gradually enacted regulations to realize both electronic-based taxation and business activities. Since then, other governments in Asia and Latin America have taken similar measures (Keifer, 2011). According to an investigation by Billientis (2020), the annual transaction volume of global electronic invoicing is estimated to be about 550 billion (B2C / government to customer (G2C): 270 billion; B2B / B2G / G2B: 280 billion).

This investigation also revealed that, compared to the traditional paper process, electronic invoicing can save 50-80% of the total cost. The main benefits of using electronic invoice further include capturing digital information, automated validation, supplier self-service, improved account reconciliation, and enhanced expense management (Keifer, 2011). A growing body of research gives confidence to the contention that well-planned and well-executed electronic invoices can materially enhance tax compliance through significant institutional and perceptual changes in tax administration.

With the rapid development of electronic commerce in China, companies gradually exchange the transaction information through the Internet. It has brought considerable challenges to tax collection and tax management. One way of overcoming this is to introduce electronic invoice in China. However, the popularity rate of electronic invoice is still not high (State Taxation Administration, 2019). Thus, understanding the factors affecting the adoption of electronic invoice and its impact on tax compliance process efficiency for businesses is crucial.

### **1.3 Research gap**

Regarding the research on IT innovation adoption, the previous research mainly focused on e-commerce adoption, cloud computing adoption, ERP adoption, IBPS adoption, EDI adoption and open systems adoption and so on (Safari et al., 2015; Chau and Tam,

1997; Hsu et al., 2014; Oliveira et al., 2014; Awa and Ojiabo, 2016; Kuan and Chau, 2001; Venkatesh and Bala , 2012; Hong and Zhu, 2006; Caron et al., 2020). There are limited studies looking at the electronic invoice adoption.

Regarding the limited research on electronic invoices, Yang (2015) just focused on analyzing the factors that affect the adoption of electronic invoices; Edelmann & Sintonen (2006) analyzed the factors that affect the adoption of electronic invoices from the perspective of small and medium-sized enterprises. Chen, Wu & Miao (2015) proposed solutions for the implementation and promotion of electronic invoices. Lian (2015) analyzed the factors that affect the adoption of electronic invoices in Taiwan from the perspective of individual users. Zhang and Wang (2017) explored the influence of electronic invoice adoption on tax collection and tax reform in China. There is a paucity of empirical research focusing simultaneously on the antecedents and consequences of electronic invoice adoption from a tax perspective.

In addition, contemporary literature on firms' electronic invoice adoption tends to focus on European countries, such as Spain (Hernandez-Ortega, 2012), Finland (Lahtinen, 2012), and Sweden (Sandberg, Wahlberg, & Pan, 2009). Little is known about the reasoning behind Chinese organizations' electronic invoice adoption decisions. Even the electronic invoice in China is still a new concept, with the hustle and bustle development of e-business in China, the scope has already extended to most developed cities, and the implementation of B2B electronic invoice has already started. The effects

that electronic invoice will bring if widely adopted is essential for current invoicing market as well as the electronic taxation project of China. Therefore, it's now necessary studying the major factors that affect the decision-making of electronic invoice adoption and its consequences on taxation in China. Be aware of these will deepen the understanding of Chinese electronic invoice market; moreover make it possible to explore an effective way of winning support from enterprises and government in China for electronic invoice promotion.

Therefore, with the technological-organizational-environmental context of the firms, the main purpose of our study is to fill the gap by analyzing the factors that affect the adoption of electronic invoices and their impact on China from a tax perspective by using the TOE framework.

#### **1.4. Research questions**

The following research questions are addressed in this study:

1. What is the relationship between perceived benefits, process compatibility and perceived security and electronic invoice adoption?
2. What is the relationship between technology readiness and electronic invoice adoption?
3. What is the relationship between trust in e-government and electronic invoice adoption?
4. What is the relationship between electronic invoice adoption and tax compliance process efficiency?

5. Does electronic invoice adoption mediate the relationship between the five TOE factors and tax compliance process efficiency?

### **1.5 Research objectives**

Stemming from the aforesaid five research questions, the research objectives framed for this research are as follows:

1. To examine the relationship between perceived benefits, process compatibility, and perceived security and electronic invoice adoption.
2. To examine the relationship between technology readiness and the adoption of electronic invoice.
3. To examine the relationship between trust in e-government and the adoption of electronic invoice.
4. To examine the relationship between electronic invoice adoption and tax compliance process efficiency.
5. To examine the mediating effects of electronic invoice adoption on the relationship between the five TOE factors and tax compliance process efficiency.

### **1.6 Significance of the study**

This section highlights the significance of this research from both theoretical and practical aspects.

### **1.6.1 Significance of theory**

In the past few decades, a plenty of researches have devoted to examining the adoption of a variety of innovations, such as EDI (electric data interchange), Radio frequency identification (RFID), Enterprise Resource Planning (ERP), cloud computing, social commerce and blockchain (Kuan and Chau, 2001; Abed ,2020; Wang et al., 2010; Safari et al., 2015; Awa and Ojiabo, 2016; Clohessy and Acton, 2019). Nevertheless, the factors affecting electronic invoice adoption and its consequences on firms is an under-researched area. The relationship between electronic invoice adoption and its antecedents and consequences need to be investigated. In this study, we explored the key factors affecting companies' acceptance of electronic invoices in China through an empirical study of existing users of electronic invoices. Therefore, this study is expected to contribute to the body of knowledge about electronic invoice adoption theory and practice. It is expected to bring benefit to the researchers and practitioners by providing a broader view and significant area of influence from this study.

At present, the adoption of electronic invoices in China is still in the development stage, and has not yet been popularized nationwide. Thus, in terms of theoretical contribution, firstly, this study dedicated to investigate the factors influencing electronic invoice adoption among firms in China under the Technology-Organizational-Environment (TOE) framework. This study provides significant empirical evidence to identify and critically evaluates the factors that drive businesses to adopt electronic invoice.

Secondly, this study contributed to the study of current user acceptance behavior (Gangwar, Date & Ramaswamy, 2015; Zhu, Kraemer & Xu, 2006; Lu, 2008; Fu & Chang, 2016; Venkatesh & Bala, 2012). An empirical study of current user acceptance was found to be a useful method for exploring post-adoption behaviors. The results of this study are consistent with post-adoption studies that even if a company adopts new technology, many factors will still affect its true acceptance of the technology (Spiller et al., 2007).

Thirdly, combining the tax administrative theory of China's electronic invoice adoption and the factor analysis of enterprise adoption is very important. Among the limited studies on the adoption of electronic invoices, several studies mainly used the TOE framework to analyze the factors affecting companies to adopt electronic invoices (Yang, 2015). Some of them focus only on the impact of the adoption of electronic invoices on tax compliance (Lee, 2016; Ali, 2016; Palupi & Darwanto, 2017). In this study, we not only use the TOE framework to explore the factors that affect Chinese companies' adoption of electronic invoices but also further explore the impact of the use of electronic invoices on tax compliance process efficiency from a tax perspective. Therefore, it provides a new perspective on our understanding of electronic invoices from a tax perspective.



### **1.6.2 Implications for practice**

From the practical point of view, understanding the key factors affecting a company's acceptance of electronic invoices can provide valuable guidance to the company. Nowadays, Information technology adoption plays an important role in improving company performance. Many companies in developed country have realized of electronic invoice adoption issue and started to implement in their strategies or policies. Thus, for developing country like China, it is important for Chinese firms to embrace electronic invoice adoption in order to meet global demand towards a more modern country. The findings from this research is therefore serve as a guideline for companies to strategize and implement appropriate actions towards electronic invoice adoption for better performance.

In addition, researchers can use this research to understand the important drivers and values that influence the adoption of electronic invoices. On the other hand, the survey results will provide standards for practitioners to evaluate and assess their adoption of electronic invoices. It can also compare with the initiatives and progress by their competitors as well as their peers.

More importantly, technological contexts, organizational contexts, and environmental contexts are significant for Chinese companies to accept electronic invoices. Therefore, tax authorities can focus on improving the factors that influence user acceptance to meet the needs of taxpayers better so that it becomes a win-win situation for companies and tax authorities.

## **1.7 Organization of the Thesis**

This section presented a short review of the thesis's structure. Firstly, chapter one delivered the background of this study, the problem statement, the research gap, research questions, research objectives, significance of the study. Chapter two presented an extensive review of literature related to the theory and related IT studies, which are TOE framework, TOE framework for IT adoption, adoption of electronic invoice, adoption of electronic invoice from tax perspective. Chapter three discussed the research framework as well as the seven hypotheses identified in this study. Chapter four presented the research design which including various aspects of research methodology and justified the practice of quantitative method and statistical tools. After completing the process of data collection, chapter five was presented to report the results of data analysis and it contained descriptive statistics as well as measurement model and structural model. Chapter six offered the discussion of findings by providing interpretation according to the research objectives. Theoretical and practical implications had been derived from the findings of study in Chapter seven. And finally, the conclusions were made emanating from the overall findings of this research in chapter eight. Further, the limitations of the research and proposes suggestions for future research in this chapter.

### **Chapter 1: Introduction**

Chapter 1 shows an overview of the research. It presents the background first including global background and background from China, and the following is problem statement,

research questions, research objectives of this study, theory and practical significance, and organization of the thesis.

## **Chapter 2: Literature Review**

Chapter 2 starts with reviewing prior literature related to the study. The following is studies related to TOE framework and extended TOE framework for IT adoption. After that, electronic invoice adoption and Adopting electronic invoice from a tax perspective are discussed.

## **Chapter 3: Theoretical Framework and Hypotheses Development**

Chapter begins with hypotheses development. Subsequently, this chapter presents the theoretical framework, the relationship between the variables and the development of research hypotheses.

## **Chapter 4: Research Methodology**

This chapter contains a discussion on the research design. Sampling design, data collection procedure, measurements for each variable, determination of sample size, questionnaire design, pretest, pilot test, and statistical method for data analysis are discussed in detail.

## **Chapter 5: Findings and data analysis**

In this chapter, the research results based on the collected data are discussed. The discussion of the results includes descriptive analysis and hypothesis testing and provides relevant tables, graphs and charts to support the discussion of the findings.

## **Chapter 6: Summary and conclusion**

Chapter 6 summarizes the discussion of this study in the beginning. Then, the implications of the study both for theory and practice are discussed in the following. Finally, this chapter highlighted the conclusions of the study as well as some limitations.

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## **CHAPTER TWO: LITERATURE REVIEW**

### **2.0 Introduction**

This chapter presents an extensive review of literature related to the theory and related IT adoption in this study, which are TOE framework, TOE framework for IT adoption, adoption of electronic invoice, adoption of electronic invoice from tax perspective.

### **2.1 Information Technology Adoption Models at Firm Level**

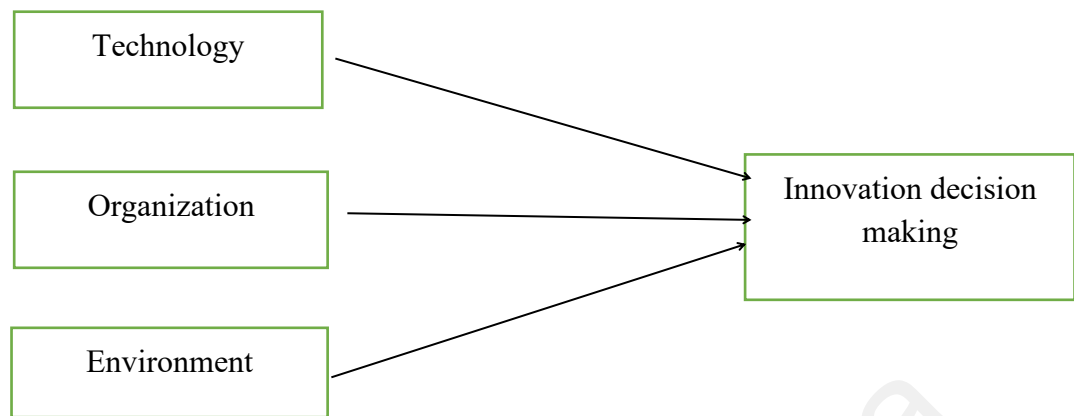
As information technology (IT) has been widely valued for its significant influence on the productivity and competitiveness of companies in recent years, researchers have shown many interests in this area. The fully realization of IT benefits premises on its widely adopting and spreading. For this purpose, understanding the determinants of IT adoption is clearly very important (Oliveira & Martins, 2011). There're some theoretical models commonly used for examining the factors affecting the rate of IT adoption at the firm level, among which the two prominent ones are diffusion of innovation (DOI) (Rogers, 1995), and the Technology, organization and environment (TOE) framework (Tornatzky & Fleischer, 1990). In this study, TOE framework will be analysis and used as a theory.

### **2.2 Technological, organizational, and environmental framework (TOE)**

The TOE framework, developed by Tornatzky and Fleischer (1990), is mainly applied theoretical frameworks for examing the adoption of technology innovation (Iacovou et al., 1995).The TOE framework assumed three contextual elements: technology context,

organization context, and environment context as the three sets of factors that affected the process of technological innovation adoption and implementation (Baker, 2012)(shown in Figure 3). Technological contexts focus on the perceptual characteristics of existing and new technologies (Zhu et al., 2006; Henderson et al., 2012). Organizational contexts refer to internal factors such as the size and scope of the company, internal resources, and the complexity of its management structure and the quality of human resources (Thong, 1999; Zhu et al., 2006; Henderson et al., 2012). Environmental contexts include the environment surrounding the company's operations (industry, competitors, and dealings with the government), which may affect adoption decisions (Henderson et al., 2012; Thong, 1999; Zhu et al., 2006) (The extended items and definitions of the separate aspects are elaborated in Table 1). In addition, the TOE framework could be applied to any firm size and industry (Wen and Chen, 2010). It is a framework for understanding technology adoption, its implementation, its foreseeable challenges, its impact on value chain activities, business innovation adoption decisions, for better organizational capabilities (Lin and Lin, 2008)

The TOE framework is consistent with Rogers' (1983) innovation diffusion theory (Shirish &Teo, 2010; Wang et al., 2010). The theory considers the following five technical characteristics as a precedent for any adoption decision: comparative advantage, complexity, compatibility, observability, and trialability. Therefore, the TOE framework illustrates the adoption of innovation, and a large amount of empirical research is concentrated in various IS areas.



**Figure 3. TOE framework (Tornatzky & Fleischer, 1990)**

**Table 1: The variables of TOE framework (Oliveira & Martins, 2011) (Tornatzky & Fleischer, 1990)**

Variables	Items	Description
Technologic al context	Availability Characteristics	Both the internal and external technologies relevant to the firm, including current practices and equipment internal to the firm as well as the set of available technologies external to the firm
Organizatio nal context	Formal and informal linking structures Communication processes Size Slack	Descriptive measures about the organization
Environmen tal context	Industry characteristics and market structure Government regulation	The arena in which a firm conducts its business—its industry, competitors, and dealings with the government

### 2.3 TOE framework for IT adoption

The TOE framework is widely used in various empirical studies to test technology adoption issues. Swanson (1995) believed that adoption of complex IT innovations

requires an advantageous technology portfolio, organizational structure, and environmental strategy.

Safari et al. (2015) used the TOE framework to examine the relationship between top management support, external pressure, IT resources, perceived benefits and cloud computing adoption. They found that external pressure and IT resources have significant influences on the adoption of cloud computing. Chau and Tam (1997) found three factors influencing open systems adoption by adopting the TOE framework. Namely, the characteristics of the innovation, organizational technology, and external environment.

In the research of Hsu et al. (2014), they found that perceived revenue, business issues, and IT capabilities were critical factors affecting the adoption of cloud computing. Oliveira et al. (2014) developed a research model based on the DOI and the TOE framework by studying 369 firms in Portugal to investigate the determinants of the adoption of cloud computing, showing that relative advantage, complexity, technology readiness, top management support and firm size have significant influence on cloud computing. Awa and Ojiabo (2016) reported that ICT infrastructures, technical know-how, perceived compatibility, perceived values and security, and the firm's size have a statistically significant influence on ERP adoption of SMEs. Kuan and Chau (2001) identified that five TOE factors (perceived benefits, financial costs and IT capabilities, perceived industry pressures and government pressures) all have important impact on the adoption of EDI by small businesses. Abed (2020) presented that top



management support in the organizational context, followed by trading partner pressure in the environmental context, and perceived usefulness in the technological context, have the most significant influence on social commerce adoption. Venkatesh and Bala (2012) proposed that TOE factors affect the adoption of IT-based inter-organizational business process standards (IBPS) and revealed that two factors in the technological context and organizational context, expected benefits and relationship trust—have a significant influence on the adoption of IBPS. Wang et al. (2010) applied TOE framework to examine the determinants that affect Radio frequency identification (RFID) adoption and revealed that complexity and compatibility in the technological context, firm size in the organizational context, trading partner pressure and information intensity in the environmental context have significant influence on RFID adoption. Shirish and Teo (2010) demonstrated the impact of information and communication technology (ICT) on the TOE framework and suggested that policymakers should consider measures to enhance the development of e-government and e-business collectively. Pan and Jang (2008) studied the factors influencing the decision of Taiwan's communications industry to adopt ERP within the framework of TOE. Chong and Ooi (2008) empirically use the TOE model to examine the factors that influence the RosettaNet standard adoption. Hong and Zhu (2006) considered the TOE framework in the adoption of e-commerce and the identification of new factors that fit the characteristics of type III innovation.

Venkatesh and Bala (2012) not only use the TOE framework to explain the factors that determine the adoption of IBPS, but also highlighted the mechanisms by which

these factors have a synergistic impact on the adoption of IBPS. Similarly, previous studies not only empirically examined TOE factors that have strong impact on e-Business adoption at the firm level with the findings of technological readiness (the significant factor), financial resources, global scope, and regulatory environment contribute strongly to e-business adoption, (Nguyen, 2013; Oliveira and Martins, 2010; Sila, 2013; Zhu et al., 2003; Zhu and Kraemer, 2005; Lin and Lin, 2008), but also further explored, in turn, these factors' significant influence on e-commerce routinization (Lin and Lin, 2008; Zhu and Kraemer, 2005). Hsu et al. (2014) designed a cloud service adoption model grounded in the TOE framework. This model not only addresses adoption intentions, but also pricing mechanisms and deployment models. The study of Zhu et al. (2006) not only explored the determinants that affect e-business adoption, but also further examined the consequences on business performance (eg., upstream coordination, internal operations, downstream sales) as the presence of e-business adoption as a mediator by combining the DOI theory and TOE framework. These empirical results confirm that TOE is a valuable framework for understanding the consequences of IT adoption on variables such as on e-commerce routinization, operational efficiency, pricing mechanisms, business performance.

Based on the literatures that supported the TOE framework for the examination of IT and IS innovations, including open systems, cloud computing, e-business, e-commerce, ICT, ERP, IBPS, RFID and RosettaNet standard technology adoption and performance (Swanson, 1995; Chau and Tam, 1997; Hsu et al., 2014; Kuan and Chau, 2001; Zhu et

al., 2004; Lin and Lin, 2008; Zhu and Kraemer, 2005; Shirish and Teo, 2010; Nguyen, 2013; Oliveira and Martins, 2010; Sila, 2013). Since TOE framework includes the environment context, it becomes better able to demonstrate intra-firm innovation technology adoption; thus, we consider this model to be more exhaustive (Zhu et al., 2004). The TOE framework also has a clearly theoretical basis, consistent empirical support, and the likely of application to IS/IT adoption (Kuan and Chau, 2001; Zhu et al., 2004; Shirish and Teo, 2010; Oliveira & Martins, 2011). Therefore, the TOE framework is a suitable theoretical basis for understanding the background factors that influence the adoption and consequences of electronic invoice because electronic invoice is an also IT innovation (Zhu et al. 2006a). For a summary of studies on adoption of innovation from the TOE perspective, please see Table 2.

To identify the constructs within the TOE framework for the present study, a literature review of technology adoption was conducted. This led to identifying several factors that may influence electronic invoice adoption (Dwivedi et al., 2017). The following chapter presents the factors in each of the three main constructs as well as the hypothesis development.

**Table 2. Previous studies' using TOE to assess technological adoption**

<b>Technology studies</b>	<b>Adoption Stage(s)</b>	<b>Source</b>	<b>Key Determinants</b>
Cloud Computing	Adoption	Safari et al., 2015	External Pressure, IT Resources
EDI	Adoption	Kuan and Chau, 2001	Perceived benefits, financial costs and IT capabilities, perceived industry pressures

			and government pressures
ERP	Adoption	Awa and Ojiabo, 2016	ICT infrastructures, technical know-how, perceived compatibility, perceived values and security, and the firm's size
Inter-organizational business process standards (IBPS)	Adoption	Venkatesh and Bala, 2012	Expected benefits and level of relationship trust
Radio frequency identification (RFID)	Adoption	Wang et al., 2010	Complexity, compatibility, firm size, trading partner pressure, information intensity
E-business	Adoption	Nguyen, 2013	Technological readiness, financial resources, global scope, and regulatory environment
Blockchain	Adoption	Clohessy and Acton, 2019	top management support and organizational readiness
E-business	Initiation, adoption, routinization	Lin and Lin, 2008	IS infrastructure, IS expertise, expected benefits, and competitive pressure
Cloud computing	Adoption and Impacts	Khayer et al., 2020	Relative advantage, service quality, perceived risks, top management support, facilitating conditions, Cloud providers influence, server location, computer self-efficacy, resistance to change and firm performance
Cloud service adoption	Adoption, pricing mechanisms and deployment models	Hsu et al., 2014	Perceived benefits, business concerns and IT capability
Inter-organizational	Adoption and	Venkatesh and Bala,	Expected benefits, and

al	business	Impacts	2012	Relationship trust, relationship quality and operational efficiency
process standards (IBPS)				
SaaS		Use, continue intention	Martins et al.,2019	Top management support, normative pressures, Perceived opportunities

## 2.4 Adoption of electronic invoice

Electronic invoicing is an information system service that can be used to collect transaction information and transfer information via the Internet (Hernandez-Ortega, 2011). In the era of rapid development of e-commerce and the digital economy, it plays a key role in maintaining business information throughout the supply chain (Chang et al., 2013). Governments around the world have adopted electronic invoice to improve business transactions. For example, Denmark has already adopted electronic invoice in February 2005. Europe is the main area for the development of electronic invoice (Korkman et al., 2010). In 2001, European governments gradually enacted regulations to realize electronic-based taxation and business activities. Since then, others in Asia and Latin America also have taken similar measures (Keifer, 2011). According to the investigation of Billientis (2020), the annual transaction volume of global electronic invoice is estimated to be about 550 billion (B2C / G2C: 270 billion; B2B / B2G / G2B: 280 billion), it also reveals that , compared with the traditional paper process, the electronic invoicing process can save 50-80% of its total costs. The main benefits of using electronic invoice also include capturing digital information, automated validation, supplier self-service, improved account reconciliation and enhanced expense

management (Keifer, 2011). At present, electronic invoice are primarily used in three key areas. (1) B2B (Business to Business): The adoption of B2B electronic invoices is mainly driven by leading companies in the supply chain. The focus is on integrating and simplifying transportation, payment and accounting processes. (2) B2C (business-to-consumer): The key to adopting B2C electronic invoices is to provide electronic invoices to consumers and provide possible applications for lifestyle improvement. (3) B2G (business-to-government): The purpose of the B2G electronic invoice adoption is to improve the transaction efficiency between enterprises and the government. This study focuses on B2G area. At present, electronic invoices are primarily used in B2G (business-to-government) entities to improve the transaction efficiency between private enterprises and the government.

#### **2.4.1 Adoption of electronic invoice from a tax perspective**

Electronic invoicing is one of the modernization plans for tax management, which aims to reduce tax compliance costs and improve tax compliance. According to the research of Palupi and Darwanto (2017), they investigated the effect of the electronic invoice application on transaction costs. They have shown that transaction costs increased significantly rather than decreased during the adaptation period. However, expected results were achieved at the end of the one year. Prior literature suggested that the use of e-government services, such as electronic invoice and e-tax filing, has a positive impact on taxpayer compliance (Sentanu and Budiarta, 2019; Lee, 2016). Lee (2016), in his research on the impact of electronic invoice on tax unification, found that the

application of electronic invoice increases the transparency of transactions, promotes taxpayer transactions, and effectively prevents tax evasion. Bellon et al. (2019) also found that electronic invoice can improve compliance by reducing compliance costs and enhancing deterrence. These literatures gave insights that electronic invoice could improve tax compliance process efficiency for companies, but did not directly examine this relationship.

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## **CHAPTER THREE: HYPOTHESIS DEVELOPMENT AND RESEARCH METHOD**

### **3.0 Introduction**

This chapter begins with the Hypothesis development, followed by discussion of research framework developed for the study. Seven hypotheses are developed in this part. For research framework, it contains the definition of the five TOE factors, which are perceived benefits, process compatibility, and perceived security in the technological context, Technology readiness in the organizational context, Trust in e-government in the environmental context. Based on the research model, the theoretical basis for each of the explanatory variables and their proposed relationships to the electronic invoice adoption intention are discussed and presented by seven hypotheses in the following.

### **3.1 Technological contexts**

A growing body of research implemented a TOE framework according to previous IT adoption research studies (Ramdani, et al., 2009; Rowe et al., 2012; Sparling et al., 2007), the technological characteristics of an organization usually explain IT innovation attributes that influence the adoption of organizational IT innovation (Kapoor, Dwivedi, and Williams, 2014; Thong, 1999). From the technological context, researchers often have considered variables, such as perceived benefits, perceived obstacles, technical compatibility, and perceived security, as the determinants of IT innovation adoption. The three most relevant factors for electronic invoicing are perceived benefits, perceived security and technical compatibility. Various literatures have highlighted the



many benefits of electronic invoices. For example, Lee (2016) in his research on the impact of electronic invoicing on tax unification found that the application of electronic invoicing increases the transparency of transactions, promotes taxpayer transactions, and effectively prevents tax evasion. Bellon et al. (2019) also found that electronic invoices can improve compliance by reducing compliance costs and enhancing deterrence. Perceived security and technical compatibility are also important aspects of electronic invoices. Lee (2016) highlights the fact that electronic invoicing will not only have tax components embedded in the system, but substantial IT standards and protocols are also included. Lee (2016) also added certain challenges of this type of invoice to tax compliance, namely, taxpayers' perceived risk of system malfunction, glitches, or privacy that may deter tax compliance. Therefore, this research considers three innovation characteristics in the context of electronic invoice adoption in Chinese companies: perceived benefits, perceived security and technical compatibility.

### **Perceived Benefits**

Perceived benefits refer to the anticipated advantages that electronic invoice adoption can provide to the companies. Iacovou et al. (1995) described the perceived benefits as managers' perception of EDI's comparative advantage. Perceived benefits are considered an essential factor for companies to adopt new information technologies (Premkumar and Roberts, 1999). Previous studies also argued that positive perception of the benefits of an innovation provides an incentive for its adoption (Lin and Lin, 2008; Hsu et al., 2006; Iacovou et al., 1995; Son et al., 2005; Kuan and Chau, 2001).

Companies are more likely to adopt electronic invoice if decision-makers perceive their benefits. The use of electronic methods to generate, deliver, and receive invoices has several benefits compared to paper-based invoices. Electronic invoicing automates the routines of financial management processes, speeding up the delivery of invoices, saving money and time, as there is no need to print and post paper versions. The circulation and approval of invoices have become faster, at the same time, reducing manual processing and mistakes. More importantly, electronic invoice provides tax authorities with immediate access to transaction data when invoices are issued, which has a greater impact on tax compliance than paper invoices. The instant access and processing of digital information by tax authorities can increase the vigilance of taxpayers on the possibility of auditing, thereby reducing non-compliance with tax returns and input tax refund requirements. Lee (2016) showed that electronic tax management (e.g., electronic invoice) will provide tax authorities with powerful tools to integrate tax information provided by taxpayers (companies) with effective, transparent and trusted services that will ultimately enhance the tax management process.

Decision-makers will consider these aspects of electronic invoice implementation when understanding the benefits of electronic invoice. Therefore, if a firm's managers find that the implementation of electronic invoice can provide them with certain tax benefits, they are more likely to consider electronic invoice. Therefore, the hypothesis as follows

**Hypothesis 1 (H1). Perceived benefits of electronic invoice have a positive effect on the firm's electronic invoice adoption.**

## **Process Compatibility**

Rogers (1995) defines compatibility as “the degree to which the innovation fits with the potential adopter’s existing values, previous practices, and current needs.”

Compatibility has been seen as a critical factor in companies' adoption of innovation.

Fuller et al. (2007) claim that compatibility refers to the applicability of the technology to the intended task. Taylor and Todd (1995) consider compatibility as a key recognition of user attitudes, so compatibility influences user intention to use technology in a business environment. Research has also shown that compatibility is closely related to the user's previous experience (Citrin et al., 2000) and changes user behavior patterns.

Since electronic invoice are developed outside the company by the tax department, compatibility issues are important because they may not be compatible with the company's internal business processes. Especially for companies that have been using technology in their business for a long time, it must be compatible with the company's preferred work practices, business value, and financial systems (Herrero and Rodríguez, 2008; Van Slyke et al., 2004). Process compatibility means that the company believes that electronic invoice is valid for its own business processes. Companies that do not understand compatibility will find more issues related to electronic invoice and will reduce their willingness to adopt them (Hernandez et al., 2014). Therefore, if the company is aware of the process compatibility of electronic invoice, the company will

be more willing to adopt electronic invoice. Thus, the following hypothesis is generated:

**Hypothesis 2 (H2). Process compatibility of electronic invoice will have a positive effect on the firm's electronic invoice adoption.**

### **Perceived security**

Ranganathan and Ganapathy (2002) defines the perceived security as the extent to which a company perceives protected against security threats caused by the use of new technology.

In the research of Ranganathan & Grandon (2002), it shows that Security is one of the most important issues related to online financial transactions and internet retail. Security issues related to payment methods used and the reliability of data transmission and storage are important (Kolsaker and Payne, 2002). Shin (2013) believes that security issues are one of the main factors influencing users' use of e-government services. Kim et al. (2010) have shown that if users have more security concerns about e-government services, they may be reluctant to adopt it. Fu et al. (2006) also suggested people may not consider to adopt a system if they perceive that the e-government system lacks security features. In recent years, tremendous technological progress has been made in enhancing the security of Web-based transactions, especially in electronic invoices and digital signatures (Anderson & Benuidenhoudt, 1996; Hoffman et al., 1995). However, the company still has concerns about establishing relationships with customers and suppliers via the Internet, so security may be one of the most important obstacles to the

development of electronic invoices (Yu & Tao, 2009; Kousaridas et al., 2008; Dai & Grundy, 2007).

Electronic invoice, is an intermediate force for achieving interconnection on the tax-enterprise. Invoices and transaction information contain trade secrets, which may cause large losses to enterprises or tax authorities if its data is leaked out. Therefore, electronic invoices must strictly meet security requirements before they can become part of a company's tax practice (Kaliontzoglou et al., 2006). Some of these requirements are related to the relationship between the company and other agents (identification and non-repudiation of origin and receipt, confidentiality and privacy), while others are related to the company's technical culture (security policy, electronic storage of electronic invoices, etc.). So, we expect that if the company perceives that the process of adopting electronic invoice has better security, the company will be more willing to adopt electronic invoice. Thus, the hypothesis as follows.

**Hypothesis 3 (H3). Perceived security of electronic invoice will have a positive effect on the firm's electronic invoice adoption.**

### **3.2 Organizational Context**

According to the TOE framework, the organizational adoption of technology may be affected by the organizational environment, which defines organizational characteristics that affect the organizational adoption of new innovative technologies (Chau & Tam, 1997). From an organizational context, researchers often regard variables like management support, IT capabilities, technical readiness, and financial readiness as

important influencing factors. Since tax authority, a regulator, has purported the adoption of electronic invoices, Lee (2016) believes this aspect has left only the technical aspect of electronic invoicing to be improved for compliance, namely, the compatibility of electronic documents and the digital signature formats. Thus, the factor that is most relevant in the context of electronic invoices would only be a company's technical readiness. This research examines one innovation characteristics within the organisational context as regards electronic invoice adoption by Chinese companies, namely, technical readiness.

### **Technology readiness**

Technology readiness refers to the level of technological resources of a company. In many previous studies, technology readiness has been a key factor in technology adoption (Iavocou et al., 1995; Kwon and Zmud, 1987; Armstrong and Sambamurthy, 1999). Kowtha and Choon (2001) pointed out that the use of new technologies depends largely on complementary resources and existing technologies, because companies that are already familiar with IT seem to be positive about further expanding IT adoption. Zhu and Kraemer (2005) who believe that two aspects of technical preparation are important, namely information technology (IT) human resources and technical infrastructure. IT human resources refer to IT professionals with the knowledge and skills to implement Internet-related applications, while Technology infrastructure refers to technologies related to Internet-related businesses. By definition, technological readiness depends not only on tangible assets but also on the human resources that

supplement them (Mata et al., 1995). IT human resources provide the skills and knowledge to develop applications for electronic invoice (Zhu and Kraemer, 2005). The technical infrastructure provides a platform for building electronic invoice systems;

From a technical infrastructure perspective, the implementation of electronic invoicing requires a complete information system platform for fiscal sharing service centers. This platform should accommodate the processing of large amounts of information and data and connects the company's internal system with the tax authority's external system. From the perspective of IT human resources, the implementation of electronic invoicing requires personnel with the relevant knowledge on the online tax system and its company own information system (Cartwright et al., 2005). Therefore, companies with a high degree of technical readiness can adopt and implement electronic invoice easily. These two mechanisms will help companies understand the IT landscape and the human capital associated with IT. Based on the above argument, a company that has a high level of technical readiness will be more likely to adopt electronic invoice. In this situation, technical readiness is crucial. Hence, the following hypothesis can be formulated:

**Hypothesis 4 (H4). Technology readiness will have a positive effect on the firm's electronic invoice adoption.**

### **3.3 Environmental contexts**

The environmental context of the TOE framework includes the industry structure, the availability of technical service providers, and the dogmatic environment of the organization (Awa et al., 2016; Scupola, 2003; Baker, 2012). The supporting

infrastructure of technology can influence innovation (Scupola, 2003). In addition, the existence of skilled consultants and workers and other technical service providers also promotes innovation (Baker, 2012). The environmental context in the TOE framework helps to better understand the impact of external environmental pressures on organizational adoption (Gutierrez et al., 2015; Taylor, 2019). In the environmental context, we only chose trust in e-government as a determinant factor because the tax authority is responsible for the development and promotion of electronic invoices as an e-government service. Lee (2016) further indicated that taxpayers and the government can only reap the rewards of electronic invoicing if ample trust is established and maintained between these two parties. This research examines one innovation characteristics within the environmental context to explain electronic invoice adoption in Chinese companies: Trust in e-government.

### **Trust in e-government.**

Trust is defined as the expectation that a party can rely on to perform its obligations and acts fairly in a predictable manner in the presence of opportunistic possibilities (Zaheer et al., 1998). Previous research has shown that trust is a crucial determinant of a system's performance (Krishnan et al., 2006; Van de Ven and Ring, 1992). Carter and Belanger (2005) pointed out that trust in government affects users' willingness to use e-government services, like electronic invoice. Companies with high levels of trust can engage in more types of collaboration, resulting in lower transaction costs in the process. On the contrary, lack of trust will reduce various types of cooperation. The study of



Kim et al. (2010) indicated that trust in e-government will influence user behavior about the e-payment systems. Lean et al. (2009) also revealed that trust will influence the adoption of e-government services. Hart and Saunders (1997) believes that the implementation of electronic invoice requires resources and changes the organization's routine procedures or processes. If the company has a high degree of trust in e-government, companies will be willing to adopt electronic invoice to automate business processes with tax authorities. Therefore, based on the above argument, we assume the following hypothesis.

**Hypothesis 5 (H5). The trust in e-government will have a positive effect on the firm's electronic invoice adoption.**

### **3.4 Outcomes of electronic invoice adoption**

Having hypothesized the role of contextual factors, we now proceed to investigate the relationship between post-adoption stages in electronic invoice diffusion: adoption and impact. The diffusion theory contends that the impact of a new technology depends on the extent to which the technology is used in key business activities. It is through the ingrained use that the new technology can improve business performance (Cooper & Zmud, 1990).

Companies are more likely to adopt electronic invoice to gain specific results, which include reducing tax compliance costs and improving tax compliance process efficiency. According to the investigation of Billentis (2020), electronic invoice processing can save 50-80% of costs compared to traditional paper-based processes. Capgemini's report

predicts that the maximum total value to be reduced will be 84 billion euros, and the market's highest potential value for invoice-related processes throughout Europe is 0.8% of GDP per year (Capgemini Consulting, 2007). With the adoption of electronic invoice, firms can reduce the time it takes to file tax returns; using the system can also reduce errors. Electronic invoicing connects all relevant parties (such as business partners, the public sector, and consumers). Thus, it's easier to get the internal details of the supply chain and accounting so that tax authorities can more easily verify (or quickly reject) customs and indirect tax returns (KPMG, 2018). We expect that if a company can adopt electronic invoice and successfully integrate them into the tax compliance process, it is more likely to improve tax compliance process efficiency. Thus, higher degrees of electronic invoice adoption will be associated with improved tax compliance process efficiency (Zhu & Kraemer, 2005, p. 70). Before electronic invoice is widely used in business activities, it would be unlikely to attain significant performance improvements in tax compliance process. This argument is consistent with empirical findings of the importance of usage in different contexts such as EDI (Mukhopadhyay et al., 1995) and decision support systems (Devaraj & Kohli, 2003). This study extends the linkage from adoption to impact to electronic invoice. Therefore, we hypothesize as follows:

Hypothesis 6 (H6). Electronic invoice adoption will be positively associated with tax compliance process efficiency.

### **3.5 Mediating Role of Electronic invoice Adoption**

Kobelsky et al. (2008) argued that the TOE factors would affect the company's performance.

Venkatesh & Bala, (2012) also identified that TOE factors had a significant effect on outcomes of IBPS adoption as the presence of IBPS adoption as a mediator. In line with his study, we expect the TOE factors to affect the results of electronic invoice adoption. However, we believe that this impact will be mediated through the use of electronic invoice. We believe that only after the company perceived the benefits of adopting electronic invoice will it further consider adopting electronic invoice. At this time, the adoption of electronic invoice as a mediator will have an impact on tax compliance process efficiency. Similarly, the adoption of electronic invoice will also mediate the relationship between perceived security, trust in e-government and tax compliance processes efficiency in this manner.

In order to improve the efficiency of the company's tax compliance process, electronic invoice must be highly compatible with the existing company's financial system and require a high degree of technical preparation to implement electronic invoice. However, if the company fails to adopt and implement electronic invoice in its tax compliance process, these factors are not sufficient to increase the efficiency of the tax compliance process. Thus, we hypothesize that there has indirect impact of the adoption of electronic invoice on the relationship between the TOE factors in this study and tax compliance process efficiency. Therefore, the following hypotheses are generated.

Hypothesis 7 (H7a) Adopting electronic invoice will mediate the effects of perceived benefits on tax compliance process efficiency.

Hypothesis 7 (H7b) Adopting electronic invoice will mediate the effects of process compatibility on tax compliance process efficiency.

Hypothesis 7 (H7c) Adopting electronic invoice will mediate the effects of perceived security on compliance process efficiency.

Hypothesis 7 (H7d) Adopting electronic invoice will mediate the effects of technology readiness on tax compliance process efficiency.

Hypothesis 7 (H7e) Adopting electronic invoice will mediate the effects of trust in e-government on tax compliance process efficiency.

### 3.6 Research model

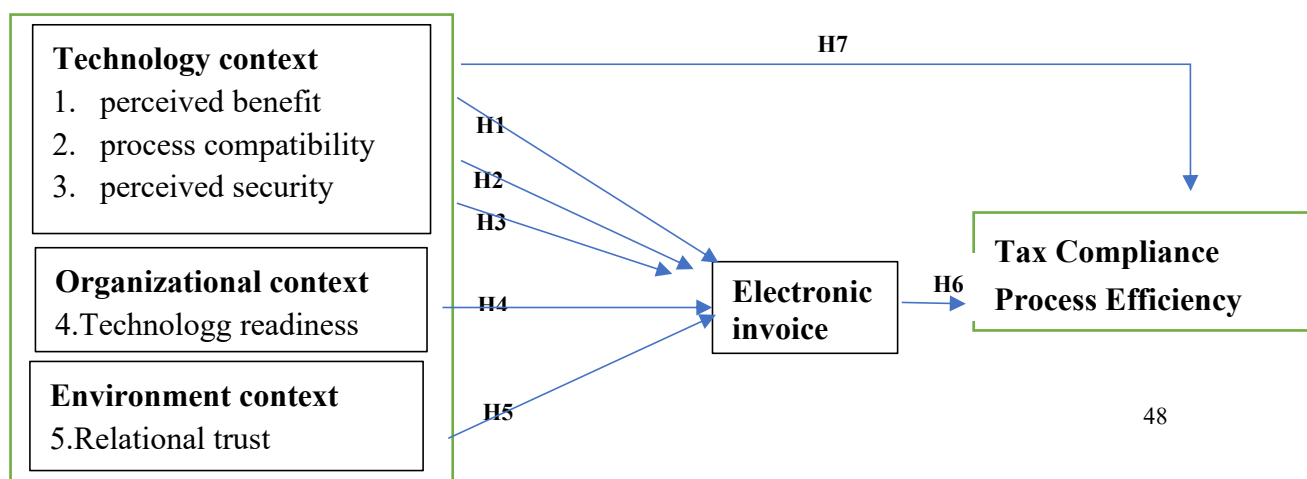
Figure 4 shows the electronic invoice research model of this study. The model hypothesised that the five TOE factors, as summarised in Table 3, will affect the electronic invoice adoption, which in turn affects the efficiency of the company's tax compliance process. Table 4. summarises the relationship between research objectives, research questions and hypotheses used in the study.

**Table3 Definition and Source of TOE Factors**

Contexts	Constructs	Definition	Source
<b>Technological</b>	Perceived benefits	The extent to which the company perceives its business and strategic benefits through the use of electronic invoice	Hsu et al. (2014) Chwelos et al. (2001).

	Process compatibility	The extent to which electronic invoice are adopted according to the pioneering methods of performing company processes.	Oliveira and Martins (2010) Premkumar et al. (1994); Ramamurthy et al. al. (1999). Venkatesh and Bala (2012) Tan et al.(2008) Hong and Zhu (2006) To and Ngai (2006)
	Perceived security	The extent to which a company perceives protected against security theats caused by the use of new technology	Pikkarainen et al. (2004) O’Cass and Fenech (2003) Ranganathan and Ganapathy, (2002)
<b>Organizational</b>	Technology readiness	The extent to which the company has the necessary technical infrastructure and IT human resources to implement electronic invoice	Venkatesh and Bala (2012) Chwelos et al. (2001) Oliveira and Martins (2010) Pan and Jang (2008) To and Ngai (2006) Wand et al.(2010)
<b>Environmental</b>	Trust in e-government	The degree to which enterprises trust in e-government services.	Belanger and Carter (2008)

**Figure 4. Research model**



Control variable:

Age

Gender

Education

**Table 4. Summarizes the relationship between research objectives, research questions and hypotheses used in the study.**

<b>Research questions</b>	<b>Research objectives</b>	<b>hypothesis</b>
1.What is the relationship between perceived benefits, process compatibility, and perceived security and e-invoice adoption?	1.To examine the relationship between perceived benefits, process compatibility, and perceived security and e-invoice adoption.	H1: Perceived benefits of e-invoice have a positive effect on the firm's e-invoice adoption. H2: Process compatibility of e-invoice have a positive effect on the firm's E-invoice adoption. H3: Perceived security of e-invoice have a positive effect on the firm's e-invoice adoption.
2.What is the relationship between technology readiness and e-invoice adoption?	2. To examine the relationship between technology readiness and e-invoice adoption.	H4: Technology readiness have a positive effect on the firm's E-invoice adoption.
3.What is the relationship between relational trust and e-invoice adoption?	3.To examine the relationship between relational trust and e-invoice adoption.	H5: The trust in e-government have a positive effect on the firm's E-invoice adoption
4. What is the relationship between e-invoice adoption and tax compliance process efficiency?	.To examine the the relationship between e-invoice adoption and tax compliance process efficiency.	H6: E-invoice adoption be positively associated with tax compliance process efficiency.
5. Does electronic invoice adoption mediates the	5.To examine the mediating effects of e-invoice adoption	H7 (H7a) Adopting electronic invoice mediate

<p>relationship between the five TOE factors and tax compliance process efficiency?</p>	<p>on the relationship between the five factors and tax compliance process efficiency</p>	<p>the effects of perceived benefits on tax compliance process efficiency.</p> <p>H7 (H7b) Adopting electronic invoice mediate the effects of process compatibility on tax compliance process efficiency.</p> <p>H7 (H7c) Adopting electronic invoice mediate the effects of perceived security on compliance process efficiency.</p> <p>H7 (H7d) Adopting electronic invoice mediate the effects of technology readiness on tax compliance process efficiency.</p> <p>H7 (H7e) Adopting electronic invoice mediate the effects of trust in e-government on tax compliance process efficiency.</p>
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## **CHAPTER FOUR:RESEARCH METHODOLOGY**

### **4.0 Introduction**

This chapter discusses the methodology adopted to empirically examine the theoretical model. To note, this chapter is separated into nine sub-sections. Beginning with the research design, followed by discussion of sampling design and data collection procedure, measurements for each variable, determination of sample size, questionnaire design, pretest, pilot test, and data analysis techniques are discussed in detail.

### **4.1 Research design**

This study uses a questionnaire survey method as the research design. Questionnaire survey is a method of quantitative data collection. Questionnaire survey technology is the main data collection tool in this study. This is the most suitable data collection method for this study because it deals with original data. In addition, questionnaire surveys can cover a large number of target respondents in different geographic locations.

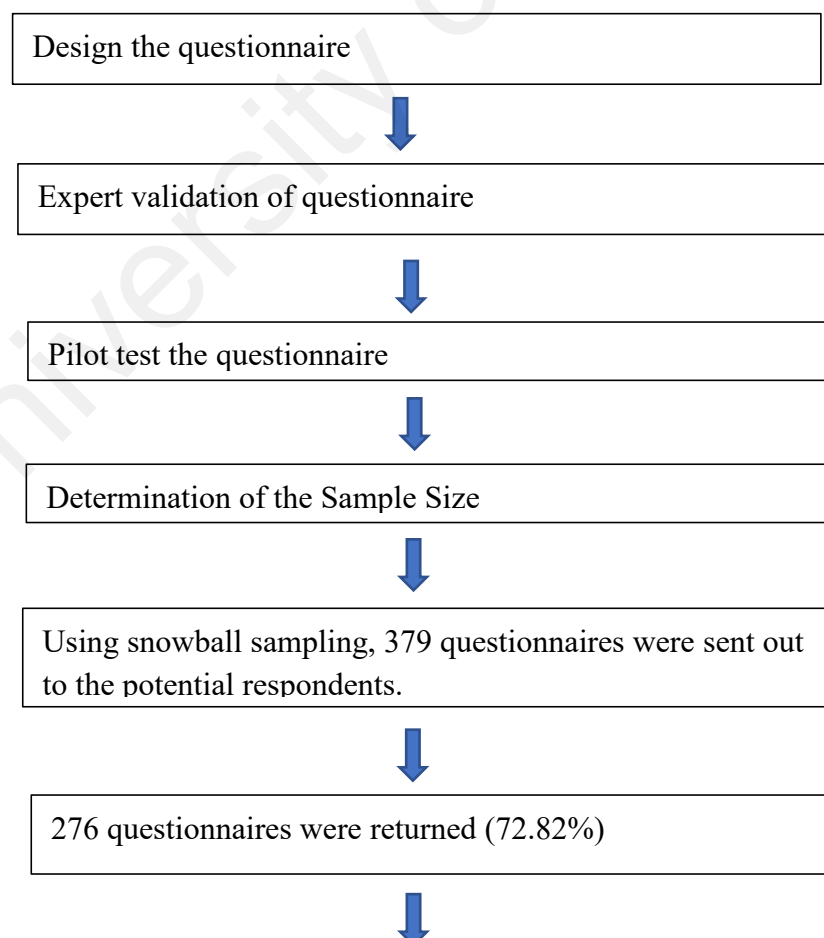
### **4.2 Sampling design and data collection procedure**

This study employed snowball sampling method to collect data due to China's public environment (Okeke, 2017). The major advantages of this method are that it allows the researcher to reach populations that are difficult to sample when using other sampling methods and the process is cheap, simple and cost-efficient. In addition, this sampling technique needs little planning and fewer workforce compared to other sampling



techniques. The snowball sampling is also known as the sampling by reference where respondent is being used to generate names of others. In this case, we use the initial respondents to help identify the other respondents in the target population. The initial respondents are people i know who are accountants and tax officers and working in a company that adopting electronic invoice. Then these initial respondents help to send the questionnaires to their friends who work in a company that adopting electronic invoice and the position of them is accountants and tax officers. In this way, the biases of snowballing method is highly reduced. The target population includes managers, tax officers, and accountants. Data collection conducted for three months from January to March, 2020. Figure 5 provides the flowchart of the methodology of this study.

**Figure 5. Flowchart of this study's methodology**



Partial least squares regression was used to analyze the collected data.

### **4.3 Measurements**

This study contains 7 variables and a total of 31 items. Measurements are modified from previous researches and extended to fit our study. The study of Dawes (2008) reported that there is no difference between 5-point Likert and 7-point Likert. Revilla et al. (2013) identified that using a 5-point scale is better than a 7-point. Thus, all items were anchored on a 5-point Likert scale which ranged from 1=strongly disagree to 5=strongly agree. The items used to measure each variable are listed in Appendix A. The questionnaire consists of two parts. The first part presented the main items for measuring the variables. The second part introduces demographic issues. The questionnaire was verified by an expert in this area to ensure its appropriateness. Moreover, the final questionnaire was validated by one professional translator to ensure that no syntax or semantic biases occurred during the translation from English to Chinese.

### **4.4 Sources of measurements**

The item for measuring perceived benefits was adapted from Iacovou et al. (1995); Chwe Los et al. (2001) whereas item assessing process compatibility was adapted from Ramamurthy et al. (1999) and Premkumar et al. (1994). The items measuring perceived security were from O'Cass and Fenech (2003), Pikkarainen et al.(2004) and Ranganathan and Ganapathy (2002). Technical readiness was adapted from Iacovou et

al.(1995) and Chwelos et al. (2001). While item for measuring trust in e- government was adapted from Pavlou and Gefen(2004). The items for electronic invoice adoption were adapted from Gangwar et al. (2015). The items assessing tax compliance process efficiency were adapted from Hult et al. (2002). Table 5 summarizes these research variables and their measurements.

**Table 5: Research variables and measurement**

<b>Construct</b>	<b>Source</b>
Perceived benefits	Iacovou et al. (1995); Chwe Los et al. (2001).
Process Compatibility	Premkumar et al. (1994); Ramamurthy et al. (1999)
Perceived Security	O'Cass and Fenech (2003); Pikkarainen et al. (2004); Ranganathan and Ganapathy (2002)
Technology Readiness	Iacovou et al. (1995); Chwelos et al. (2001)
Trust in E-government	Pavlou and Gefen (2004)
Electronic invoiceAdoption	Gangwar et al. (2015)
Tax Compliance Process Efficiency	Hult et al. (2002)

#### **4.5 Determination of Sample Size**

Considering the huge number of population, it was not practical to carry out survey upon the whole population. To form the representativeness of the sample for generalizability, having the right sample size was very important (Sekaran, 2003). Sample size played a crucial role on the detection of significant differences and relationships (Bartlett, Kotrlik & Higgins, 2001). Although it was generally accepted that samples of larger size were better than those of the smaller, however, it was also notable that, while too large a sample could lead to erroneous conclusions, too small a sample could distort the generalizability of the study regardless of how well it was selected (Gay & Diehl, 1996). Therefore, the determination of sample size was carefully dealt with.

There were several heuristics regarding the appropriate sample size required for an empirical study. According to the formula from Kumar et al (2013), the appropriate sample size that must be gathered is around 385 respondents. The sample size is concluded from population size of 3.27 billion electronic invoice issued nationwide in 2018 (iiMedia Research, 2019). Calculation is made with 95% confidence level and 5% margin of error.

#### **4.6 Questionnaire Design**

In this research, questionnaire was used as the tool for collection of data. Dillman (2007) suggested four guidelines for structuring and designing a good questionnaire which included:

- i. Started with more important and useful questions.
- ii. Group similar questions together in the same section.
- iii. Created a kind of rapport among the groups of questions.
- iv. Placed the questions that were most likely to be unpleasant to respondents.

It was important to note that questionnaire format, physical arrangement of items on the pages and general appearances were imperative in attracting respondents and success of the research (Creswell, 2003). Besides, a well-designed and carefully constructed questionnaire facilitated the collation and analysis of the data collected as well as increasing the response rate (Trochim, 1999). Also, in order to increase the response rate, clear and brief instructional information, coherent arrangement of questionnaire items, transitional phrases and an aesthetic arrangement of questions appear to be

rewarding (Dillman, 2007). Following these guidelines, the questionnaire used in this study was divided into four main sections as shown in Table 6.

**Table 6. Distribution of Variable**

Section	Title	Item
A	Independent variable	Perceived benefits, Process Compatibility, Perceived Security, Technology Readiness, Trust in E-government, Electronic invoice adoption
B	Dependent variable	Electronic invoice adoption, Tax Compliance Process Efficiency
C	Mediating variable	Electronic invoice adoption
D	Demographic	Organization background and respondents' profile

Firstly, section A, B, and C are the main part of the questionnaire, the dependent variables, independent variables and mediating variables in the research model are measured by twenty-five questions. The first part was demographic questions regarding the background of the company. These questions comprised of type of the company, size of organization. The second part was the personal information on the respondents, such as gender, age, level of education, and position held in the organization.

The design used in Section D is same, it contains questions regarding the demographic information of respondents. The demographic questions were separated into two parts.

All the questionnaires would be grouped together in a survey. Due to the reason that the

respondents were made by Chinese, both English and Chinese were chosen as the languages in the instrument for the convenience for understanding.

The items deployed in the questionnaire were based on related previous studies. Questionnaires were adopted in their original form from previous studies to ensure that the questionnaires would obtain complete and accurate information possible. For those cannot be adopted due to new population, location, language, mode or any combination of these, an adaption would be made to the question content, format, response options or visual presentation (Harkness, 2012). Modifications of the wording and sentence structure were made to give way to more comprehensible items in the context of this study. Questionnaires adapted for this study was followed the six procedural guidelines by Harkness (2012):

1. Determined the policy, people, and procedures for adaptation for the project.
2. Recruited an expert in the subject to work on adaptations.
3. Reviewed, as relevant, the source questionnaire for adaption needs.
4. Reviewed the translate questionnaire or instrument for adaption needs.
5. Documented adaptations and the rationale for making them.
6. Pre-test or pilot adapted instrument to find out whether the questions were understood as intended and could be answered without undue burden.

It was imperative to provide high quality questionnaires in order to collect dependable data. Appendix A represented the complete questionnaire.

#### 4.7. Pretest

Before conducting the actual survey, an initial draft of the questionnaire was pretested by asking experts to go through it and identify if there were any ambiguities that had not been noticed by the researcher. Pre-test was the leading statistical analysis, which referred to a trial application of an instrument to identify flaws and eliminate potential errors (Malhotra, 2007). Researchers had pointed up that instruments should be tested before the data collecting process no matter how much developmental work was done on the questionnaires (Oksenberg & Kalton, 1991).

The current research followed Lynn's (1986) recommendation by using two qualified experts from the academic field. As the current study cross-disciplined among two main fields (IT innovation adoption and taxation), the academic experts from each field were chosen for the expert validity assessment. Each expert was given a softcopy of a survey by sending e-mail

which all items are organized as per a structured questionnaire. They were carefully briefed on each construct's definition to ensure that their understanding of the concept is consistent with what the current research intended.

Experts were requested to pay attention on the wordings of measures adapted from existing instruments and those pooled through literature study, so as to check if items in both cases were appropriate, precise, and coherently reflect the intended measure within. Notably, precise wordings gave rise to discriminant validity. Further, in particular, to ensure clarity, understandability, and readability of the items, experts were requested to

check against the use of jargon, compounded words carrying multiple meanings, double-barreled items, leading items, and emotionally loaded items. During the collection back of the expert validity forms, short discussions were held.

Based on the feedback given by the experts, we made corresponding amendments to the format and content of the questionnaire. Later, some students were invited to participate in the face validity. By face validity, the measurement looks, on the face of it, as if it measured the construct intended. Face validity provided insights into how respondents might interpret the items (DeVon et al., 2007). This step helped to detect ambiguous questions and technical jargon that might jeopardize the understanding of their respondents. It, therefore, improved the language clarity, readability, and comprehensibility of the items from the layman stance. There were also asked as to how many times an item had to be read before a choice was made. Based on these evaluation criteria, corrections and improvements were noted, which were later included in the survey instrument.

#### 4.8. Pilot test

While pretest was the initial testing of one or more aspects of the study design, pilot test was important as it served as a miniaturized walk-through of the entire study design (used in the final study) (Babbie, 1999). It was a small-scale version of a study used to establish procedures, materials, and parameters used in the full study (Bordens & Abbott, 2011). Therefore, pilot testing assisted to improve the reliability of scales (Nueman & Kreuger, 2003). It helped researchers to determine if the items are



generating the anticipated pattern of correlations. In cases which the pattern was not achieved, the sample correlation matrix could be adopted to detect the problem items. These items could then be discarded or revised based on a careful analysis of the content of each item (Summers, 2001).

In the practical sense, the pilot study attested the feasibility of the constructs for the specific context of the current study, that was, its workability under the real-life condition and whether it worked well in the population for which it is intended for (Harris, 2010). This was important so because the reliability of a constructed scale might vary across samples. A scale which achieved good reliability in one past study did not grant their generalizability in producing the same findings in other studies of different contexts. Therefore, it was necessary to check that each of the construct scales was reliable with the particular sample of the current study (Pallant, 2011).

At the stage of pilot study, snowball sampling was generally acceptable (Okeke, 2017). A number of 30 sets of questionnaires were returned. This sample size concurred with the recommendation of at least thirty subjects to establish the existence or non-existence of a relationship (Gay & Diehl, 1996).

#### 4.8.1 Reliability and Validity of the Instrument

Smart PLS was used to test the reliability and validity of the instrument. We use composite reliability (CR) to assess construct reliability of scales. The acceptable threshold for composite reliability (CR) is above 0.7 (Fornell and Larcker, 1981). The CR value in our study is higher than 0.7 for all constructs (see in Table 7), suggesting

that the construct reliability is satisfied. Average variance extracted (AVE) should be above 0.5 (Fornell and Larcker, 1981). As all constructs have average variance extracted (AVE) values higher than 0.50, the convergent validity of the measurement model is also adequate. The acceptable Cronbach's alpha value is higher than 0.7 (Hair et al., 2010). The indicator reliability was examined based on the criteria that the loadings should be greater than 0.70 and loadings less than 0.4 should be eliminated (Henseler et al., 2009). And the loadings equal to and greater than 0.60 are acceptable (Byrne,2016). According to the above criteria, all of the indexes in this study are above 0.6, so it is acceptable (see Table 7).

**Table 7: Reliability and validity of the instrument.**

Variables	Number of items	CR	AVE	Cronbach's $\alpha$
Perceive benefits (PB)	5	0.905	0.656	0.870
Process Compatibility (PC)	5	0.930	0.729	0.908
Perceived Security (PS)	3	0.846	0.652	0.742
Technology Readiness (TR)	3	0.775	0.542	0.756
Electronic invoice adoption (EA)	4	0.936	0.880	0.864
Trust in E-government (TE)	3	0.879	0.879	0.820
Tax Compliance Process efficiency(TCPE)	2	0.899	0.748	0.836

Discriminant validity indicated the extent to which a given construct was distinct from other latent constructs, and that the measures of one construct could not have been correlated unreasonably high with other constructs (Sekaran, 2003). The discriminant

validity of the constructs was assessed by using three types of criteria: Cross-loading, Fornell–Larcker, and Heterotrait-Monotrait Ratio (HTMT). The first criterion requires that the loadings of indicators on the assigned latent variables (in italic) should be higher than the loadings on all other latent variables (Chin, 1998). As shown in Table 8, all loadings (in italic) are higher than the other cross-loadings. The second criterion requires that the square root of AVE (diagonal elements) is higher than the correlations between the constructs (Table 9), so the second criterion (that square root of AVE should be higher than the correlations between the construct) is supported (Fornell and Larcker, 1981). In addition, previous study have suggested construct thresholds of 0.85 (Kline, 2011) and HTMT.90 (Gold et al., 2001) for HTMT to establish discriminant validity (Henselar et al., 2015). Table 10 shows that the values are lower than the required threshold value, indicating that discriminant validity is established for the constructs of this study.

The pilot test results show that the construct reliability, indicator reliability, convergence validity and discriminant validity of the constructs are satisfactory.

Therefore, the reliability and validity of the Instrument is good enough so that it can be used to collect data.

**Table 8: Assessment of Discriminant Validity (Cross-loading)**

	<b>PB</b>	<b>PC</b>	<b>PS</b>	<b>TR</b>	<b>TE</b>	<b>EA</b>	<b>TCPE</b>
PB1	<b>0.794</b>	0.407	0.354	0.299	0.385	0.524	0.490
PB2	<b>0.878</b>	0.457	0.361	0.304	0.474	0.502	0.513

PB3	<b>0.745</b>	0.376	0.369	0.336	0.437	0.369	0.403
PB4	<b>0.686</b>	0.391	0.393	0.333	0.416	0.292	0.380
PB5	<b>0.687</b>	0.392	0.325	0.271	0.377	0.313	0.429
PC1	0.471	<b>0.805</b>	0.389	0.421	0.391	0.314	0.389
PC2	0.511	<b>0.848</b>	0.438	0.490	0.532	0.441	0.438
PC3	0.426	<b>0.884</b>	0.480	0.508	0.448	0.379	0.480
PC4	0.380	<b>0.866</b>	0.429	0.532	0.439	0.380	0.429
PC5	0.436	<b>0.808</b>	0.466	0.481	0.434	0.369	0.466
PS1	0.437	0.439	<b>0.902</b>	0.408	0.497	0.416	0.406
PS2	0.418	0.448	<b>0.901</b>	0.419	0.461	0.338	0.412
PS3	0.243	0.295	<b>0.614</b>	0.274	0.306	0.173	0.246
TR1	0.303	0.486	0.384	<b>0.859</b>	0.452	0.396	0.389
TR2	0.366	0.518	0.377	<b>0.884</b>	0.443	0.326	0.361
TR3	0.352	0.469	0.403	<b>0.795</b>	0.505	0.285	0.303
TE1	0.389	0.450	0.466	0.450	<b>0.685</b>	0.394	0.458
TE2	0.420	0.401	0.357	0.405	<b>0.840</b>	0.629	0.600
TE3	0.467	0.465	0.446	0.454	<b>0.799</b>	0.427	0.511
TE4	0.436	0.404	0.433	0.434	<b>0.805</b>	0.539	0.584
EA1	0.498	0.427	0.398	0.384	0.603	<b>0.935</b>	0.663
EA2	0.526	0.418	0.358	0.371	0.615	<b>0.938</b>	0.673
TCPE1	0.523	0.398	0.332	0.353	0.567	0.614	<b>0.852</b>
TCPE2	0.482	0.474	0.424	0.366	0.640	0.683	<b>0.905</b>
TCPE3	0.503	0.473	0.385	0.355	0.561	0.508	<b>0.794</b>

Note: Electronic invoice adoption (EA), Perceive benefits (PB), Process Compatibility (PC), Perceived Security (PS), Technology Readiness (TR), Trust in E-government (TE), Tax Compliance Process Efficiency (TCPE).

**Table 9: Assessment of Discriminant Validity (Fornell-Larcker Criterion)**

	EA	PB	PC	PS	TCP E	TE	T R
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E-invoice adoption (EA)	0.937							
Perceive benefits (PB)	0.547	0.762						
Process Compatibility (PC)	0.451	0.529	0.843					
Perceived Security (PS)	0.404	0.465	0.490	0.817				
Tax Compliance Process efficiency(TCPE)	0.713	0.587	0.524	0.446	0.851			
Trust in E-government (TE)	0.650	0.543	0.538	0.529	0.693	0.7		
Technology Readiness (TR)	0.403	0.397	0.579	0.456	0.419	0.5	0.8	
							46	47

The diagonal elements (bold) are the square root of AVE while the off-diagonal elements represent the correlations.

**Table 10: Assessment of Discriminant Validity (HTMT Ratio)**

	EA	PB	PC	PS	TCPE	TE	TR
Electronic invoice adoption (EA)	<b>0.937</b>						
Perceive benefits (PB)	0.547	<b>0.762</b>					
Process Compatibility (PC)	0.451	0.529	<b>0.843</b>				
Perceived Security (PS)	0.404	0.465	0.490	<b>0.817</b>			
Tax Compliance Process efficiency (TCPE)	0.713	0.587	0.524	0.446	<b>0.851</b>		
Trust in E-government (TE)	0.650	0.543	0.538	0.529	0.693	<b>0.7</b>	
Technology Readiness (TR)	0.403	0.397	0.579	0.456	0.419	0.5	<b>0.8</b>

#### 4.9 Data Analysis Techniques

We empirically tested the research model based on structural equation modeling using Smart PLS version 3.0 software. This approach is a variance-based technique that it is suitable for exploring untested conceptual models (Ke et al., 2009; Teo et al., 2003; Ringle et al., 2015). As a structural equation modeling (SEM) technology, PLS can

examine both measurement models and structural models by minimizing error (Gefen et al., 2011). Similarly, PLS is likely to be used with very complex models with hierarchical models and a large number of indicators, structures and relationships (Hair et al., 2011; Fassott et al., 2016; Wetzels et al., 2009). In addition, PLS avoids the problem of small sample sizes, has less strict assumptions about data being normally distributed and error terms (Sarstedt et al., 2014). Thus, Smart PLS is suitable for this study.

Smart PLS 3 was used to test the reliability and validity of the measurement model followed by an examination of the structural relationships outlined in the structural model.

Before analyzing the data, the questions in the questionnaire were coded and each section was numbered sequentially. The coding and numbering system conforms to the order of the questions in the questionnaire. Therefore, the questionnaire format is used as a codebook for this purpose. Then enter the data in a comma-separated value (csv) format, which is compatible with Smart PLS, because Smart PLS must be converted to csv format before it can be analyzed using its software.

The next step is to check the reliability and validity of the data. Reliability is defined as "the degree to which a variable or set of variables is consistent within the range to be measured", and validity is defined as "a measure or a set of measures correctly represents one or more (Hair et al., 1998, p. 3). " Reliability is related to the consistency

of the measurement and its measurement method, while the validity focuses on the accuracy of the concept defined by the measurement and the scope of the measurement. validity also refers to the degree to which it does not have any systematic or non-random errors. Reliability refers to the degree to which it produces consistent results without random errors. Therefore, reliability and validity are two different concepts. A measure may be accurate (valid) but inconsistent (reliable), and vice versa. Reliability and validity tests are very important, especially in survey research, the measurement of variables mainly depends on the researcher's classification. In the PLS path modeling analysis, these tests are part of the outer model evaluation. Only after these two tests have been performed can subsequent analysis be performed. These tests will be discussed in detail in the next chapter.

Then descriptive analysis was performed to tabulate the demographics of the respondents, the company, and the frequency distribution of the responses. Finally, the inner or structural model is evaluated. The evaluation of the inner model includes the R-square ( $R^2$ ) evaluation of the endogenous latent variables and the path coefficient ( $\beta$ ) evaluation. The path coefficient and its significances are used to test various hypotheses, including its direction and significant level.

## **CHAPTER FIVE: FINDINGS AND DATA ANALYSIS**

### **5.0 Introduction**

There are three main sections covered in this chapter beginning with an introduction which is further followed by descriptive statistics in the second section and data analysis in the third section. In the third section, it contains measurement model and structural model. For measurement model, we examined the validity and reliability of this data; for structural model, it presented the direct effects and indirect effects (Mediating effects).

### **5.1 Data Cleaning and Screening**

After the respondent returns to the questionnaire brochure, the completeness and accuracy of the answers provided in the questionnaire will be checked. If there is any missing data, and the missing data is considered a missing value. According to Hair et al. (1998), the missing data can occur in many ways. For example, errors in data entry can lead to the creation of invalid codes, failure to complete the entire questionnaire, the incidence of respondents, disclosure restrictions, inapplicability of questions, refusal to answer certain questions, insufficient knowledge of certain questions, etc. Although the lost data cannot be avoided, it can be minimized and processed.

Smart PLS provides two options to deal with missing values: mean replacement and case deletion. This study chooses the mean replacement method to deal with the missing data. In addition, deleting on a case-by-case basis may discard a lot of useful



information, which may result in a decrease in efficiency (Temme, Kreis, and Hildebrandt, 2006). The data is also checked to see if any errors have occurred, especially during data entry. This is done by performing descriptive statistical analysis to detect the presence of any invalid code.

## 5.2 Response Rate

The response rate of the survey was a significant concern in a study because it ensured the questionnaires collected were valid for data analysis (Hair et al., 2010). Response rate defined by Hamilton (2009) as the percentage of respondents who participated in the survey from the sample size determined for the research. In the process of collecting questionnaires, it just can get hold of 379 potential respondents. And finally, a total of 276 questionnaires were collected back from the respondents. It yields a high response rate of 72.82 percent as the questionnaires were issued to the respondents one by one (Shown in table 11). According to the research of Wright et al. (2012), non-response becomes an important issue when response rates fall below 70%. In this thesis, non-response bias is not tested as the response rates are above 70%.

Therefore, a response rate of 72.82% was considered greatly sufficient for the analysis based on Sekaran's (2003) argument that the response rate of 30% was acceptable for surveys. Further, Some of the questionnaires were reclassified. This classification does not affect the validity of the questionnaire.

**Table 11: Response Rate of the Survey**

Characteristics	Response Rate
-----------------	---------------

Total questionnaires sent to respondents	379
Questionnaires received from respondents (online)	276
Unusable questionnaires	-
Total questionnaires received	276
<b>Overall response rate</b>	<b>72.82%</b>

### 5.3 Descriptive statistics

Table 12 presents the profile of the respondents. Our respondents comprise of 100 males (36.2%) and 176 females (63.8%). Most of them (71.4%) were below 30 years old, followed by 21.7% respondents aged between 30 to 39 years, 5.8% aged 40 to 49 years and above, and 1.1% were 50 years and above. The majority (93.1%) of the respondents were under 40 years old, which is consistent with China's largest online user group.

The respondents comprise of Accountant, tax officer, Manager. The largest proportion of the respondents are Accountant and made up 57.9% of the respondents. Followed by the Managers with the percentage of 30.1, and 12.0% were tax officer. Overall, since the respondents were the targeted respondents who have broad knowledge of using electronic invoice, it can be concluded that the information gathered for this study came from reliable sources.

In terms of level of education, the largest proportion of the respondents (63.8%) were Bachelor's degree holders, 15.9% were diploma holders, and 20.3% held at least a masters degree.

Table 12 also tabulates the frequency distribution of the sample firms. As can be seen from Table 12, the sample firms represent various industries. Almost half (44.9%) of the sample firms were from Services industry, followed by Manufacture industry with the percentage of 21.7. Other industries include Commerce, Construct, Health, Information and communication with the percentage of 19.6, 8.3, 2.2, 3.3, respectively. Respondents working in medium and large enterprises account for the majority, with the percentage of 61.5. And the rest of the respondents are from small (26.4%) and micro companies (12.7%).

**Table 12: Sample characteristics (n=276).**

Measure	Items	Frequency	Percent
Gender	Male	100	36.2%
	Female	176	63.8%
	Total	276	100%
Age	Less than 30	197	71.4%
	30-39	60	21.7%
	40-49	16	5.8%
	50 years and above	3	1.1%
	Total	276	100%
Education	Diploma or below	44	15.9%
	Bachelor's degree	176	63.8%

	Master's degree	55	19.9%
	Phd	1	0.4%
	Total	276	100%
Respondent's position	Accountant	160	57.9%
	tax officer	33	12.0%
	Manager	83	30.1%
	Total	276	100%
Industry	Services	124	44.9%
	Manufacture	60	21.7%
	Commerce	54	19.6%
	Construct	23	8.3%
	Health	6	2.2%
	Information and communication	9	3.3%
	Total	276	100%
Firm size	Micro( $\leq 10$ )	35	12.7%
	Small(11-50)	73	26.4%
	Medium(51-250)	67	24.3%
	Large( $> 250$ )	101	36.6%
	Total	276	100%

## 5.4 Data analysis

### 5.4.1 Measurement model

#### Tests of Validity

Validity focuses on what should be measured and the accuracy of the indicators measurement. There are two types of measures for effectiveness testing: convergent validity and discriminant validity.

## **Convergent Validity**

Convergent validity assesses the degree to which two measures of the similar concept are correlated (Hair et al., 1998). If the scale correctly measures the expected concept, the correlation will be high. It has two ways to assess convergent validity: (1) factor loading for each indicator should be significant and exceed 0.50; and (2) the value of average variance extracted (AVE) for each construct should be at least 0.50 (Fornell and Larcker, 1981).

First, the convergence validity is evaluated by checking the factor loading of each indicator. This is also a test of the reliability of a single item (indicator) (Chin, 1998; Henseler et al., 176 al., 2009). The interpretation of the factor loading generated by PLS is similar to the loading generated by principal component factor analysis (Bookstein, 1986). An indicator should share more variance with the component score than with the error variance. Therefore, the correlation between the construct and each of its indicators (standard external load) should be greater than 0.70. However, Chin (1998, p. 325) believes that the 0.70 rule of thumb for reliability of a single item “should not be so strict in the early stages of scale development. If there are other indicators in the block for comparison, a load of 0.50 or 0.60 Still acceptable”. Hulland (1999) also suggested that a value of 0.50 should be sufficient as a threshold for the reliability of a single item. Therefore, this study uses 0.50 as an acceptable value for the reliability of a single item.

The factor load should be significant and exceed 0.50. Table 13 shows the factor loading of each indicator in the outer model. It can be seen that all the indicators in each construct meet at least the minimum requirement of convergent validity. Therefore, none of them were deleted. It can be seen from Table 14 that the AVE values of all structures are above 0.50, so the second test of convergence validity is satisfied (Fornell and Larcker, 1981).

### **Discriminant Validity**

Discriminant validity refers to the degree of difference between two conceptually similar concepts (Hair et al., 1998). The discriminant validity of the constructs was assessed by using three types of criteria: Cross-loading, Fornell–Larcker, and Heterotrait-Monotrait Ratio (HTMT). The first criterion requires that the loadings of indicators on the assigned latent variables (in *italic*) should be higher than the loadings on all other latent variables (Chin, 1998).

Table 15 shows the cross loadings for all indicators. The shaded area is composed of the loadings of all indicators in each construct. It is found that all items have a higher loading on their own block (construct) than on other blocks (construct). This means that the construct component score predicts each indicator in its block better than the indicators in its other blocks, thereby satisfying the first criterion of discriminant validity. The second criterion requires that the square root of AVE (diagonal elements) is higher than the correlations between the constructs (see table 16 ), so the second

criterion (that square root of AVE should be higher than the correlations between the construct) is supported (Fornell and Larcker, 1981).

The former evaluates discriminant validity at the indicator level, while the latter evaluates discriminant validity at the construct level (Henseler et al., 2009). In addition, previous studies have suggested construct thresholds of 0.85 and 0.9 for HTMT to establish discriminant validity (Henseler et al., 2015). Table 17 shows that the values are lower than the required threshold value of HTMT.85 (Kline, 2011) and HTMT.90 (Gold et al., 2001), indicating that discriminant validity is established for the constructs of this study.

### **Tests of Reliability**

Reliability assesses the degree of consistency of various measures. In the PLS methodology, Chin (1998) suggests to use the composite reliability,  $\rho_c$ , developed by Werts, et al (1974) to evaluate the internal consistency of indicators. The main difference between composite reliability and the commonly used reliability measure, Cronbach's (1951) coefficient alpha (Cronbach's  $\alpha$ ) is that the latter assumes that all indicators have the same reliability (Chin, 1998; Henseler et al., 2009). Therefore, "Cronbach's  $\alpha$  tends to seriously underestimate the internal consistency reliability of the latent variables in the PLS path model" (Henseler et al., 2009, p. 299). On the contrary, composite reliability recognizes that the indicators have different loadings. In addition, composite reliability provides closer reliability because it does not assume tau equivalence between Cronbach  $\alpha$  and other measures. This explains why Cronbach's  $\alpha$  is often the lower limit of reliability. Therefore, similar to Chin (1998), Das et al. (2000)

and Henseler et al. (2009), this study uses composite reliability as a measure of internal consistency.

The commonly used reliability threshold is 0.70, where a value higher than 0.70 indicates high reliability, and a value lower than 0.70 indicates lack of reliability (Hair et al., 1998). The overall reliability of this study exceeds the threshold of 0.70 (see Table 14), which indicates that all constructions are reliable (Hair et al., 1998; Chin, 1998; Das et al., 2000; and Henseler et al., 2009).

After examining the validity and reliability of the model, the model fit is also tested. According to the research of Hu & Bentler (1998), it suggested that the standardized root mean square residual (SRMR) is the only approximate model fit criterion implemented for PLS path modelling. Therefore, a cut-off value of 0.08 for SRMR as proposed by Hu and Bentler (1999) seems to be more suitable for PLS path models. The value of SRMR in our study is 0.075 thus the model fit is within the threshold.

Finally, collinearity between the constructs were examined based on the variance inflation factor (VIF). The VIF is a regularly used approach to examine multicollinearity (Petter et al., 2007). The VIF ranges from 1.311 to 3.045 (see table 13), which is below the threshold of 3.3, which indicates that there is no multicollinearity problem.

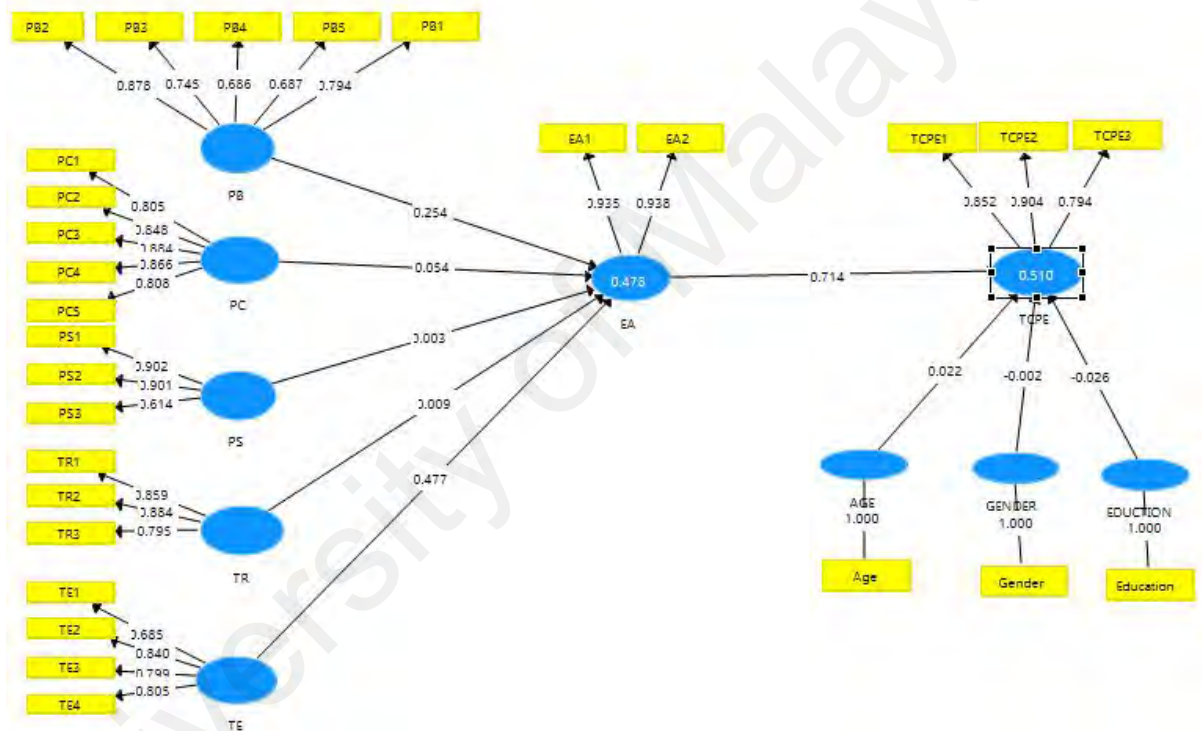


The measurement model results show that the construct reliability, indicator reliability, convergence validity and discriminant validity of the constructs are satisfactory.

Therefore, these constructs can be applied to examine conceptual research model.

Figure 6 presents our research results in PLS tool diagram.

**Figure 6 Research results in PLS tool diagram**



**Table 13: Item name, Mean, SD, VIF, Item Loading.**

Construct name	Item name	Mean	SD	VIF	Item loading
Perceived benefits	PB1	4.37	0.667	1.813	0.794
	PB2	4.30	0.725	2.388	0.878

		PB3	4.07	0.890	1.615	0.745
		PB4	4.08	0.802	1.645	0.686
		PB5	4.23	0.720	1.542	0.687
<b>Process Compatibility</b>		PC1	3.99	0.804	2.119	0.805
		PC2	4.09	0.738	2.324	0.848
		PC3	3.95	0.766	3.045	0.884
		PC4	3.95	0.783	2.858	0.866
		PC5	3.88	0.798	2.092	0.808
<b>Perceived Security</b>		PS1	4.18	0.652	1.895	0.902
		PS2	4.13	0.708	2.183	0.901
		PS3	3.97	0.822	1.311	0.614
<b>Technology Readiness</b>		TR1	4.04	0.697	1.670	0.859
		TR2	3.95	0.714	2.183	0.884
		TR3	3.93	0.783	1.708	0.795
<b>Trust in E-government</b>		TE1	4.09	0.722	1.387	0.685
		TE2	4.13	0.682	1.710	0.840
		TE3	3.92	0.803	1.890	0.799
		TE4	4.12	0.706	1.745	0.805
<b>Electronic invoice Adoption</b>		EA1	4.33	0.618	2.319	0.935
		EA2	4.26	0.632	2.319	0.938
<b>Tax Compliance</b>		TCPE1	4.24	0.665	1.819	0.852
<b>Process Efficiency</b>		TCPE2	4.17	0.622	2.178	0.905
		TCPE3	3.92	0.778	1.622	0.784

**Table 14: Validity and reliability.**

<b>Variables</b>	<b>Number of items</b>	<b>CR</b>	<b>AVE</b>	<b>Cronbach's <math>\alpha</math></b>
Perceive benefits (PB)	5	0.872	0.580	0.821
Process Compatibility (PC)	5	0.925	0.711	0.898

Perceived Security (PS)	3	0.854	0.667	0.755
Technology Readiness (TR)	3	0.884	0.717	0.805
Electronic invoice adoption (EA)	4	0.864	0.616	0.792
Trust in E-government (TE)	3	0.934	0.877	0.860
Tax Compliance Process efficiency(TCPE)	2	0.887	0.725	0.810

**Table 15: Assessment of Discriminant Validity (Cross-loading)**

	<b>PB</b>	<b>PC</b>	<b>PS</b>	<b>TR</b>	<b>TE</b>	<b>EA</b>	<b>TCPE</b>
PB1	<b>0.794</b>	0.407	0.354	0.299	0.385	0.524	0.490
PB2	<b>0.878</b>	0.457	0.361	0.304	0.474	0.502	0.513
PB3	<b>0.745</b>	0.376	0.369	0.336	0.437	0.369	0.403
PB4	<b>0.686</b>	0.391	0.393	0.333	0.416	0.292	0.380
PB5	<b>0.687</b>	0.392	0.325	0.271	0.377	0.313	0.429
PC1	0.471	<b>0.805</b>	0.389	0.421	0.391	0.314	0.389
PC2	0.511	<b>0.848</b>	0.438	0.490	0.532	0.441	0.438
PC3	0.426	<b>0.884</b>	0.480	0.508	0.448	0.379	0.480
PC4	0.380	<b>0.866</b>	0.429	0.532	0.439	0.380	0.429
PC5	0.436	<b>0.808</b>	0.466	0.481	0.434	0.369	0.466
PS1	0.437	0.439	<b>0.902</b>	0.408	0.497	0.416	0.406
PS2	0.418	0.448	<b>0.901</b>	0.419	0.461	0.338	0.412
PS3	0.243	0.295	<b>0.614</b>	0.274	0.306	0.173	0.246
TR1	0.303	0.486	0.384	<b>0.859</b>	0.452	0.396	0.389
TR2	0.366	0.518	0.377	<b>0.884</b>	0.443	0.326	0.361
TR3	0.352	0.469	0.403	<b>0.795</b>	0.505	0.285	0.303
TE1	0.389	0.450	0.466	0.450	<b>0.685</b>	0.394	0.458
TE2	0.420	0.401	0.357	0.405	<b>0.840</b>	0.629	0.600
TE3	0.467	0.465	0.446	0.454	<b>0.799</b>	0.427	0.511
TE4	0.436	0.404	0.433	0.434	<b>0.805</b>	0.539	0.584

EA1	0.498	0.427	0.398	0.384	0.603	<b>0.935</b>	0.663
EA2	0.526	0.418	0.358	0.371	0.615	<b>0.938</b>	0.673
TCPE1	0.523	0.398	0.332	0.353	0.567	0.614	<b>0.852</b>
TCPE2	0.482	0.474	0.424	0.366	0.640	0.683	<b>0.905</b>
TCPE3	0.503	0.473	0.385	0.355	0.561	0.508	<b>0.794</b>

Note: Electronic invoice adoption(EA), Perceive benefits(PB), Process Compatibility (PC), Perceived Security (PS), Technology Readiness (TR), Trust in E-government (TE), Tax Compliance Process Efficiency (TCPE).

**Table 16: Assessment of Discriminant Validity (Fornell-Larcker Criterion)**

	EA	PB	PC	PS	TCP E	TE	TR
Electronic invoice adoption (EA)	0.937						
Perceive benefits (PB)	0.547	0.762					
Process Compatibility (PC)	0.451	0.529	0.843				
Perceived Security (PS)	0.404	0.465	0.490	0.817			
Tax Compliance Process efficiency (TCPE)	0.713	0.587	0.524	0.446	0.851		
Trust in E-government (TE)	0.650	0.543	0.538	0.529	0.693	0.785	
Technology Readiness (TR)	0.403	0.397	0.579	0.456	0.419	0.546	0.84

The diagonal elements (bold) are the square root of AVE while the off-diagonal elements represent the correlations.

**Table 17: Assessment of Discriminant Validity (HTMT Ratio)**

	EA	PB	PC	PS	TCPE	TE	T R
Electronic invoice adoption (EA)							
Perceive benefits (PB)		0.623					
Process Compatibility (PC)		0.508	0.616				

Perceived Security (PS)	0.468	0.578	0.583			
Tax Compliance Process efficiency (TCPE)	0.847	0.717	0.616	0.554		
Trust in E-government (TE)	0.767	0.687	0.644	0.683	0.856	
Technology Readiness (TR)	0.476	0.502	0.679	0.576	0.515	0.700

#### 5.4.2 Structural model

In the above sections, the measurement model was assessed and validated. In this section, the structural model is assessed. Study by Chin (1998) showed that the R-squared ( $R^2$ ) and the path coefficients can indicate how well the data support a hypothesized model. In this study, the  $R^2$  was obtained using the PLS algorithm function. The  $R^2$  value denotes the amount of variance in the dependent variable due to the impact of an independent variable. Larger  $R^2$  value inflates the predictive ability of the structural model. The range of  $R^2$  value is from 0 to 1; value closer to 1 indicates a higher accuracy of predictive ability. Henseler and Fassot (2009) have provided a rule of thumb for interpretation of  $R^2$ . A value close to 0.75 is substantial, whereas, a value close to 0.50 is said to be moderate and value close to 0.25 is said to be weak (Hair et al., 2011). Path coefficient allows researchers to analyze the strength of the relationship between the dependent variable and independent variable (Hair et al., 2017). On PLS, to examine the relationship and significance level between the variables, bootstrapping function is used to generate t-statistics. The t-statistic output determines the significance level of each relationship. The values are presented in Table 18,

## The Direct Effect

As shown in Table 18, it suggests that perceived benefit ( $H1\beta = 0.254$ ,  $p < 0.001$ ) is statistically significant in explaining the adoption of electronic invoice. It shows that more perceived benefits lead the higher level of adoption of electronic invoice. Therefore, Hypothesis 1 is supported. The relationship between trust in e-government ( $H5: \beta = 0.477$ ,  $p < 0.001$ ) and the adoption of electronic invoice is positively and statistically significant. Thus, Hypothesis 5 is supported. In contrast, the relationships between process compatibility ( $H2: \beta = 0.054$ ,  $p = 0.443$ ), perceived security ( $H3: \beta = 0.003$ ,  $p = 0.962$ ), technology readiness ( $H4: \beta = 0.009$ ,  $p > 0.901$ ) and the adoption of electronic invoice are not statistically significant. The R-squared was 0.478, which indicates that the independent variables explain 47.8% of the variance of the adoption of electronic invoice. The relationship between Electronic invoice adoption ( $H6: \beta = 0.714$ ,  $p < 0.001$ ) and tax compliance process efficiency is positively and statistically significant, explaining 51% of the variance present on tax compliance process efficiency. Through this analysis, hypotheses H1, H5, H6 were supported, while hypotheses H2, H3, H4 did not find support.

**Table 18: Summary of the Structural Model for IV>DV**

Hypothesis	Relationships	Path Coefficient( $\beta$ )	T Statistics	P Values	Supported
H1	PB-> EA	0.254	3.665	0.000	YES
H2	PC -> EA	0.054	0.768	0.443	NO
H3	PS-> EA	0.003	0.047	0.962	NO
H4	TR -> EA	0.009	0.124	0.901	NO

<b>H5</b>	TE> EA	0.477	6.185	0.000	YES
<b>H6</b>	EA ->	0.714	20.727	0.000	YES
	TCPE				

Note. N=276; \*p <0.05 \*\*p <0.01. \*\*\*p <0.001

### **The Mediating Effect**

We assessed the mediation effect of electronic invoice adoption between the TOE factors and tax compliance process efficiency. The bootstrapped results were obtained from PLS. As indicated in Table 19. To test if electronic invoice adoption mediated the TOE factors on tax compliance process efficiency, the approach of Preacher and Hayes (2008) was adopted. We started by first checking if only direct effects are statistically significant to explain electronic invoice adoption. Based on this, we conclude that only perceived benefits and trust in e-government are statistically significant, indicating that electronic invoice adoption may be mediated by either or both of these two factors. We then examined if the indirect effect of perceived benefits and trust in e-government is significant on tax compliance process efficiency. The results of our study indicated that the mediating effect of electronic invoice adoption on the relationship between perceived benefits, trust in e-government and tax compliance process efficiency is significant with p-values of 0.000 and 0.000, respectively.

The indirect effect value for PC -> EA -> TCPE is 0.038, PS-> EA -> TCPE is 0.002, and TR -> EA -> TCPE is 0.006 , This  $\beta$  value showed that the mediating effects of electronic invoice adoption on these relationships were not significant with p-values of

0.445, 0.962 and 0.901, respectively. Therefore, based on the above analysis, supporting H7a, H7e, and rejecting H7b, H7c, H7d.

**Table 19: Test of mediation-mediated path analysis**

Mediated path	Mediated Coefficient	Path	T Values	P value	Supported
PB-> EA ->	0.181		3.741	0.000	YES
TCPE					
PC -> EA ->	0.038		0.764	0.445	NO
TCPE					
PS-> EA ->	0.002		0.047	0.962	NO
TCPE					
TR -> EA ->	0.006		0.124	0.901	NO
TCPE					
TE> EA -> TCPE	0.340		5.454	0.000	YES

**Table 20 Summary of Research Objectives, Hypotheses and Results of Hypotheses Testing**

Research objectives	hypothesis	Results of Hypotheses Testing
1.To examine the relationship between perceived benefits, process compatibility, and perceived security and e-invoice adoption.	<p><b>H1:</b> Perceived benefits of e-invoice have a positive effect on the firm's e-invoice adoption.</p> <p><b>H2:</b> Process compatibility of e-invoice have a positive effect on the firm's E-invoice adoption.</p> <p><b>H3:</b> Perceived security of e-invoice have a positive effect on the firm's e-invoice adoption.</p>	<p>Supported</p> <p>Not supported</p> <p>Not supported</p>
2. To examine the relationship between technology readiness and	<b>H4:</b> Technology readiness have a positive effect on the firm's E-invoice adoption.	Not supported



e-invoice adoption.		
3.To examine the relationship between relational trust and e-invoice adoption.	<b>H5:</b> The trust in e-government have a positive effect on the firm's E-invoice adoption	Supported
.To examine the the relationship between e-invoice adoption and tax compliance process efficiency.	<b>H6:</b> E-invoice adoption be positively associated with tax compliance process efficiency.	Supported
5.To examine the mediating effects of e-invoice adoption on the relationship between the five factors and tax compliance process efficiency	<b>H7 (H7a)</b> Adopting electronic invoice mediate the effects of perceived benefits on tax compliance process efficiency.	Supported
	<b>H7 (H7b)</b> Adopting electronic invoice mediate the effects of process compatibility on tax compliance process efficiency.	Not supported
	<b>H7 (H7c)</b> Adopting electronic invoice will mediate the effects of perceived security on compliance process efficiency.	Not supported
	<b>H7 (H7d)</b> Adopting electronic invoice mediate the effects of technology readiness on tax compliance process efficiency.	Supported
	<b>H7 (H7e)</b> Adopting electronic invoice mediate the effects of trust in e-government on tax compliance process efficiency.	

## **CHAPTER SIX:SUMMARY AND CONCLUSIONS**

### **6.0 Introduction**

This chapter consists of four sections. Section 6.1 summarizes the discussion of this study. Then, the implications of the study both for theory and practice are discussed in Section 6.2. Finally, Section 6.3 highlights the conclusions of the study as well as some limitations.

### **6.1 Discussion**

We used the TOE framework to conduct a comprehensive empirical assessment of the factors affecting the adoption of electronic invoice and further explored their impact on tax compliance process efficiency. Consistent with prior literature on IT adoption (Kuan and Chau, 2001; Premkumar and Roberts,1999; Thong, 1999), the empirical results of our study support the underlying concept that constructs in the TOE framework are directly useful for explaining the factors behind adoption of electronic invoice. The results show that the adoption of electronic invoice is significantly affected by two factors, which are perceived benefits and trust in e-government. Further, the results of this study indicated that electronic invoice adoption mediated the effect of two TOE factors, i.e., perceived benefit and trust in e-government on tax compliance process efficiency. Our research also suggested that the adoption of electronic invoice has a significant impact on tax compliance process efficiency.

With regard to the technology context, perceived benefit is a determinant factor for companies' electronic invoice adoption in China. Previous research has shown that perceived benefits play an important role in technology adoption (Hsu et al., 2014;

Abed, 2020; Chwelos et al., 2001; Venkatesh and Bala, 2012). In addition, compared with paper invoices, electronic invoice has the advantage of being able to record and store online transaction information and timely transmit transaction data to the tax department. It is precisely because electronic invoice has the advantages over paper invoices that promote the company's adoption behavior. However, our study found that process compatibility is not the driver for electronic invoice adoption. This finding is in disagreement with those of previous studies (Chen, and Tan, 2004; Azmi et al., 2016; Premkumar and Roberts, 1999; Thong, 1999). This is consistent with previous literature (Low et al., 2011; Martins et al., 2016). A reasonable explanation is compatibility is viewed as the ability to integrate electronic invoice within the companies' existing IT systems and thus integration is guaranteed by the government. This may suggest the lack of concern regarding electronic invoice compatibility in the companies business activities. Unexpectedly, our finding also found that perceived security is not significantly influence electronic invoice adoption. This finding is inconsistent with the findings in prior research (Benlian and Hess, 2011).The plausible explanation for this insignificant result might be because users might need less security and more on trust to the government who is providing this service. Future research could explore the interaction between this type of trust and security in the adoption of electronic invoice.

In the organizational context, our findings indicated that the company's technical readiness does not influence the adoption of electronic invoice. Although some studies have found that technical readiness is a vital determinant of IT innovation and use (Zhu

and Kraemer, 2005; Gutierrez et al., 2015; Chwelos et al., 2001), the results of our study show the contrary for electronic invoice. A reasonable explanation is that, in China, the infrastructure and technology related to electronic invoice is actually in the hands of the relevant suppliers (such as State Taxation Administration), and companies can be less dependent on their technical capabilities by purchasing electronic invoice systems from suppliers. This reduces the need for IT capabilities within the company. This result of the present study is consistent with Martins et al. (2019).

In terms of environment context, our study shows that there is a significant relationship between trust in e-government and electronic invoice adoption (H5). Similarities to this finding have been suggested in other studies such as (Lian, 2015; Venkatesh and Bala, 2012). In China, the electronic invoice system is researched and developed by the State Taxation Administration. Enterprises can purchase electronic invoice system from State Taxation Administration to issue electronic invoice. Therefore, trust in e-government plays a vital role in the company's adoption of electronic invoice. When the company trusts the electronic invoice system developed by the tax authority, the managers in the company tend to make a strategic decision to adopt the electronic invoice system. The study of Teo et al. (2008) also shows that trust in e-government is positively related to information quality, system quality, and service quality. These findings may help companies better evaluate electronic invoice adoption when formulating organizational strategies.

In the above discussion, we found that electronic invoice adoption mediates the relationship between perceived benefits, trust in e-government and tax compliance process efficiency. Tax compliance process efficiency should be achievable when a company adopted electronic invoice. Our results further suggest that electronic invoice adoption should be considered from dual aspects. Both perceived benefit and trust in e-government are influential for improvements towards tax compliance processes.

## **6.2 Implication**

### **6.2.1 Theory Implication**

In this study, we explored the key factors that affect the adoption of electronic invoice in Chinese companies through an empirical study of existing users of electronic invoice. This study has contributed to the knowledge system in the following perspectives.

Firstly, this study contributed to the study of current user acceptance behavior (Gangwar et al., 2015; Zhu, et al., 2006; Lu, 2008; Fu and Chang, 2016; Venkatesh and Bala, 2012). An empirical study of current user acceptance was found to be a useful method for exploring post-adoption behaviors. The results of this study are consistent with post-adoption studies that even if a company adopts new technology, many factors will still affect its true acceptance of the technology (Spiller et al., 2007). The research model we developed by using the TOE framework seeks to provide a better understanding of the electronic invoice diffusion process. Our model provides a holistic and purposeful basis for evaluating the post-adoption stages of electronic invoice use.

The model utilized the context of technology, organization and environment, and also evaluated electronic invoice adoption as a mediator of the technology, organization and environment context factors to assess its effects on tax compliance process efficiency. This study represents an initial step in examining the impact of these types of effects on the organizational diffusion of electronic invoice. Compared to earlier studies (Chiu et al., 2014; Yang and Lin, 2015), our research offers theoretical depth in the analysis by presenting the mediation results and highlighting the variance explained by the theoretical constructs (Hong et al., 2014). Our research thus makes valuable contributions to the electronic invoice diffusion and use knowledge base. Researchers may find the model and the instrument applicable to diffusion studies of other emerging technologies.

Secondly, the study makes important contributions to research in the area of electronic invoice. Most studies on IT innovation adoption have focused on a single stage (i.e. intention or adoption), Our research differentiated the two stages of electronic invoice adoption, namely, current electronic invoice adoption and post-adoption stage, and empirically examined the mediating effects of electronic invoice adoption on tax compliance process efficiency. The study thus fills an important research gap by providing a better understanding of the determinants that affect electronic invoice adoption and in the turn the impact of these factors on tax compliance process efficiency of companies. Most importantly, this study provides new insights into the adoption of electronic invoice from a tax perspective. Several studies mainly used the TOE

framework to analyze the factors affecting companies to adopt electronic invoice in small and medium-sized enterprises (Edelmann and Sintonen, 2006). Some of them focus only on the impact of the adoption of electronic invoice on tax compliance (Lee, 2016; Palupi and Darwanto, 2017). In this study, we not only use the TOE framework to explore the factors that affect Chinese companies' adoption of electronic invoice but also further explore the impact of the use of electronic invoice on tax compliance process efficiency. Therefore, it provides a new perspective on our understanding of electronic invoice from a tax perspective.

### **6.2.2 Practical implications**

In addition to the theoretical implications discussed above, this study has the following practical implications. Firstly, understanding the key factors affecting a company's acceptance of electronic invoice can provide valuable guidance to the company. It can extend their knowledge of companies' decision making and lead to better strategies. Our research provides a starting point for government seeking ways to improve companies' acceptance of electronic invoice. Second, we suggest that electronic invoice providers should pay more attention to promoting and verifying the benefits of adopting electronic invoice when marketing their services to potential early adopters, because we found that perceived benefits are the key determinants for electronic invoice adoption at this time. Third, we found that the current adopters of electronic invoice are companies that have strong IT capabilities. If electronic invoice providers can attract more companies with strong IT capabilities to adopt electronic invoice and generate successful cases, then the experience of these companies may have a positive impact on the adoption of electronic

invoice by other companies in the future. Last but not least, our research can provide guidance to tax authorities to improve their own electronic invoice system, by creating a workforce for the digital age. This workforce will need new sets of skills and responsibilities that emphasis on strengthening citizen's trust in the electronic invoice system such as secured cloud computing, digital security and data science.

### **6.3 Conclusion and limitations of the Study**

Most studies on the adoption of electronic invoice have focused only on factors that affect the adoption of electronic invoice. There has no study that further explores the impact of the adoption of electronic invoice on tax compliance efficiency. This study uses the TOE framework to evaluate the determinants of electronic invoice adoption, and further explores electronic invoice adoption as a mediator on the relationship between TOE factors and tax compliance process efficiency. The study found that the adoption of electronic invoice has a positive impact on the tax compliance process efficiency. In addition, the study indicated that electronic invoice adoption as a mediator between some TOE factors and the tax compliance process efficiency. The study provides further evidence that, in evaluating the adoption of innovative IT technologies, such as electronic invoice, through the organization 's technology, organization, and environmental context, is more meaningful in offering valuable insights into practitioners and researchers.



This study has the following key limitations. First of all, although this research explores the factors that affect the adoption of electronic invoice, it only starts from companies that adopt electronic invoicing systems, future research can start with the adopters and the non-adopters, and distinguish their findings. Second, our research sample only considers the situation in China. Future research can collect data from different countries to compare the impact of cultural differences on the adoption of electronic invoice. Third, our research focused exclusively on the adoption and impact of electronic invoice, and future research can distinguish between adopters and non-adopters and also can apply our model to the adoption of other e-government services.

## Reference:

- Abed, S., 2020. Social commerce adoption using TOE framework: An empirical investigation of Saudi Arabian SMEs. *International Journal of Information Management*, 53, 102118.
- Armstrong, C.P. and Sambamurthy, V. (1999), "Information technology assimilation in firms: the influence of senior leadership and IT infrastructures", *Information Systems Research*, 10, 304-27.
- Awa, H. O., Ukoha, O., and Emecheta, B. C. (2016). Using TOE theoretical framework to study the adoption of ERP solution. *Cogent Business and Management*, 3(1), 1196571.
- Anderson, r., & benuidenhoudt, S. (1996). On the reliability of electronic payment systems. *IEEE Transactions on Software Engineering*, 22(5), 294-301
- Azmi, A., Sapiei, N., Mustapha, M., and Abdullah, M. (2016). SMEs' tax compliance costs and IT adoption: the case of a value-added tax. *International Journal Of Accounting Information Systems*, 23, 1-13.
- Babbie, E. A. (1999). *The basics of social research*, Thomson Learning. Inc. USA.
- Baker, J. (2012). *The technology–organization–environment framework. Information systems theory*. New York, NY: Springer.231–245
- Belanger, F., and Carter, L. (2008). Trust and risk in e-government adoption. *Journal of Strategic Information Systems*,17 (2),165-176
- Benlian, A., and Hess, T. (2011). Opportunities and risks of software-as-a-service: Findings from a survey of IT executives. *Decision Support Systems*, 51(1), 232-246.
- Bellon, M., Chang, J., Dabla-Norris, E., Khalid, S., Lima, F., Rojas, E. and Villena, P., 2019. Digitalization to Improve Tax Compliance. *IMF Working Papers*, WP/19/231.
- Bordens, K.S., & Abbott, B.B. (1996). *Research design and methods: A process approach*. Mountain View, CA: Mayfield.

- Bughin, J., Chui, M., and Manyika, J. (2010). Clouds, big data, and smart assets: Ten tech-enabled business trends to watch. *McKinsey Quarterly*, 2010 (4), 26-43.
- Capgemini Consulting, SEPA:potential benefits atstake,(2007),available at: [http://ec.europa.eu/internal\\_market/payments/docs/sepa/sepa-capgemini\\_study-final\\_report\\_en.pdf](http://ec.europa.eu/internal_market/payments/docs/sepa/sepa-capgemini_study-final_report_en.pdf), (Accessed 12 September 2016)
- Caron-Fasan, M. L., Lesca, N., Perea, C., & Beyrouthy, S. (2020). Adoption of enterprise social networking: Revisiting the IT innovation adoption model of Hameed et al. *Journal of Engineering and Technology Management*, 56, 101572.
- Carter, L., and Belanger, F. (2005). The utilization of e-government services: Citizen trust, innovation and acceptance factors. *Information Systems Journal*, 15 (1), 5–25.
- Cartwright, J., Hahn-Steichen, J., He, J., and Miller, T. (2005). RosettaNet for Intel’s trading entity automation. *Intel Techn. J.* 9(3), 239–246.
- Chang, C. J., Kuo, H. C., Chen, C. Y., Chen, T. H., and Chung, P. Y. (2013). Ergonomic techniques for a mobile electronic invoice system: Operational requirements of an information management system. *Human Factors and Ergonomics in Manufacturing and Service Industries*, 23 (6), 582-589.
- Chau, P.Y.K. and Tam, K.Y. (1997), “Factors affecting the adoption of open systems: an exploratory study”, *MIS Quarterly*, 21, 1-24.
- Chen, L. D., and Tan, J. (2004). Technology adaptation in e-commerce:: key determinants of virtual stores acceptance. *European Management Journal*, 22 (1), 74-86.
- Chin, W. W. (1998). Commentary: Issues and Opinion on Structural Equation Modeling. *MIS Quarterly* , 22(1), 7-16
- Chiu, C., Wang, E.T.G., Fang, Y. and Huang, H. (2014), “Understanding customers’ repeat purchase intentions in B2C e-commerce: the roles of utilitarian value, hedonic value and perceived risk”, *Information Systems Journal*, 24(1),85-114

- Chong, A.Y.L. and Ooi, K.B. (2008), “Adoption of interorganizational system standards in supply chains: an empirical analysis of RosettaNet standards”, *Industrial Management & Data Systems*, 198, 529-47
- Chwelos, P., I. Benbasat, A. S. Dexter. 2001. Research report: Empirical test of an EDI adoption model. *Inform. Systems Res.* 12 (3), 305–321.
- Cooper RB and Zmud RW (1990) Information technology implementation research: a technological diffusion approach. *Management Science* 36(2), 123–139.
- Citrin, A. V., Sprott, D. E., Silverman, S. N., and Stem, D. E. (2000). Adoption of internet shopping: The role of consumer innovativeness. *Industrial Management and Data Systems*, 100 (7), 294–300.
- Cruz-Jesus, F., Pinheiro, A., & Oliveira, T. (2019). Understanding CRM adoption stages: empirical analysis building on the TOE framework. *Computers in Industry*, Vol.109, pp. 1-13.
- Dai, X., and Grundy, J. C. (2007). Netpay: An off-line, decentralized micro-payment system for thin-client applications. *Electronic Commerce Research and Applications*, 6 (1), 91-101.
- Dawes, J. (2008). Do data characteristics change according to the number of scale points used? An experiment using 5 point, 7 point and 10 point scales. *International Journal of Market Research*, 50 (1)61-104.
- Devaraj S and Kohli R (2003) Performance consequences of information technology: is actual usage the missing link? *Management Science* 49(3), 273–289.
- DeVon, H. A., Block, M. E., Moyle-Wright, P., Ernst, D. M., Hayden, S. J., Lazzara, D. J., ... & Kostas-Polston, E. (2007). A psychometric toolbox for testing validity and reliability. *Journal of Nursing Scholarship*, 39(2), 155-164.
- Dwivedi, Y. K., Rana, N. P., Janssen, M., Lal, B., Williams, M. D., & Clement, M. (2017). An empirical validation of a unified model of electronic government adoption (UMEGA). *Government Information Quarterly*, 34(2), 211–230.

- Edelmann, J., and Sintonen, S. (2006). Adoption of electronic invoicing in Finnish SMEs: two complementary perspectives. *International Journal Of Enterprise Network Management*, 1 (1), 79-98.
- Electronic invoice / electronic invoicing, E-Billing / Electronic Billing, AP, The electronic invoice journey 2019-2025 Automation. (2020). available at: [https://www.billentis.com/einvoicing\\_ebilling\\_market\\_report\\_EN.htm](https://www.billentis.com/einvoicing_ebilling_market_report_EN.htm) (accessed 19 April 2020)
- Fassott, G., Henseler, J. and Coelho, P. (2016). Testing moderating effects in PLS path models with composite variables. *Industrial Management & Data Systems*, 11(9), 1887-1900.
- Fornell, C. and Larcker, D.F. (1981), "Evaluating structural equation models with unobservable variables and measurement error", *Journal of Marketing Research*, 18 (1), 39-50
- Fuller, M. A., Hardin, A. M., and Scott, C. L. (2007). Diffusion of virtual innovation. *ACM SIGMIS Database: the DATABASE for Advances in Information Systems*, 38(4), 40-44.
- Fu, J. R., Farn, C. K. and Chao, W. P. (2006). Acceptance of electronic tax filing: a study of taxpayer intentions. *Information and Management*, 43(1), 109-126.
- Fu, H. P., and Chang, T. S. (2016). An analysis of the factors affecting the adoption of cloud consumer relationship management in the machinery industry in Taiwan. *Information Development*, 32(5), 1741-1756.
- Gangwar, H., Date, H., and Ramaswamy, R. (2015). Understanding determinants of cloud computing adoption using an integrated TAM-TOE model. *Journal Of Enterprise Information Management*, 28(1), 107-130.
- Gall, D. & Holland D. 2005. E-billing on Demand: Is your firm ready? Omega Legal. Available at: [http://www.omegalegal.com/white\\_pages/E-Billing\\_Article.pdf](http://www.omegalegal.com/white_pages/E-Billing_Article.pdf). [accessed 11 February 2018]
- Gay, L. R. & Diehl, P. L. (1996). Research methods for business and management. Singapore: International Edition. Simon & Schuster (Asia) pte. Ltd.

- Gefen, D., Rigdon, E., and Straub, D. (2011). An update and extension to SEM guidelines for administrative and social science research. *MIS Quarterly*, 35(2), 3-14
- Gil-Garcia, J.R., Chengalur-Smith, I., and Duchessi, P. (2007) Collaborative e-Government: Impediments and benefits of information-sharing projects in the public sector. *European Journal of Information Systems*, 16 (2), 121-133.
- Gold, A. H., Malhotra, A., and Segars, A. H. (2001). Knowledge Management: An Organizational Capabilities Perspective. *Journal of Management*, 18(1), 85-214.
- Gutierrez, A., Boukrami, E., and Lumsden, R. (2015). Technological, organisational and environmental factors influencing managers' decision to adopt cloud computing in the UK. *Journal Of Enterprise Information Management*, 28(6), 788-807.
- Gupta, S., Keen, M., Shah, A., Verdier, G., and Walutowy, M. F. (Eds.). (2017). *Digital revolutions in public finance*. Washington, DC: International Monetary Fund.
- Hair, J. F., Ringle, C. M., and Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *Journal of Marketing theory and Practice*, 19(2), 139-152.
- Hair, J., Hult, G., Ringle, C. and Sarstedt, M. (1997). A Primer On Partial Least Squares Structural Equation Modeling (PLS-SEM). Los Angeles: SAGE.
- Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (1998). *Multivariate data analysis* ( 5(3), 207-219). Upper Saddle River, NJ: Prentice hall.
- Harris, D. C. (2010). *Quantitative chemical analysis*. Macmillan.
- Hamilton, M. B. (2009). *Online survey response rates and times: Background and guidance for industry*. Longmont: Ipathia.
- Hart, P., and Saunders, C. (1997). Power and trust: Critical factors in the adoption and use of electronic data interchange. *Organization science*, 8(1), 23-42.
- Harald, B. 2009. Final report of the Expert Group on e-invoicing. Expert Group. Available at:

[http://ec.europa.eu/internal\\_market/consultations/docs/2009/einvoicing/report\\_en.pdf](http://ec.europa.eu/internal_market/consultations/docs/2009/einvoicing/report_en.pdf)[accessed 11 February 2018]

- Herrero, A., and Rodríguez, I. (2008). The effect of innovativeness on the adoption of b2C e-commerce: A model based on the Theory of planned behaviour. *Computers in Human Behavior*, 24(6), 2830-2847.
- Hernandez-Ortega, B. (2012). Key Factors for The Adoption and Subsequent Use of Electronic invoice. *Academia, Revista Latinoamericana de Administración*, 50, 15-30.
- Hernandez-Ortega, B., Serrano-Cinca, C., and Gomez-Meneses, F. (2014). The firm's continuance intentions to use inter-organizational ICTs: The influence of contingency factors and perceptions. *Information and Management*, 51(6), 747-761.
- Hernandez-Ortega, B. (2012). Key factors for the adoption and subsequent use of electronic invoice. *Academia. Revista Latinoamericana de Administración*, 50, 15-30.
- Henseler, J., Ringle, C. M., and Sarstedt, ( 2015). A new criterion for assessing discriminant validity in variance-based structural equation modelling. *Journal of the Academy of Marketing Science*, 43(1), 115-135.
- Henseler, J., Ringle, C. M., and Sinkovics, R. R. (2009). The use of partial least squares path modeling in international marketing. *In New challenges to international marketing*,(20), 277-319.
- Hsu, P., Ray, S., and Li-Hsieh, Y. (2014). Examining cloud computing adoption intention, pricing mechanism, and deployment model. *International Journal Of Information Management*, 34(4), 474-488.
- Hong, W. and Zhu, K. (2006), "Migrating to internet-based e-commerce: factors affecting e-commerce adoption and migration at the firm level", *Information & Management*, 43, 204-21.

- Hong, W., Chan, F.K.Y., Thong, J.Y.L., Chasalow, L.C. and Dhillon, G. (2014), "A framework and guidelines for context-specific theorizing in information systems research", *Information Systems Research*, 25 (1) 111-136.
- Hoffman, D.L., Novak, T., & Chatterjee, p. (1995). Commercial scenarios for the web: Opportunities challenges. *Journal of Computer-Mediated Communication*, Special Issue on Electronic Commerce, 1:3. Available online: <http://www.ascusc.org/jcmc/vol1/issue3/hoffman.html>.
- Hsu, P.F., Kraemer, K.L. and Dunkle, D. (2006), "Determinants of e-business use in US firms", *International Journal of Electronic Commerce*, (10), 9-45.
- Hult, G. T. M., Ketchen Jr, D. J., and Nichols Jr, E. L. (2002). An examination of cultural competitiveness and order fulfillment cycle time within supply chains. *Academy of management Journal*, 45 (3),577-586.
- Hu, L. and Bentler, P.M. (1998), "Fit indices in covariance structure modeling: sensitivity to underparameterized model misspecification", *Psychological Methods*, 3(4), 424-453.
- Hulland, J. (1999). Use of partial least squares (PLS) in strategic management research: A review of four recent studies. *Strategic management journal*, 20(2), 195-204.
- Iacovou, C. L., Benbasat, I., and Dexter, A. S. (1995). Electronic data interchange and small organizations: Adoption and impact of technology. *MIS quarterly*, 19 (4), 465-485.
- iiMedia Report (2019), "2019 China electronic invoice industry research", available at: <https://www.iimedia.cn/c400/66459.html> (accessed 22 October 2019)
- Kaliontzoglou, A., boutsi, p., & polemi, D. (2006). eInvoice: Secure electronic invoicebased on web services. *Electronic Commerce Research*, 6, 337-353.
- Kapoor, K. K., Dwivedi, Y. K., & Williams, M. D. (2014). Innovation adoption attributes: A review and synthesis of research findings. *European Journal of Innovation Management*, 17(3), 327–348.
- Keifer, S. (2011). Electronic invoice: The catalyst for financial supply chain efficiencies. *Journal of Payments Strategy and Systems*, 5(1),38-51.



- Ke, W., Liu, H., Wei, K.K., Gu, J. and Chen, H. (2009), “How do mediated and non-mediated power affect electronic supply chain management system adoption? The mediating effects of trust and institutional pressures”, *Decision Support Systems*, 46 (4), 839-851.
- Kim, C., Tao, W., Shin, N., and Kim, K. S. (2010). An empirical study of customers’ perceptions of security and trust in e-payment systems. *Electronic commerce research and applications*, 9 (1),84-95.
- Kobelsky, K. W., V. J. Richardson, R. E. Smith, R. W. Zmud. 2008. Determinants and consequences of firm information technology budgets. *Accounting Rev.* 83(4), 957–995.
- Kolsaker, A., and Payne, C. (2002). Engendering trust in e-commerce: a study of gender-based concerns. *Marketing intelligence and planning*, 20(4), 206-214.
- Korkman, O., Storbacka, K., and Harald, B. (2010). Practices as markets: Value co-creation in electronic invoice. *Australasian Marketing Journal (AMJ)*, 18(4), 236-247.
- Kousaridas, A., pareas, G., and Apostolopoulos, T. (2008). Open financial services architecture based on the use of intelligent mobile devices. *Electronic Commerce Research and Applications*, 7 (2), 232-246.
- KPMG,(2018).The mandate is growing for electronic invoice adoption. (2018). available  
[t:https://assets.kpmg/content/dam/kpmg/za/pdf/2018/August/mandate-for-electronic-invoice-adoption-kpmg-tax.pdf](https://assets.kpmg/content/dam/kpmg/za/pdf/2018/August/mandate-for-electronic-invoice-adoption-kpmg-tax.pdf) (accessed 25 December 2019)
- Krishnan, R., X. Martin, N. G., Noorderhaven. 2006. When does trust matter to alliance performance? *Acad. Management J.* 49 (45), 894–917.
- Kuan, K., and Chau, P. (2001). A perception-based model for EDI adoption in small businesses using a technology–organization–environment framework. *Information and Management*, 38 (8),507–521.

- Kwon, T. H., and Zmud, R. W. (1987). Unifying the fragmented models of information systems implementation. In *Critical Issues in Information Systems Research*, R. J. Boland and R. A. Hirschheim (eds.), John Wiley & Sons, Inc., USA, 227–251
- Layne, K. and Lee, J. (2001). Developing fully functional e-government: A four stage model. *Government Information Quarterly*, 18 (2), 122-136.
- Lahtinen, M. (2012). *Electronic invoice Adoption in Organizations*. Helsinki: Hanken School of Economics
- Lean, O. K., Zailani, S., Ramayah, T., and Fernando, Y. (2009). Factors influencing intention to use e-government services among citizens in Malaysia. *International Journal of Information Management*, 29 (6),458-475.
- Lee, H. C. (2016). Can electronic tax invoicing improve tax compliance? A case study of the Republic of Korea's electronic tax invoicing for value-added tax. *Working Paper*.  
No. 7592.The World Bank, 7 March.
- Lee, J. N., Park, C., and Whitesides, G. M. (2003). Solvent compatibility of poly (dimethylsiloxane)-based microfluidic devices. *Analytical chemistry*, 75(23), 6544-6554.
- Lian, J. W. (2015). Critical factors for cloud based electronic invoice service adoption in Taiwan: An empirical study. *International Journal of Information Management*, 35 (1), 98-109.
- Li, J., Wang, X., & Wu, Y. (2020). Can government improve tax compliance by adopting advanced information technology? Evidence from the Golden Tax Project III in China. *Economic Modelling*, 93, 384-397.
- Lin, H. F., and Lin, S. M. (2008). Determinants of e-business diffusion: A test of the technology diffusion perspective. *Technovation*, 28 (3), 135-145.
- Low, C., Chen, Y., and Wu, M. (2011). Understanding the determinants of cloud computing adoption. *Industrial Management and Data Systems*, 111 (7),1006-1023.

- Lu, X. (2008). Critical factors of ASP acceptance in SMEs: an empirical study of Chinese ASP clients. *International Journal Of Electronic Customer Relationship Management*, 2(4),297-314.
- Lynn, M.R. (1986). Determination and quantification of content validity. *Nursing Research*, 35, 382–385
- Martins, R., Oliveira, T., and Thomas, M. (2016). An empirical analysis to assess the determinants of SaaS diffusion in firms. *Computers In Human Behavior*, 62, 19-33.
- Martins, R., Oliveira, T., Thomas, M., and Tomás, S. (2019). Firms' continuance intention on SaaS use—an empirical study. *Information Technology and People*. 32 (1), 189-216
- Mata, F., W. Fuerst, J. Barney. 1995. Information technology and sustained competitive advantage: A resource-based analysis. *MIS Quart.*19 (4), 487–505.
- Malhotra, N.K. (2007): Marketing Research, Pearson Prentice Hall
- Mukhopadhyay T, Kekre S and Kalathur S (1995) Business value of information technology: a study of electronic data interchange. *MIS Quarterly* 19(2), 137–156.
- Neuman, W. L., & Kreuger, L. W. (2003). *Social work research methods: Qualitative and quantitative approaches*. Boston: Allyn and Bacon.
- Nguyen, H. O. (2013). Critical factors in e-business adoption: Evidence from Australian transport and logistics companies. *International Journal of Production Economics*, 146 (1),300-312.
- O'cass, A., and Fenech, T. (2003). Web retailing adoption: exploring the nature of internet users Web retailing behaviour. *Journal of Retailing and Consumer services*, 10 (2),81-94.
- Oksenberg, L., & Kalton, G. (1991). New strategies for pretesting survey questions. *Journal of official statistics*, 7(3), 349.

- Oliveira, T., and Martins, M. F. (2010). Understanding e-business adoption across industries in European countries. *Industrial Management and Data Systems*, 110(9),1337-1354.
- Oliveira, T., & Martins, M. F. (2011). Literature review of information technology adoption models at firm level. *Electronic Journal of Information Systems Evaluation*, 14(1), 110.
- Oliveira T, Thomas M and Espadanal M (2014) Assessing the determinants of cloud computing adoption: An analysis of the manufacturing and services sectors. *Information & Management* 51(5): 497–510.
- Palupi, C., and Darwanto, D. (2017). Transaction Cost on The Implementation of Electronic invoices in Micro and Small Enterprises. *Signifikan: Jurnal Ilmu Ekonomi*, 6(1),139-158.
- Pan, M.J. and Jang, W.Y. (2008), “Determinants of the adoption of enterprise resource planning within the technology-organization-environment framework: Taiwan’s communications industry”, *Journal of Computer Information Systems*, (48), 94-102.
- Pallant, J. (2011). *SPSS survival manual: A step by step guide to data analysis using SPSS*. Australia.
- Partland, S. and Afriyie, A. (2013). How electronic invoice could revolutionise public sector procurement.available at: <http://www.theguardian.com/public-leaders-network/2013/jan/14/einvoicing-public-sector-procurement>(accessed 19 Feb,2013)
- Pavlou, P. A. (2003). Consumer acceptance of electronic commerce: Integrating trust and risk with the technology acceptance model. *International Journal of Electronic Commerce*, 7 (3),69–103.
- Petter, Straub, and Rai. (2007). Specifying Formative Constructs in Information Systems Research. *MIS Quarterly*, 31(4), 623-656

- Pikkarainen, T., Pikkarainen, K., Karjaluoto, H., and Pahlila, S. (2004). Consumer acceptance of online banking: an extension of the technology acceptance model. *Internet research*, 14 (3), 224-235.
- Preacher, K. J. and Hayes, A. F. (2008), "Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models", *Behavior Research Methods*, 40 (3), 879-891.
- Premkumar, G., and Roberts, M. (1999). Adoption of new information technologies in rural small business. *OMEGA – International Journal of Management Science*, 27 (4), 467–484.
- Premkumar, G., K. Ramamurthy, N. Sree. 1994. Implementation of electronic data interchange: An innovation diffusion perspective. *J. Management Inform. Systems*, 1 (2), 157–186.
- Ramamurthy, K., G. Premkumar, M. R. Crum. 1999. Organizational and interorganizational determinants of EDI diffusion and organizational performance: A causal model. *J. Organ. Comput. Electronic Commerce*. 9(4), 253–285.
- Ramdani, B., Kawalek, P., & Lorenzo, O. (2009). Predicting SMEs' adoption of enterprise systems. *Management*, 22(1/2), 10–24.
- Rao Kowtha, N., & Whai Ip Choon, T. (2001). Determinants of website development: a study of electronic commerce in Singapore. *Information & Management*, 39(3), 227-242.
- Ranganathan, S., and Ganapathy, C. (2002). Key dimensions of business-to-consumer Web sites. *Information and Management*. 39 (6), 457-465.
- Revilla, M. A., Saris, W. E., and Krosnick, J. A. (2013). Choosing the number of categories in agree-disagree scales. *Sociological Methods and Research*, 43(14), 73–97.
- Ring, P. S., A. H. Van de Ven. 1992. Structuring cooperative relationships between organizations. *Strategic Management J.* 13(7), 483–498.

- Ringle, C. M., Wende, S., & Becker, J. M. (2015). SmartPLS 3. SmartPLS GmbH, Boenningstedt. *Journal of Service Science and Management*, 10(3).
- Rowe, F., Truex, D., & Huynh, M. Q. (2012). An empirical study of determinants of ecommerce adoption in SMEs in Vietnam: An economy in transition. *Journal of Global Information Management (JGIM)*, 20(3), 23–54.
- Safari, F., Safari, N., Hasanzadeh, A., and Ghatari, A. R. (2015). Factors affecting the adoption of cloud computing in small and medium enterprises. *International Journal of Business Information Systems*, 20(1), 116-137.
- Sarstedt, M., Ringle, C. M., Smith, D., Reams, R., and Hair, J. F. (2014). Partial least squares structural equation modeling (PLS-SEM): A useful tool for family business researchers. *Journal of Family Business Strategy*, 5(1), 105-115.
- Sandberg, K. W., Wahlberg, O., & Pan, Y. (2009). Acceptance of Electronic invoice in SMEs. D. Harris (Ed.): *Engin. Psychol. and Cog. Ergonomics*, pp. HCII 2009, LNAI 5639, pp. 289–296
- Sekaran, U. (2003). *Research methods for business: A skill building approach*. New York: John Wiley & Sons, Inc
- Scupola, A. (2003). The adoption of Internet commerce by SMEs in the south of Italy: An environmental, technological and organizational perspective. *Journal of Global Information Technology Management*, 6(1), 52–71.
- Shin, D. H. (2013). User centric cloud service model in public sectors: Policy implications of cloud services. *Government Information Quarterly*, 30(2), 194–203.
- Shirish, C.S. and Teo, T.S.H. (2010), “E-government, e-business, and national economic performance”, *Communications of the Association for Information Systems*, 26, 267-86.
- Son, J.Y., Narasimhan, S. and Riggins, F.J. (2005), “Effects of relational factors and channel climate on EDI usage in the customer-supplier relationship”, *Journal of Management Information Systems*, (22), 321-53.

- Sila, I. (2013). Factors affecting the adoption of B2B e-commerce technologies. *Electronic commerce research*, 13(2),199-236.
- Swanson, E.B. (1995), "Information systems management among organizations", *Management Science*, (40), 1069-92.
- Sparling, L., Toleman, M., & Cater-Steel, A. (2007). SME adoption of e-commerce in the Central Okanagan region of Canada. *ACIS 2007 Proceedings*, 95.
- Spiller, J., Vlastic, A., and Yetton, P. (2007). Post-adoption behavior of users of Internet Service Providers. *Information and Management*, 44 (6), 513-523.
- Summers, J. O. (2001). Guidelines for conducting research and publishing in marketing: From conceptualization through the review process. *Journal of the Academy of Marketing Science*, 29(4), 405-415.
- Tan, S.K., Chong, S.C., Lin, B. and Eze, U.C. (2008), "Internet-based ICT adoption: evidence from Malaysian SMEs", *Industrial Management & Data Systems*, (109), 224-44.
- Taylor, S. and Todd, P. A. (1995). Understanding Information Technology Usage: A Test of Competing Models. *Information Systems Research*, 6(2), 144-176.
- Taylor, P. (2019). Information and Communication Technology (ICT) adoption by small and medium enterprises in developing countries: The effects of leader, organizational and market environment factors. *International Journal of Economics, Commerce and Management United Kingdom*, 7(5).
- Teo, T.S., Srivastava, S.C. and Jiang, L. (2008), "Trust and electronic government success: an empirical study", *Journal of Management Information Systems*, 25 (3), 99-132.
- Teo, H.H., Wei, K.K. and Benbasat, I. (2003), "Predicting intention to adopt interorganizational linkages: an institutional perspective", *MIS Quarterly*, 27(1),19-49.
- Temme, D., Kreis, H., & Hildebrandt, L. (2006). PLS path modeling. Humboldt-Universität zu Berlin, Wirtschaftswissenschaftliche Fakultät.

- Thong, J.Y., 1999. An integrated model of information systems adoption in small businesses. *J. Manag. Inf. Syst.* 15 (4), 187–214.
- Thomson Reuters. 2010. Challenges and solutions for electronic billing. Available at: <http://www.elite.com/wpcontent/uploads/2013/09/900b79e16c02bf5f5dcd8b7c086ab5328.pdf>[accessed 11 February 2018]
- Tornatzky, L.G., Fleischer, M., 1990. The Process of Technological Innovation. Lexington Books, Lexington, MA.
- To, M.L. and Ngai, E.W.T. (2006), “Predicting the organizational adoption of B2C e-commerce: an empirical study”, *Industrial Management & Data Systems*, 106, 1133-47
- Van de Ven, A. H., and Ring, P. S. (2006). Relying on trust in cooperative inter-organizational relationships. *Handbook of trust research*, 144-164.
- Van Slyke, C., Belanger, F., and Comunale, C. L. (2004). Factors Influencing the Adoption of WebBased Shopping: The Impact of Trust. *Database for Advances in Information Systems*, 35 (2), 32-49.
- Venkatesh, V., and Bala, H. (2012). Adoption and consequences of Interorganizational Business Process Standards: Role of Partnering Synergy. *Information Systems Research*, 23(4), 1131-1157.
- Wang, Y.M., Wang, Y.S. and Yang, Y.F. (2010), “Understanding the determinants of RFID adoption in the manufacturing industry”, *Technological Forecasting & Social Change*, (77), 803-15.
- Wall, D. 2016. Finland and Denmark lead race to achieve EU electronic invoice goals. Nordic Business Forum [accessed 15 November 2017]. Available at: <https://www.nbforum.com/nbreport/finland-and-denmark-lead-race-to-achieve-eu-electronic-invoice-goals/>
- Wetzels, M., Odekerken-Schröder, G., and Van Oppen, C. (2009). Using PLS path modeling for assessing hierarchical construct models: Guidelines and empirical illustration. *MIS quarterly*, 33(1), 177-195.



- Wen, K. W., and Chen, Y. (2010). E-business value creation in Small and Medium Enterprises: a US study using the TOE framework. *International Journal of Electronic Business*, 8(1), 80-100.
- Winn, J. K., & Zhang, A. (2013). China's Golden Tax Project: A Technological Strategy for Reducing VAT Fraud. *Peking University Journal of Legal Studies*. 4, 1-33.
- Wright, P., Stern, J., & Phelan, M. (Eds.). (2012). *Core Psychiatry E-Book*. Elsevier Health Sciences.
- Yang, T.M., Zheng, L., and Pardo, T. (2012). The boundaries of information sharing and integration: A case study of Taiwan e-government. *Government Information Quarterly*, 29(1), S51-S60.
- Yang, H.-L. and Lin, S.-L. (2015), "User continuance intention to use cloud storage service", *Computers in Human Behavior*, 52, 219-232.
- Yu, C.-S., and Tao, Y.-H. (2009). Understanding business-level innovation technology adoption. *Technovation*, 29(2), 92-109.
- Zaheer, A., B. McEvily, and V. Perrone (1998). "Does Trust Matter? Exploring the Effects of Interorganizational and Interpersonal Trust on Performance," *Strategic Management Journal*, 9(2), 141–159.
- Zhang, B., & Wang, S. (2017). The influence of electronic invoice on tax collection and tax reform in China. *Journal of Tax Reform*. 2017. T. 3.№ 3, 3(3), 158-169.
- Zhiyan Consulting, Chinas market situation for electronic invoices and forecast for 2018-2024, (2018),available at:<http://www.chyxx.com/industry/201805/641328.html>.(Accessed 16 May 2018)
- Zhou, H., Wang, C., and Cao, M.,(2016), "Research on the Development Process and Implementation Method of Electronic Invoice in my country", *China Academic Journal Electronic Publishing House*.152,86-87.
- Zhu, K., Dong, S.T., Xu, S.X. and Kraemer, K.L. (2006), "Innovation diffusion in global contexts: determinants of post-adoption digital transformation of

European companies”, *European Journal of Information Systems*, 15 (6), 601-616.

Zhu, K., Kraemer, K., and Xu, S. (2006). The Process of Innovation Assimilation by Firms in Different Countries: A Technology Diffusion Perspective on EBusiness. *Management Science*, 52(10),1557-1576.

Zhu, K., Kraemer, K., & Xu, S. (2003). Electronic business adoption by European firms: a cross-country assessment of the facilitators and inhibitors. *European journal of information systems*, 12(4), 251-268.

Zhu K and Kraemer KL (2005) Post-adoption variations in usage and value of e-business by organizations: cross-country evidence from the retail industry. *Information Systems Research* 16(1), 61–84.

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