

E-Invoicing in The Austrian Retail Sector: How to Increase Consumer Willingness to Adopt the New Technology

Bachelor's Thesis

Submitted to Xavier Matteucci

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Vienna, June 6

Affidavit

I hereby affirm that this Bachelor's Thesis represents my own written work and that I have used no sources and aids other than those indicated. All passages quoted from publications or paraphrased from these sources are properly cited and attributed.

The thesis was not submitted in the same or in a substantially similar version, not even partially, to another examination board and was not published elsewhere.

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4 Abstract

The purpose of this thesis was to identify and analyze factors influencing consumer willingness of adoption regarding electronic invoicing on the Austria retail sector. Through purposive sampling, 78 participants answered a questionnaire related to the topic. The variables included in the questionnaire were derived from previous researches regarding electronic invoicing and consumer acceptance levels towards Information- and Communications Technology. All the hypotheses investigated displayed significant correlations. Perceived usefulness was found to be moderately correlated to consumer willingness of adoption ($r = .463$), therefore displaying the strongest correlation. The variable perceived ease of use was included in two questions of the questionnaire and displayed a moderate correlation ($r = .425$, $r = .305$). This finding implies a relative increase in impact of perceived ease of use on consumer behavior. The variables user awareness ($r = .251$) and perceived security ($r = .265$) displayed a small correlation to consumer willingness of adoption. The provision of electronic invoicing technology on smartphones displayed a moderate correlation to consumer willingness of adoption ($r = .418$), therefore manifesting the importance of providing easily accessible e-invoicing services.

Key Words: Electronic invoicing, consumer willingness to adopt, digital receipts

5 Introduction

In today's economy, digitalization plays an important role in improving efficiency and providing new technology through enabling open innovation. In Europe, the digital economy is currently growing at 7 times the rate of the rest of the economy, with digitalization affecting most of its sectors (European Commission, 2014). There is, however, a need for further digitalization of invoices in order to facilitate improvements in effectiveness, time savings and the reduction of CO2 emissions. This need can be met by the adoption of e-invoicing technology throughout Europe. Nienhuis and Bryant (2015) pointed out the substantial positive impact on the environment, enabled by a switch from paper invoicing to electronic invoicing, by stating that a 1% increase in the usage of e-invoicing technology in Europe would lead to an annual sparing of 800,000 trees. The European Commission (2010a) has analyzed factors influencing the up-take of electronic invoicing on a European level. Included in the study were barriers and solutions, as well as key actions that need to be taken by the European Union, in order to increase the willingness of consumers, as well as businesses, to adopt electronic invoicing (European Commission, 2010a). The Euro Retail Payments Board (2015) has previously analyzed the state of play of electronic invoicing in the retail sector, as well as core activities that need to be considered in order to drive European businesses and consumers towards using electronic invoicing technology. Davis (1989) and Hernandez-Ortega (2012) have analyzed multiple factors influencing consumer acceptance levels towards Information- and Communication Technology and, in turn, their willingness to adopt such technologies. However, the contextual frameworks from their studies focus on businesses and business environments, respectively. The research aims to derive the findings of prior researches and combine them with the findings from this research, in order to identify and evaluate the forces influencing consumer willingness to adopt electronic invoicing technology. The research question addressed in this thesis is how to increase consumer willingness to adopt electronic invoicing technologies, in the retail sector, in Austria. Austria represents an interesting case as it is currently a part of the central-European countries that are on the up-rise, when it comes to adopting e-invoicing technologies (Nienhuis & Bryant, 2015). There has been no prior research concerning this topic, especially considering the established focus on the Austrian retail sector. In order to fill the existing research gap, the researcher developed a

questionnaire and distributed it to a sample of 78 people, with the aim of using the gathered data to analyze 5 hypotheses, derived from previous studies. The investigated hypotheses aim to explain 5 main factors assumed to positively influence consumer willingness to adopt electronic invoicing technology. These Hypotheses are “There is a positive correlation between Perceived usefulness and willingness to adopt e-invoicing technology.”, “There is a positive correlation between Perceived ease of use and willingness to adopt e-invoicing technology.”, “There is a positive correlation between user awareness and willingness to adopt e-invoicing technologies.”, “There is a positive correlation between perceived security and willingness to adopt e-invoicing technologies.” and “There is a positive correlation between the provision of electronic invoicing services on smartphones and willingness to adopt electronic invoicing technologies.”

This thesis will discuss literature regarding the state of play of electronic invoicing technology in Europe and Austria, as well as the forces influencing the consumer’s willingness to adopt e-invoicing technology. Benefits as well as barriers and solutions, regarding e-invoicing will be discussed. The hypothesis development and methodology will follow the literature review. Then, Descriptive and inferential statistics, as well as results, will be presented. Lastly, the findings and limitations of this research will be discussed and concluded.

6 Literature Review

6.1 Definition of E-Invoicing

In the EU Council Directive 2014/55/EU, e-invoicing has been defined as "an invoice that has been issued, transmitted and received in a structured electronic format which allows for its automatic and electronic processing" (Euro Retail Payments Board, 2015). By definition, no paper document is involved.

6.2 State of Play and Adoption Rates

6.2.1 Europe

With more than 40 countries and legislation and over 100 languages spoken, the European market is very fragmented. However, moving towards e-invoicing is at the top of the European agenda and in order to increase e-invoicing adoption rates, the European Union is working on removing barriers and simplifying regulatory frameworks (Euro Retail Payments Board, 2016). These measures are part of the European Commission's flagship initiative "A Digital Agenda for Europe" which was established in 2010 (European Commission, 2010a).

Koch (2017) split the development of e-invoicing in the European Union into 4 phases. The initiation for electronic invoicing on a pan-European level was the isolated development of an early stage e-invoicing market, in each of the member states, by the solution- and service providers (Koch, 2017). Subsequently, e-invoicing became a key element of the digital agenda defined by the European Commission (2010a). The first national multi-stakeholder organizations were founded with the aim of supporting market development and harmonizing the services provided on, at least, national level (Koch, 2017). The European Commission then developed directives, with the aim of reducing barriers and increasing standardization of electronic invoicing (Koch, 2017). In 2014, the European Commission released two directives, which legally obligate more than 300,000 public administrations to support a certain standard of electronic invoicing technology from the end of 2018 and 2019, respectively (Koch, 2017).

Through the establishment of the European Multi-Stakeholder Forum on E-Invoicing, the European Union aims to connect stakeholders from national e-invoicing forums with market participants in order to promote e-invoicing in Europe. Additionally, the European Committee for Standardization is working on a standardized solution that can be used extensively throughout Europe (Euro Retail Payments Board, 2016). A European standard on E-Invoicing is fundamental in order to develop fully automated e-invoicing solutions which can be used on a pan-European level. Since 2016 e-invoicing is mandatory in procurement throughout the European Union. This measure was taken in order to accelerate the take up of e-invoicing technology and gain information on how to effectively harmonize core section of the electronic invoice (Euro Retail Payments Board, 2015).

Currently, there are more than 400 operating e-invoicing solution providers in Europe with only 50 achieving critical mass (Nienhuis & Bryant, 2010). This leads to an overlap in functionality and reach and creates problems concerning interoperability. However, eventually, the depth of manufacture is expected to settle at around 20-25% with solution providers focusing on specific functions that are then provided by specialists (Koch, 2017). Followed by the rapidly growing central – and western European countries, the Nordic states of Europe lead the way with adoption rates of up to 40% (Euro Retail Payments Board, 2015; Helgren & Tenhunen, 2010).

In 2017, the estimated volume of electronic invoices sent and received was 2 billion splitting in 1.3 billion generated through B2B transactions and 700 million drafted through B2C transactions. This figure represents € 4.5 trillion of total monetary value (OpusCapita Solutions, 2017). This implies a growth rate of 22 % over 2016. Between 2014 and 2015, the growth rate of e-invoicing was 23,44% and 33,13% on the B2B and B2C sector respectively (Euro Retail Payments Board, 2016). The need for a simple, high scale solution is inevitably obvious, as consumer demand concerning electronic invoicing is growing ever so strongly. This requires organized development, coordinated action and support at national and European level by the above-mentioned forums and the commission (Euro Retail Payments Board, 2016).

Currently, the European Multi-Stakeholder Forum on E-invoicing connects stakeholders from national e-invoicing forums with actors from the market (Euro Retail Payments Board, 2016) The aim of this measure is to support the European

Commission on all aspects of electronic invoicing and promote electronic invoicing at European level (Euro Retail Payments Board, 2016). Additionally, the European Committee for Standardisation is developing a European e-invoicing standard, which currently focuses on the B2B and B2G segments, but will be expanded to the B2C sector in the future (Euro Retail Payments Board, 2016).

The Euro Retail Payments Board (2016) addresses the possible future evolution of e-invoicing by stating various measures. Improving the coverage of electronic invoicing technology in countries with low levels of penetration is mentioned by the authors as a key measure to ensure pan-European success of electronic invoicing technology (Euro Retail Payments Board, 2016). Addressing the age group of 20 to 30-year old's, who display high levels of adoption of digital technologies, and responding to their needs and interests is another inevitable measure to increase adoption rates of e-invoicing across Europe (Euro Retail Payments Board, 2016). Along with the differing requirements on the different segments, the inclusion of e-invoicing technology in the Single Euro Payments Area needs to be considered (Euro Retail Payments Board, 2016).

Koch (2017) states that around 80 percent of larger companies, operating in advanced economies, are users of e-invoicing. Although, some of them might exchange only a small portion of their invoices digitally, they might have achieved good business cases (Koch, 2017). Currently, 30 percent of organizations are obliged, by either important trading partners or legislation, to exchange invoices digitally (Koch, 2017). This figure is expected to double by 2020 (Koch, 2017).

6.2.2 Austria

In Austria, e-invoicing is traditionally utilized by large companies. However, a standardized e-invoicing format, which is primarily aimed at SMEs, called "ebInterface" has emerged. E-Invoicing technologies continue to be heavily promoted on a national level by the Austrian Chamber of Commerce with ebInterface being improved progressively (Nienhuis & Bryant 2010). At the European level, Austria is recognized as an emerging and rapidly growing market for e-invoicing with adoption levels ranging from 10-30% (European Commission, 2010a).

6.3 Forces Influencing Adoption

6.3.1 Perceived Usefulness & Perceived Ease of Use

Perceived usefulness and perceived ease of use are two of the integral determinants of user acceptance (Davis, 1989). Usage behavior tends to be related to the extent to which the user perceives an enhancement in efficiency, enabled through using an application. However, even if the user perceives said application as useful, they might find the application to be too hard to use, which in turn can outweigh the perceived performance benefits (Davis, 1989). Through conducting qualitative research, Davis found that perceived usefulness is linked to usage significantly stronger than ease of use. He argues that whilst perceived difficulty of use can discourage users in adopting a technology or system that they perceive as useful, no amount of ease of use can neutralize the perceived un-usefulness of a technology or system. However, the easier a system or technology is perceived to use, the less effort is needed to operate it and the user base will, therefore, grow more quickly (Davis, 1989). Perceived usefulness and ease of use are frameworks that reflect the subjective opinion of people, rather than objective gains in efficiency (Davis, 1989). Therefore, the author states the importance of differentiating between perceived and actual performance - "even if an application would objectively improve performance, if users don't perceive it as useful, they're unlikely to use it." (Davis, 1989). Overall, Davis (1989) finds perceived usefulness and perceived ease of use to be highly influential in decisions to use information technology.

These findings are partly supported by Segars and Grover. However, they argue in favor of a third, underlying construct termed "Effectiveness" which acts as a control variable between job performance and effectiveness (Segars & Grover, 1993). The authors go on to argue that the concepts of perceived usefulness and perceived ease of use are very subjective and, therefore, hard to be measured objectively. Theoretical frameworks used must differ on a case-to-case basis considering the user base as well as the technology or system used (Segars & Grover, 1993). This finding supports a study conducted by Hauser and Simmie (1981), in which the authors argue that subjective ease of use overshadows objective ease of use when it comes to the users' decision-making. This argument is also mentioned by Davis (1989), who states the user's unwillingness to accept and use available technology as a hinderance of

objective performance gains. Davis (1989) goes on to mention self-efficacy and outcome beliefs as influential on decisions regarding Information- and Communications Technology. Additionally, the author mentions the cost-benefit paradigm as an important tool to explain people's choice among numerous decision-making strategies, in terms of effort required to employ a strategy and the quality of the resulting decision (Davis, 1989).

For consumers, the lack of a comfortable and easy to use solution is a considerable detriment in terms of willingness to adopt e-invoicing solutions (Euro Retail Payments Board, 2015). This finding is supported by Dahlberg & Öörni (2014), who argue that perceived ease of use influences willingness to adopt an innovation greatly.

Hernandez-Ortega (2012) mentions perceived usefulness as a main determinant of the willingness of non-users to adopt electronic invoicing. However, the author negates a correlation between perceived ease of use and the willingness of non-users to adopt electronic invoicing and argues that perceived ease of use effects only the user's willingness to continuously use e-invoicing technology (Hernandez-Ortega).

This leads to the development of the first and second hypothesis.

H1: There is a positive correlation between Perceived ease of use and willingness to adopt e-invoicing technology

H2: There is a positive correlation between Perceived usefulness and willingness to adopt e-invoicing technology.

6.3.2 Non-user Awareness

One of the most prominent barriers electronic invoicing adoption rates are hindered by is the limited knowledge about advantages and added value provided by the implication of such technology (Euro Retail Payments Board, 2015). This lack of awareness leads to low motivation with regards to adapting the innovation. In order to resolve this issue, the European Union is working on better communication of the benefits e-invoicing technology provides to consumers and businesses (Euro Retail Payments Board, 2015). On the one hand, this measure is supported by the provision of a coherent customer value proposition that responds to customer needs and

provides tangible benefits. On the other hand, providing a clear outlook of the benefits for businesses will support the efforts in tackling this barrier (Euro Retail Payments Board, 2016).

Awareness and use of technology on all levels were found to be a key force influencing the willingness of consumers towards using new technologies (Nienhuis & Bryant, 2010). Hernandez-Ortega (2012) captured the importance of non-user awareness by stating: “the adoption of an innovation begins with non-users' awareness of its existence...”. The Euro Retail Payments Board (2015) mentioned low levels of knowledge about the advantages provided by e-invoicing technologies as a main factor leading to low motivation and, therefore negatively affecting the consumer's willingness to adopt e-invoicing.

Generally, the influence of non-user awareness on the willingness of adopting e-invoicing is part of the pre-decision stage mentioned by Hernandez-Ortega (2012). In this stage, non-users actively or passively receive information about electronic invoicing. Simultaneously, they develop a favorable or unfavorable attitude towards the topic which influences their motivation, and ultimately their decision, to adopt, or not adopt e-invoicing (Hernandez-Ortega, 2012). Nienhuis and Bryant (2010) and the Euro Retail Payments Board (2015) state the necessity of increasing the efforts with regards to the communication of the benefits provided by electronic invoicing. Hernandez-Ortega (2012) furthermore mentions the post-decision stage, in which adopters decide whether to continue or stop using an innovation.

Moreover, the role of public administration as early adopters and the national – as well as the European – government as policymakers is not to be underestimated. Furthermore, population size negatively relates to ease of implementation – therefore the smaller the country, the easier it is to accomplish high adoption rates (Nienhuis & Bryant, 2010). It must be said that efforts towards increased adoption rates for e-invoicing need to be greatly supported by domestic governments (Nienhuis & Bryant, 2010). The Euro Retail Payments Board (2016) states a well-articulated value proposition, for all entities involved, regarding e-invoicing as one of the critical success factors regarding the up-take of electronic invoicing. This leads to the construction of the third hypothesis.

H3: There is a positive correlation between non-user awareness and willingness to adopt e-invoicing technologies.

6.3.3 Perceived Security

Dahlberg and Öörni (2007) describe the thus far failed attempts in meeting consumer needs when it comes to mobile payments and electronic invoicing. In their research, the authors identify trust – regarding privacy concerns and the safety of payments - as the most important factor that payment instruments need to provide to their consumers in order to increase adoption rates and support subsequent use of the technology offered. This finding is supported by Hernandez-Ortega, the author argues that besides perceived usefulness and compatibility, perceived security is one of the main factors that influence initial adoption. Hernandez-Ortega (2012) goes on to mention that security is one of the most important concerns regarding Information and Communications Technologies, and, therefore greatly influences non-user's willingness of adoption of e-invoicing technology. However, contrary to initial adopters, subsequent users pay less attention to perceived security. The author mentions the technological advances in recent years as a major step towards improving the levels security, regarding data as well as payment, regarding to e-invoicing (Hernandez-Ortega, 2012).

Kaliontzoglou et al. (2006) argue that perceived security influences trust, which is in turn, a major factor influencing consumer willingness to adopt e-invoicing technology. Lian builds on those findings by suggesting effort expectation and social influence as additional factors to trust in e-government and perceived risk when it comes to adapting e-invoicing technologies (Lian, 2015). With rising levels in cybercrime and low trust in payment-related networks, strict security requirements need to be fulfilled in order to ensure security and increase trust in the provided services (Kaliontzoglou, Boutsis & Bolemi, 2006; European Commission, 2010a). Through the examination of the influence of perceived security on willingness to adopt new technologies, the fourth hypothesis was developed.

H4: There is a positive correlation between perceived security and willingness to adopt e-invoicing technologies.

6.3.4 Cellphones for E-Invoicing

Cellphones are bound to becoming the globally favored method of payment (Nguyen, 2008). The potential of using cell phones – especially smartphones – to enable e-invoicing for consumers is not to be underestimated, as it builds upon the increasing ordinariness of using cellphones in other areas than receiving and making calls (Nguyen, 2008). This has the potential to provide the – as above mentioned – inevitably important accessibility consumers expect from an e-invoicing technology. This measure can be enhanced through the inclusion of additional features, such as the integration of e-commerce processes. Hernandez-Ortega (2012) mentions compatibility as a determining factor of non-user's willingness to adopt e-invoicing, as well as the user's willingness to continuously use the technology. Furthermore, adapting available solutions to the needs of the consumers is stated as necessary with regards to the consumer's willingness to adopt e-invoicing technology (Euro Retail Payments Board, 2016). The provision of electronic invoicing technology on the consumer's smartphone would also lower perceived complexity of use, which is mentioned as a main barrier of the uptake of e-invoicing by the Euro Retail Payments Board (2016). Additionally, the Euro Retail Payments Board (2016) mentions the availability of e-invoicing on smartphones, as well as tablets, as an important measure, promoting the uptake of electronic invoicing technology. Therefore, the researcher developed the fifth hypothesis:

H5: There is a positive correlation between the provision of electronic invoicing services on smartphones and willingness to adopt electronic invoicing technologies.

6.3.5 Blockchain for E-Invoicing

Blockchain has the potential to serve as a platform for value-added services regarding e-invoices like payment, recording or contracts (Koch, 2017). Although Blockchain technology is yet to be used by the general public, it might be relevant for new market participants or new topics such as hybrid models that combine blockchain with e-invoicing technology. Koch (2017) mentions blockchain as a particularly interesting topic for new market participants in very liberal countries, such as parts of North America, parts of Europe, Japan and the Pacific region. It is, however, unlikely that

Blockchain technology will replace B2B networks within the foreseeable future – rather it would complement and augment the technology in place (Koch, 2017).

6.3.6 Other Factors

The size of the service provider sector is to be recognized as an important factor concerning the adoption of e-invoicing technology (Nienhuis & Bryant, 2010). This alteration complies with the above-mentioned argument by Koch (2017) contra a bloated service provider market. However, in order to reach the potential of the innovation, the co-existence of strong service providers is indispensable (Nienhuis & Bryant, 2010). In their research, Vrcek and Magdalenic (2011) point out the importance of the public sector leading the way, when it comes to the adaptation of e-invoicing. The authors state that in turn, this may guide other organizations, sectors or even society toward adapting e-invoicing technology (Vrcek & Magdalenic, 2011). This can be accomplished through the development and promotion of an open source solution, which would mitigate potential high initial investments (Vrcek & Magdalenic, 2011). This finding is underlined by Nienhuis and Bryant (2010), who mention sector initiatives as one of the most important measures to take in order to positively influence the uptake of new technology.

In addition to the factors mentioned above, gender, age, education, income level, and profession have been identified as the main variables moderating willingness to adopt electronic invoicing. These variables also reflect upon the consumers' needs and abilities to adopt new technologies (Dahlberg & Öörni, 2007). Lian (2015) mentions age levels as a moderating variable between perceived risk and behavioral intention. Moreover, he states the mediating function of trust and perceived risk between behavioral intention and security concerns regarding e-government.

The European Commission (2010a) points out the creation of a single market is as the most important long-term goal concerning e-invoicing on a pan-European level. The measures set to reach this goal include the building of digital confidence for the users, and the ongoing reinforcing of a single market for telecommunication services (European Commission, 2010a). Furthermore, the authors underline the importance of making e-invoicing technology accessible for companies and the general public, which is supported by the above-mentioned statement by Vrcek and Magdalenic

(2011). One of the focal points to be considered is the enablement and simplifying of cross border transactions, which shall build upon the Single Euro Payments Area and reduce fragmentation along national borders (European Commission, 2010a).

6.4 Benefits

Wadsworth et al. (2010) stated that in a sample of 61 consumers, 70% have reported having no organized method for storing receipts. Furthermore, 60% of the participants have been reported to state that losing a receipt is frustrating to them. 30% of the studies' participants have been stated to believe that paper receipts are a growing environmental concern. Furthermore, adopting electronic invoicing technology is reported to increase efficiency levels and time savings, for consumers (Euro Retail Payments Board, 2015). Adoption of e-invoice technology can directly facilitate the elimination of the above-mentioned problems.

6.4.1 Efficiency, Cost & Environment

Through gains in efficiency and save costs in terms of postage, processing errors and raw materials needed, moving towards e-invoicing can lead to potential savings of up to € 240 billion, over a 6-year period, in Europe alone (European Commission, 2010b). Furthermore, e-invoicing technology leads to a reduction in failed payments and, therefore, penalty interest paid and – from a companies' point of view – improve customer relations. Efficiency gains especially affect companies through speeding up financial administration whilst reducing manual – error-prone – work, which enables a switch of focus from low productivity non-automated processing towards high output knowledge-based tasks (Hellgren & Tenhunen, 2010; Nienhuis & Bryant, 2010). This finding is supported by Koch (2017), who argues that manual data validation and updating represent highly inefficient and costly tasks. Furthermore, paper invoicing entails high operational costs for sender and receiver and high cost associated with preventing fraud (Nienhuis & Bryant, 2010). 20-30% of all paper invoices have been reported to be inaccurate (Koch, 2017). This issue can immediately be resolved, or at least improved by using the same electronic channel (Koch, 2017). Moreover, legal dispute handling can be conducted in a more efficient way. Furthermore, the highly ineffective storage and maintenance of thousands of paper receipts, merchants are legally obligated to keep, could be reduced significantly (Wadsworth, Guido, Griffin &

Mandil et al, 2010). Additionally, Wadsworth et al (2010) mention electronic invoicing as a potential source of competitive advantage for financial institutes.

Adopting e-invoicing technologies immediately leads to savings in CO2 emissions, and, therefore helps in reducing the ecological footprint of the users. More accurately put, a 1% increase in usage of e-invoicing leads to 800,000 trees being saved annually (Nienhuis & Bryant, 2010). In comparison to a paper invoice, an electronic invoice is, on average, four times more environmentally friendly (Hellgren & Tenhunen, 2010). In their research, Hellgren and Tenhunen stated that: "The best green solutions are beneficial not only for the environment but also for companies as they are cost-effective ways to respond to the needs of customers" which supports the findings by Nienhuis and Bryant (2010).

In addition to the above-mentioned benefits, e-invoicing will increase consumers' control over their finances, which will support them towards making better payment choices and increase the security of their payment through operating under a rather strict framework (Euro Retail Payments Board, 2015).

6.5 Other Barriers & Solutions

Today e-invoicing technologies are confronted with various barriers that hinder adoption, especially on a pan-European level.

Current solutions are often associated with high cost and complexity. Especially when considering the above-mentioned importance of SMEs in supporting mass adoption, the severity of this barrier becomes evident. The Euro Retail Payments Board (2016) pointed out that 80% of the solution and service providers operating in the e-invoicing sector reported that their consumer base – mainly consistent of SMEs and micro enterprises – consider the currently available solutions too expensive or too complex. Return on investment, naturally, is a key concern for businesses considering adoption of e-invoicing technology, therefore provision of open source solutions is a key aspect that needs to be considered in order to improve the business case of e-invoicing technology for SMEs (Vrcek & Magdalenic, 2011).

The lack of a common network for e-invoicing within the European Union leads to low interoperability and low levels of reachability (Euro Retail Payments Board, 2016;

European Commission, 2010b). This impediment is currently being worked on by the European Commission through the implementation of standardization initiatives, that aim to provide increased levels of interoperability (Euro Retail Payments Board, 2016). Furthermore, the reinforcement of a single market, connected through the above-mentioned common network directly enhances the open-access approach proposed by Vrcek & Magdalenic (2011) and helps alleviate cross border transactions (European Commission, 2010a).

In order to operate e-invoicing technologies on a European level harmonization of national legislative frameworks, such as law concerning digital signatures, is required (Kaliontzoglou, Boutsis & Bolemi, 2006; European Commission 2010b). In order to resolve this issue, the European Commission has implemented multiple directives dealing with coordinating legal frameworks throughout the European Union (Kaliontzoglou, Boutsis & Bolemi, 2006). The achievement of a single, pan-European, market directly enables the European population to make use of the immense potential embedded in the digital economy, which is currently growing at 7 times the rate of the rest of the economy (European Commission, 2014). The importance of overcoming this barrier is not to be underestimated, as stagnation leads to a comparative disadvantage and it harms every citizen, business and innovator in Europe. The aim of the European Union is to achieve a shift towards disruptive innovations and collaboration between different stakeholders (Koch, 2017).

7 Hypotheses

Quantifiable variables that can help answer the research question have to be identified. Since the purpose of this research is to find out to which extent the factors perceived ease of use, perceived usefulness, customer awareness and perceived security influence consumer willingness of adopting electronic invoicing services. These factors represent the independent variable of each of the hypotheses. Correspondingly, the dependent variable in each hypothesis is consumer willingness to adopt electronic invoicing.

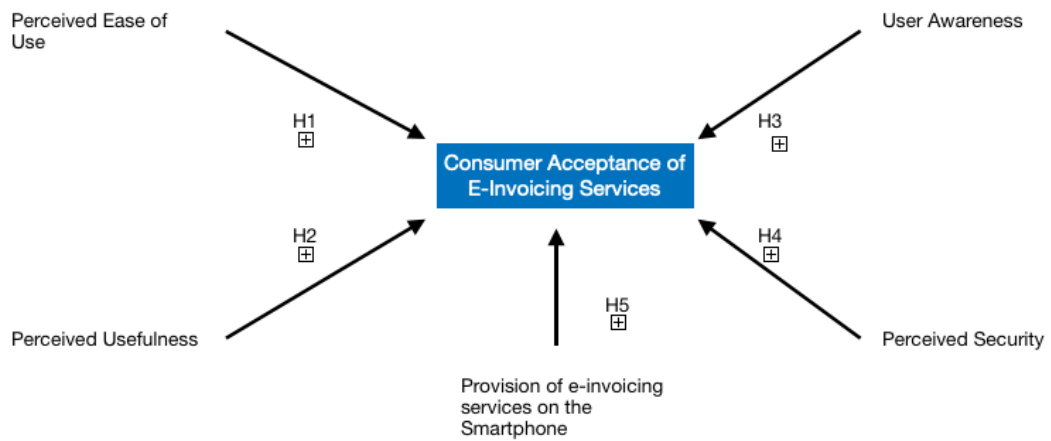


Figure 1 – Conceptual Model

The research implies that the above listed factors will positively influence consumer acceptance of E-Invoicing services.

The null hypothesis states that there will be no relation between any of the factors listed above and consumer acceptance of E-Invoicing services.

8 Methodology

As the research question and hypotheses examine a descriptive relationship, the research approach is quantitative, empirical. Quantitative research is characterized by the usage of formal, standard questions with predetermined response options. Through using a cross sectional research design, advantages provided by a quantitative research approach can be combined with data gained from analyzing a population at a specific point in time, with the aim of validating relationships between different variables and, in turn making accurate predictions about consumer behavior.

To collect the relevant data, a questionnaire was handed out to a sample of 78 people. The questionnaire was drafted by the author based on existing literature by Davis (1989), Hernandez-Ortega (2012), Nguyen (2008), Dahlberg and Öörni (2014) and the Euro Retail Payments Board (2016). It was handed out in physical or electronic format to students at MODUL University Vienna, FH Krems and FH Salzburg which can be referred to as convenience sampling. This approach was chosen due to the importance of meeting the needs and expectations of highly educated people, falling within the age group of 20-30, in order to achieve mass adoption of electronic invoicing (Euro Retail Payments Board, 2016). Through convenience sampling, data collection was speedy and cost effective. A factor analysis was used to validate the constructs that consist of more than one variable. The scales used were a Likert scale from with 7 scale points per answer and nominal binary scales for yes or no answers and gender. The possible answers for the questions involving a Likert scale was coded chronologically (i.e. 1 = fully disagree, 7 = fully agree), whilst the response options involving a nominal binary scale were coded with 0 and 1 respectively (0 = male; no 1 = female; yes). This process was enhanced by using an online survey, which enables the researcher to receive feedback from a large sample on relatively short notice. Furthermore, online surveys were found to increase response rates and honesty in the consumer responses, in comparison to written questionnaires (Evans & Mathur, 2005).

The collected data was analyzed through the usage of PSCP and SPSS software. Spearman correlation analysis were used to proof the hypotheses. Anonymity in data collection ensured non-biased data evaluation and confidentiality of data. Results

were summarized in an objective, statistical manner. Descriptive and inferential statistics were used to analyze the data.

9 Descriptive Statistics

9.1 Gender

The graph below shows the gender distribution of the participants. 24,4 % of the participants were males, whilst 75,6% were females.

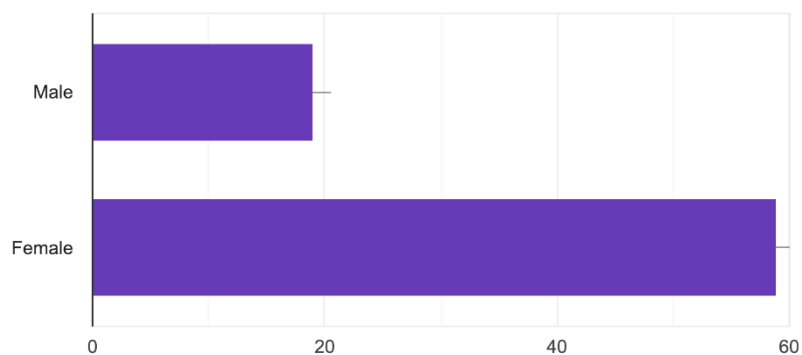


Figure 2 - Gender

9.2 Age

The age of the participants is between 18 and 47 years, with the majority being in their early to mid-twenties.

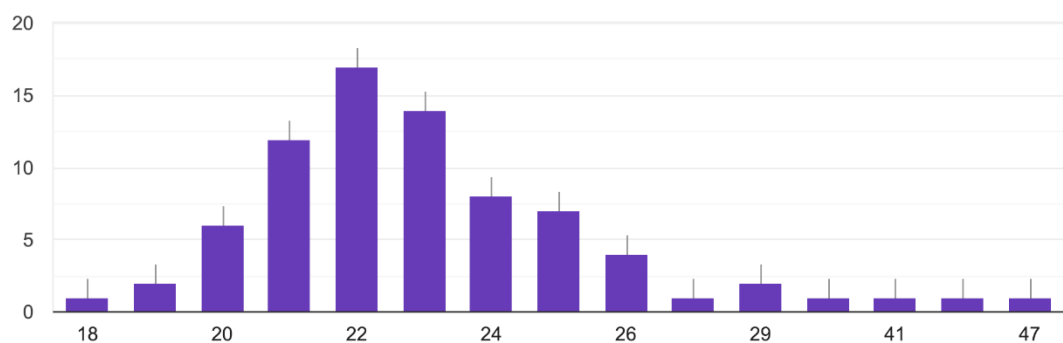


Figure 3 – Age

9.3 Usage of Digital Technologies

65 % of the participants stated that they use digital technologies “very regularly”.

Mean Score	6.269230769
Standard Deviation	1.429495206
N	78

Table 1 - Usage of Digital Technologies

(1 – Not at All, 7 – Very Regularly)

10 Inferential Statistics

Hypothesis 1: There is a positive correlation between Perceived ease of use and willingness to adopt e-invoicing technology.

The mean score and standard deviation can be found in the table below:

	Mean Score	Standard Deviation	N
Q1	2.678970944	0.83454311	78
Q2	2.661357223	0.837247463	78
Q12*	2.038251186	1.294587826	78

Table 2 – Hypothesis 1

(1 – Strongly Agree, 7 – Strongly Disagree)

*In general, I am open to adapt electronic Invoicing.

Results of the Spearman correlation analysis can be found in the following tables:

Q1: I expect electronic invoicing to be easy to use.

Correlation Coefficient	1.000	.425
P		0.000
N	78	78

Table 3 – Hypothesis 1

Q2: I expect electronic invoicing services to be easily accessible.

Correlation Coefficient	1.000	.305
P		0.003
N	78	78

Table 4 – Hypothesis 1

The hypothesis was tested through 2 questions in the questionnaire. According to the tables, it can be stated that hypothesis 1 has a moderate and significant correlation coefficient. The null hypothesis can be rejected. Thus, perceived ease of use positively influences the willingness of potential customers to adopt electronic invoicing.

Hypothesis 2: There is a positive correlation between Perceived usefulness and willingness to adopt e-invoicing technology.

The mean score and standard deviation can be found in the table below:

	Mean Score	Standard Deviation	N
Q3	2.674893512	0.799929851	78
Q12*	2.038251186	1.294587826	78

Table 5 – Hypothesis 2

(1 – Strongly Agree, 7 – Strongly Disagree)

*In general, I am open to adapt electronic Invoicing.

Q3: I expect electronic invoicing to be a more efficient way of receiving receipts on a daily basis.

Results of the Spearman correlation analysis can be found in the following table:

Correlation Coefficient	1.000	.463
P		0.000
N	78	78

Table 6 – Hypothesis 2

Thus, it can be reported that hypothesis 2 has a moderate and significant correlation coefficient and the null hypothesis can be rejected. This finding shows, that perceived usefulness is positively related to the willingness to adopt electronic invoicing services. Therefore, the null hypothesis can be rejected.

Hypothesis 3: There is a positive correlation between user awareness and willingness to adopt e-invoicing technologies.

The mean score and standard deviation can be found in the table below:

	Mean Score	Standard Deviation	N
Q10	2.730791853	0.808972034	78
Q11	2.755169203	0.812131917	78
Q12*	2.038251186	1.294587826	78
Q13	2.779546553	0.81529548	78

Table 7 – Hypothesis 3

(1 – Strongly Agree, 7 – Strongly Disagree)

*In general, I am open to adapt electronic Invoicing.

The hypothesis was tested through including the variable “user awareness” in 3 separate questions and afterwards concluding the answers through a factor analysis. Subsequently, the factor score for each of the questions was calculated. Then, the regression was calculated from the factor score.

Q10: Prior to this study, I have heard about electronic invoicing.

Q11: I know about the benefits provided through electronic invoicing.

Q13: I am aware of the environmental impact caused by paper invoicing.

Results of the Spearman correlation analysis can be found in the following table:

Correlation Coefficient	1.000	.251
P		0.013
N	78	78

Table 8 – Hypothesis 3

Therefore, it can be said that hypothesis 3 has a small but significant correlation coefficient. Therefore, the null hypothesis can be rejected. This finding shows that the willingness of potential customers to adopt electronic invoicing is lightly correlated to customer awareness.

Hypothesis 4: There is a positive correlation between perceived security and willingness to adopt e-invoicing technologies.

The mean score and standard deviation can be found in the table below:

	Mean Score	Standard Deviation	N
Q5	2.85336987	0.82591007	78
Q6	2.865767907	0.812445855	78
Q12*	2.89262834	0.795968152	78

Table 9 – Hypothesis 4

(1 – Strongly Agree, 7 – Strongly Disagree)

*In general, I am open to adapt electronic Invoicing.

The hypothesis was tested through including the variable “perceived security” in 2 separate questions:

Q5: I expect increased measures in terms of data security when using electronic invoicing.

Correlation Coefficient	1.000	.265
P		0.010
N	78	78

Table 10 – Hypothesis 4

Q6: I expect increased safety of payment through the use of electronic invoicing.

Correlation Coefficient	1.000	.309
P		0.003
N	78	78

Table 11 – Hypothesis 4

It can be stated that both correlations tested hypothesis 4 had a small but significant correlation coefficient. The null hypothesis can be rejected. Thus, perceived security lightly influences customer’s willingness to adopt electronic invoicing.

Hypothesis 5: There is a positive correlation between the provision of electronic invoicing services on smartphones and willingness to adopt electronic invoicing technologies.

The mean score and standard deviation can be found in the table below:

	Mean Score	Standard Deviation	N
Q16	2.220779221	1.456594592	77
Q12*	2.038251186	1.294587826	78

Table 12 – Hypothesis 5

(1 – Strongly Agree, 7 – Strongly Disagree)

*In general, I am open to adapt electronic invoicing.

44% of the participants strongly agreed to the statement that the provision of E-Invoicing services on their Smartphones would increase their willingness to use such services. Another 22% somewhat agreed to this statement.

Q16: The provision of e-invoicing services on my smartphone would increase my willingness to use such services.

Correlation Coefficient	1.000	.418
P		.000
N	77	77

Table 13 – Hypothesis 5

It can be stated that hypothesis 5 has a moderate and significant correlation coefficient. Therefore, the null hypothesis can be rejected. Thus, provision of e-invoicing services on smartphones positively influences the willingness of potential customers to adopt electronic invoicing.

11 Discussion

The purpose of this study was to investigate the relationship and potential correlation between perceived ease of use, perceived usefulness, user awareness, perceived security, the provision of e-invoicing technology on smartphones and willingness to adopt e-invoicing technologies. All the correlations were hypothesized to be positive. All the hypotheses tested were found to display significant correlations. Furthermore, insights on the state of play, concerning e-invoicing technology, in Austria, could be gained. Therefore, it can be said that the effort was successful.

The variables used in this study were derived from several previous studies. Some of them had to be adjusted slightly to fit the purpose of this research. The variable “willingness to adopt electronic invoicing” was derived from Davis’ variable “user acceptance levels of Information Technology” (Davis, 1989). Davis stated the variable “user acceptance levels of Information Technology” as a combination of willingness to adopt and continuously use a technology, whereas this study primarily deals with the factors that influence the consumer’s willingness to adopt electronic invoicing (Davis, 1989). Therefore, “willingness to adopt electronic invoicing” is defined as “the extent to which non-users are eager to adopt electronic invoicing technology”. The variable “perceived ease of use” was derived from Davis’ study concerning correlation between perceived usefulness, perceived ease of use and user acceptance of Information Technology (Davis, 1989) and Hernandez-Ortega's study concerning key factors for the adoption and subsequent use of e-invoicing (Hernandez-Ortega, 2012). Hernandez-Ortega (2012) defines perceived ease of use as “the degree to which the firm can effortlessly use an information and communications technology”. Davis (1989) defines perceived ease of use as “the degree to which a person believes that using a particular system would be free of effort”. In this study, the variable “perceived ease of use” is defined as “the extent to which consumers perceive electronic invoicing technology as effortless in use”. The variable “perceived usefulness” was defined by Davis as the extent to which people believe an application will help them perform better at their job (Davis, 1989). A similar construct was used by Hernandez-Ortega (2012). However, Hernandez-Ortega's research refers to the key factors for adoption and subsequent use of e-invoicing applicable to companies. Like the first variable, the second variable used in this study was adjusted with regards to

the different contexts. In this research, “perceived usefulness” is defined as “the extent to which consumers perceive electronic invoicing technology to provide increased levels of efficiency to their lives”. Therefore, the variable used in this study is more subjective and a matter of personal preference rather than performance numbers. The development of this rather subjective variable is supported by a study conducted by Hauser and Simmie (1981). The variable “user awareness” was derived from studies conducted by Nienhuis and Bryant (2010) and Hernandez-Ortega (2012), in this research, the variable is defined as “the consumers’ recognition of the existence of electronic invoicing technology and its benefits, both personally and environmentally”. The variable “perceived security” was derived from studies by Dahlberg and Öörni (2007) and Hernandez-Ortega (2012). In this research, it is defined as “the extent to which consumers perceive electronic invoicing technology as a secure way of receiving invoices”. The variable “provision of e-invoicing services on smartphones” was derived from a research by Nguyen (2008) and aims at testing the impact of the provision of electronic invoicing technology on the consumer’s smartphones on their willingness to adopt electronic invoicing.

To ensure the validity of the findings, Cronbach alpha reliability was .95 for all the correlations tested. Through reviewing literature, the researcher came to the assumption that the correlation between the factors mentioned above would be positive. Therefore, the hypotheses were tested through conducting a one-tailed, binary Spearman correlation.

The first hypothesis, investigated by the researcher, tested the correlation between the variables “perceived ease of use” and “willingness to adopt electronic invoicing”. The variables tested were included in two questions in the questionnaire, and for both, the correlation coefficient was found to be moderate and significant with correlations of .425 and .305 respectively. This finding contrasts Hernandez-Ortega’s finding that perceived ease of use does not have a significant effect on the users’ decision to adopt electronic invoicing technology (Hernandez-Ortega, 2012). However, it can be argued that Hernandez-Ortega’s study relates to the usage of electronic invoicing in companies, rather than personal use (Hernandez-Ortega, 2012). Another factor that could potentially have led to the difference in correlation is the slight adjustment of the variable “perceived ease of use”. Davis (1989) argues

in support of this finding, by mentioning perceived ease of use as one of the most important factors influencing consumer acceptance of Information- and Communications Technology. In comparison to Davis' (1989) findings, regarding the importance of perceived ease of use in comparison to the importance of perceived usefulness, perceived ease of use was found to have radically increased its impact on consumer willingness to adopt electronic invoicing, in this study. The researcher attributes this finding towards advancements of technology in general, over the last two decades and the different contextual framework of the study. Additionally, the increased impact of perceived ease of use on consumer behavior could be explained by the difference in age groups of the participants involved in Davis' and this study, respectively. Davis' does not specify a specific age group as the target population of his study, however, with regards to the context of his study, it can be assumed that the average age of the participants in his study was significantly higher than the average age of participants in this study (Davis, 1989). Studies by the Euro Retail Payments Board (2015) and Dahlberg and Öörni (2007) argue in favor of the high importance of ease of use as a driver of consumer willingness to adopt new technologies. However, it must be stated that no amount of ease of use would drive consumers towards using new technologies if they do not perceive them as somewhat useful in the first place (Davis, 1989).

The second hypothesis investigated the correlation between the variables "perceived usefulness" and "willingness to adopt electronic invoicing". The correlation coefficient of the variables tested was found to be moderate with a correlation of .463. This finding confirms Davis' argument of perceived usefulness overshadowing perceived ease of use in relation to future usage of Information- and Communications Technology (Davis, 1989). Regarding the significantly lower levels of correlation found in this study, it can be assumed that through the advancements in information technologies over the last two decades, today's users expect a certain level of usefulness of a new technology, or innovation in general. This goes hand in hand with the assumption that today, information technologies are, in general, more widely accepted and perceived as useful, than in the year 1989. Therefore, the author argues that perceived usefulness has lost impact on consumer behavior through the increased standards of usefulness a new technology is expected to provide to the consumer. The slight adjustment of the variable perceived usefulness, as well as the

different contextual framework, are assumed to be another factor for the lower levels of correlation found in this study. Hernandez-Ortega (2012) mentions perceived usefulness as a deciding variable of the willingness of non-users to adopt an innovation. The author additionally states a positive impact of perceived usefulness on the willingness of adopters to continue to use a technology (Hernandez-Ortega, 2012).

These findings show, that the factors perceived ease of use and perceived usefulness both need to be considered heavily in relation to the consumer's willingness to adopt a new technology. Davis stated that "with all else being equal, the easier a system is to interact with, the less effort needed to operate it, and the more effort one can allocate to other activities..." (1989). This statement can, overall, be confirmed by the researcher. Thus, a new technology necessarily needs to be perceived as useful in order to achieve high levels of adoption. However, if a technology is perceived as difficult to use, the potential users are less likely to adopt it, even if it objectively would improve their performance or efficiency levels (Davis, 1989; Hauser & Simmie, 1981). This finding is also supported by Hill, et al. (1987), who found self-efficacy and outcome beliefs to influence the decision to learn a computer language. The variables used build a similar construct as the ones used in Davis' and this study. The results of their researches' construct differ highly depending on the contextual framework, which could be another explanation of the findings of the differences in correlation coefficients found in this study (Hill, et al., 1987). Additionally, it must be mentioned that, relative to the influence of perceived usefulness, perceived ease of use had a significantly larger impact on the participant's willingness to adopt electronic invoicing in this study, than in any of the previous studies discussed in the literature review. This finding must be considered heavily, in order to increase the acceptance levels, of the general public, towards electronic invoicing, in Austria.

The Euro Retail Payments Board (2015) mentioned relatively low levels of knowledge about the advantages provided by electronic invoicing technologies as a main factor for low motivation in terms of switching towards electronic invoicing. And although, 78% of the participants of this study answered in agreement of the statement "prior to this study, I have heard about electronic invoicing", it must be mentioned that in confirmation of the statement provided above, awareness levels of the participants

in this study, regarding the benefits e-invoicing, were rather low. The mode of the answers was centered around rather neutral value 3 with 29.5 % of the participants answering either neutral or in disagreement of the statement “I know about the benefits provided by electronic invoicing”.

In this study, consumer awareness was found to have a light, positive correlation to the consumers’ willingness to adopt electronic invoicing technology. This finding is supported by Nienhuis & Bryant’s (2015) statement that improving the general awareness of the benefits provided by e-invoicing is an important measure when trying to increase the consumers’ willingness to adopt e-invoicing. However, it is hereby important to mention that the author chose to split the variable into three separate variables – the awareness of the existence of electronic invoicing, the awareness of the benefits provided through electronic invoicing and the awareness of the environmental impact caused by paper invoicing. As mentioned in the results section of this research, these variables were included in a factor analysis, from which the correlation was tested. The awareness of the benefits provided through electronic invoicing displayed the highest factor score, which leads the researcher to assume that it is correlated to the consumers’ willingness to adopt e-invoicing the strongest out of the three factors. This finding is supported by Nienhuis & Bryant (2015) and the Euro Retail Payments Board (2016) who state relatively low levels of consumer awareness regarding e-invoicing and its benefits as a main barrier of e-invoicing all throughout Europe. And although most of the participants of this study claimed to know what electronic invoicing is, they seem to underestimate the added value e-invoicing could provide to their lives through time savings and increased efficiency regarding personal finances and the storing of receipts (Euro Retail Payments Board, 2015, Nienhuis & Bryant, 2010). Another assumed factor leading to relatively low levels of consumer awareness, with regards to the benefits provided through electronic invoicing, is the familiarity of traditional invoices to the consumers. It can be assumed that nearly all the participants in this study have received paper invoices for the vast majority of purchases they have made over the last decade. This could lead to them perceiving electronic invoicing as unnecessary, and, therefore create a bias towards an unwillingness to adopt the new technology. Due to this assumed bias, the participants might not be interested in the objective benefits provided by e-invoicing, which could explain the relatively low levels of awareness. This argument is

especially applicable to the older part of the generation. Therefore, the author recognizes increasing communicational efforts regarding the benefits provided through e-invoicing as a necessary measure towards increasing the consumer's willingness of adoption. Regarding the relatively high levels of awareness, concerning the existence of electronic invoicing, the researcher argues that this finding is mainly due to the use of e-invoicing by e-commerce platforms. Therefore, each of the participants that, at some point, bought a product online, was likely to receive an electronic invoice. This general awareness is the first step towards increasing the consumer's acceptance levels of e-invoicing and ultimately their willingness to adopt the technology. Hernandez-Ortega argues in support of this logic by stating "the adoption of an innovation begins with non-users' awareness of its existence...". The researcher argues that in this aspect it is important to raise awareness of the possibilities provided by e-invoicing and its possible areas of use and, simultaneously, extend the usage of electronic invoicing, on the B2C sector, from mostly e-commerce to other sectors, such as retail. The third variable included in the factor analysis was the participant's awareness of the environmental impact caused by paper invoicing. This variable had the lowest factor score of the three, implying the smallest correlation to the variable "willingness to adopt e-invoicing". This finding seems especially considerable when reflecting upon this researches' finding of 51% of the users answering in agreement of the statement "I am aware of the environmental impact caused by paper invoicing". The researcher assumes that the relatively low factor score is mainly influenced by the sheer scale electronic invoicing in the retail sector would be operating on. Following this assumption, the participants may believe they know about the environmental impact caused by paper invoicing, however in reality it might be difficult for them to grasp the volume of paper invoices issued in Austria every day and the impact induced on the environment (Hellgren & Tenhunen, 2010). The researcher argues that, in order to increase consumer willingness to adopt electronic invoicing, it is important to further educate consumers about the environmental benefits electronic invoicing provides, in comparison to paper invoicing.

These findings show that user awareness influences consumer willingness to adopt e-invoicing considerably. The Euro Retail Payments Board (2015) and Hernandez-Ortega (2015) have mentioned user awareness as one of the main factors influencing the take

up of a new technology. This finding can be confirmed by the researcher. However, unlike in other researches, in this research, user awareness was split into three factors. This measure allowed for more detailed insights into the otherwise very broadly definable variable user awareness.

The fourth hypothesis tested the correlation between perceived security and consumer willingness to adopt electronic invoicing technology. The variables were included in two questions of the questionnaire, regarding the importance of increased measures of data security, and the importance of increased security of payments, to the participants, respectively. Both correlations tested displayed small, positive and significant correlation coefficients, with the variable “safety of payment” portraying a slightly stronger correlation coefficient. These findings are supported by prior studies conducted by Lian (2014) and Kaliontzoglou et al (2006). Both studies argue that increasing measures regarding the safety of payment and data security is inevitable, to gain consumer trust, and, therefore increase their willingness to adopt electronic invoicing technology. This measure is to be considered especially when considering the rising levels of cybercrime and the low levels of trust in payment-related networks reported by the European Commission (2010a). Hernandez-Ortega (2012) supports these findings by arguing that data security is one of the most important concerns with information - and communications technology. The researcher goes on to mention low levels of perceived security as one of the main barriers of increasing levels of willingness to adopt electronic invoicing (Hernandez-Ortega, 2012). Although researching in the context of companies, Hernandez-Ortega's results, concerning the effect of perceived security on the willingness to adopt e-invoicing technology, are similar to the ones found in this research (Hernandez-Ortega, 2012).

These findings lead to the assumption that, in order to increase consumer willingness to adopt electronic invoicing technology, the provision of a technology that provides high levels of data security and safety of payments is necessary. This assumption is supported by the European Commission (2010a). The process is supported by the strict regulations concerning e-invoicing implied on a national and pan European level (Kaliontzoglou et al, European Commission 2010a). Therefore, the necessary measures are already being taken and will be extended with increasing levels of

adoption, which should lead to higher levels of perceived security (European Commission 2010a).

Lastly, the correlation between the provision of electronic invoicing services on smartphones and willingness to adopt electronic invoicing technologies was tested. The results showed a moderate, positive and significant correlation. This finding is supported by Nguyen (2008), who argues that the provision of e-invoicing services on smartphones would lead to digital receipt technology becoming more widely accepted, and, therefore increase consumer willingness of adoption. Various authors state that the provision of easy-to-use technologies is a major step towards achieving mass adoption of e-invoicing technologies, and, therefore argue in support of increased implementation of smartphones in the electronic invoicing process (Euro Retail Payments Board, 2015; Dahlberg & Öörni, 2014). This finding is supported by Hernandez-Ortega (2012), who stated compatibility as one of the determining factors for non-user's willingness to adopt electronic invoicing technology. And although, Hernandez-Ortega researches in the contextual framework of corporations, this finding can easily be derived to the context of consumers. The Euro Retail Payments Board (2016) found high perceived complexity to be one of the main barriers leading to low levels of consumer willingness of adoption, regarding e-invoicing. These findings are directly connected to the second hypothesis, regarding perceived ease of use. The researcher argues that the implementation of smartphones in the e-invoicing process would lead to higher levels of perceived ease of use and, in turn, higher willingness of adoption. Additionally, like Nguyen (2008), the researcher assumes a positive influence on consumer acceptance and willingness of adoption through the integration of the relatively new technology – electronic invoicing – in a tool most of the participants of this study use daily – the smartphone. Furthermore, the provision of e-invoicing services on smartphones is assumed to make the technology more widely accessible, therefore positively influencing an uptake of electronic invoicing.

12 Conclusion

The objective of this study was to explore and analyze factors influencing consumer willingness of adoption, of electronic invoicing technology, in the retail sector, in Austria. The author reviewed previous researches on the topics of electronic invoicing,

as well as factors that influence user acceptance and their levels of willingness, regarding the adoption of new information technologies. After developing five hypotheses related to the literature review, a questionnaire was developed and distributed to a sample of 78 people. All the hypotheses tested in this study held significant correlations. Perceived ease of use was found to be moderately correlated to consumer willingness to adopt electronic invoicing. This finding is supported by Davis (1989). However, it must be pointed out that perceived ease of use displayed a significantly higher correlation coefficient in comparison to previous studies by Davis (1989) and Hernandez-Ortega (2012). The researcher argues that the high levels of impact perceived ease of use displayed on willingness to adopt e-invoicing are influenced by the technological advancements over the last two decades and the differences in age groups included in Davis' (1989), Hernandez-Ortega's (2012) and this study, respectively. Therefore, it can be concluded that consumers want a technology, low in complexity and easy to use in their everyday lives. Perceived usefulness was found to be most correlated to consumer willingness to adopt e-invoicing most strongly. This finding is in support of Davis' (1989) and Hernandez-Ortega's (2012) findings regarding user acceptance of information technology and the key factors for the adoption and subsequent use of e-invoicing, respectively. However, the correlation coefficient of perceived usefulness found in this study was significantly lower than in previous studies. The author argues that this is partly influenced by the higher standards of usefulness for new technologies, induced by the general technological advancement. This argument is to be considered especially in relation to Davis' (1989) findings from two decades ago. User awareness displayed a small, positive correlation. The researcher chose to split the variable up into three parts to get a more detailed understanding - the awareness of the existence of electronic invoicing, the awareness of the benefits provided through electronic invoicing and the awareness of the environmental impact caused by paper invoicing. Followed by the awareness of the existence of electronic invoicing technology and the awareness of the environmental impact caused by paper invoicing, consumer awareness of the benefits provided through electronic invoicing displayed the highest factor score of the three sub-variables. It is hereby important to mention the high levels of awareness of the existence of electronic invoicing and awareness of the environmental impact of paper invoicing found through analyzing the questionnaire. These findings are

contrasted by low levels of awareness regarding the benefits provided through electronic invoicing. Therefore, the low level of correlation found is argued to be related to the participant's low levels of awareness of the benefits provided through electronic invoicing, as mentioned in the discussion. In conclusion, findings by the Euro Retail Payments Board (2015) and Nienhuis and Bryant (2010), regarding the impact of consumer awareness regarding the benefits provided through electronic invoicing on the willingness to adopt e-invoicing are supported by this study. Like consumer awareness, perceived security was split into sub-variables. The researcher chose to split the variable into two separate variables – perceived security regarding data security and perceived safety of payment. The correlations were tested independently. Both displayed small, positive correlations coefficients, with perceived safety of payment displaying a slightly stronger correlation coefficient than perceived data security. This finding is supported by Lian (2014) and Kaliontzoglou et al (2006) and further proves the necessity of increased measures regarding data security and safety of payment, with regards to increasing consumer willingness of adoption of e-invoicing. Lastly, the provision of e-invoicing services on the consumer's smartphone displayed a moderate, positive correlation to their willingness to adopt electronic invoicing technology. It is hereby important to address the relatively high correlation coefficient. The correlation found was second only to perceived usefulness, displaying a higher correlation coefficient than perceived ease of use, consumer awareness and perceived security. This finding demonstrates the increasing importance of the smartphone in the consumer's daily life and builds upon findings by Ngueyn (2008). Concludingly, the focus shall be laid upon the provision of useful, easy-to-use solutions, which provide high levels of security in order to ensure personal data protection (Euro Retail Payments Board, 2015; European Commission, 2010b). Additionally, non-users shall be made aware of the benefits provided through electronic invoicing. Smartphones shall be considered an enabler and driver of mass adoption of e-invoicing technologies, especially considering the continuously rising penetration rates in smartphone usage throughout Europe (Nguyen, 2008; Statista, 2019). However, customers with limited or no access to the internet need not be left behind and provided with paper invoices if required (European Commission, 2010b). Although this study has provided up to date insights into what drives consumer's towards adopting electronic invoicing technology, a great need for future research on

the topic of electronic invoicing, on the European level, regarding consumers and businesses, was found by the researcher. Regarding the finding of the gain in effect of perceived ease of use on consumer willingness to adopt e-invoicing, the researcher recommends for future research to further investigate the topic.

13 Limitations

This study has been facing several limitations. The sample size of 78 participants conducted through the questionnaire of this study makes it difficult to generalize on the general Austrian population. Although, the highly educated part of the population, aged between 20 and 30, has been mentioned as the most important target group, to achieve mass adoption of e-invoicing, by the Euro Retail Payments Board (2016), the convenience sampling approach used in this study disallows for the generalization of its findings. Additionally, this study analyzes only one country. As mentioned in the literature review, the differences in legal frameworks and the lack of homogeneity of e-invoicing services provided throughout the European Union impede a generalization of the findings of this study. Gender, age, education, profession and income level have been detected to influence consumer behavior, by previous literature (Dahlberg & Öörni, 2014). In this study, however, through the implication of convenience sampling, age, education, profession and income level have been rather similar throughout the sample.

14 Managerial Implications

Electronic invoicing technology represents a trend in digitization that can benefit consumers, as well as companies (European Commission, 2014). Whilst the technology is still in the early stages of development and adoption throughout Europe (Koch, 2017), it is to be considered a possibly relevant technology for companies to invest in. Benefits gained from electronic invoicing affect both, companies and consumers, and can be illustrated as gains in efficiency and cost savings (European Commission, 2010b). To implement it, cooperation with e-invoicing service providers and the European Commission is recommended by the researcher. Cost savings are enhanced through savings in paper and human resources regarding the bureaucratic

effort caused by paper invoicing. Therefore, investing in electronic invoicing technology is perceived as a successful investment in the long-term by the researcher. Furthermore, Koch (2017) states that 80% of European companies operating in advanced markets already use electronic invoicing technology in B2B procurement. Another 30% are said to be obliged, either legally or by important trading partners, to use electronic invoicing technology (Koch, 2017). Therefore, if already used in B2B transactions, implying electronic invoicing on the B2C segment entails only a marginal additional investment. Participants of this study were found to be highly accepting of electronic invoicing technology, in general. Therefore, the researcher assumes an easy implication process. Additionally, electronic invoicing enables savings in CO2 emissions and facilitate a more sustainable economy. The service provider sector of electronic invoicing services, in Europe, still seeks for harmonization and increased levels of interoperability. However, e-invoicing is a key element of the digital agenda for Europe, developed by the European Commission. Subsequently, multi-national stakeholder forums were found by the European Commission, to support the adoption of electronic invoicing technology.

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16 Appendices

16.1 Timeline

Tasks	Sept 2018	Oct 2018	Nov 2018	Dec 2018	Jan 2019	Feb 2019	Apr 2019	May 2019
Literature Review								
Research Proposal								
Data Collection								
Data Analysis								
Reporting								

16.2 Terms & Definitions

16.2.1 Electronic Invoice

In the EU Council Directive 2014/55/EU, e-invoicing has been defined as "an invoice that has been issued, transmitted and received in a structured electronic format which allows for its automatic and electronic processing" (Euro Retail Payments Board, 2015). By definition, no paper document is involved.

16.2.2 Willingness to Adopt Electronic Invoicing

Willingness to adopt electronic invoicing is defined as "the extent to which non-users are eager to adopt electronic invoicing technology". This definition is derived from Davis' (1989) definition of the variable "user acceptance levels of information technology".

16.2.3 Perceived Ease of Use

Hernandez-Ortega (2012) defines perceived ease of use as "the degree to which the firm can effortlessly use an information and communications technology". Davis (1989) defines perceived ease of use as "the degree to which a person believes that

using a particular system would be free of effort". In this study perceived ease of use was defined as "the extent to which consumers perceive electronic invoicing technology as effortless in use".

16.2.4 Perceived Usefulness

Davis (1989) defines perceived usefulness as "the extent to which people believe an application will help them perform better at their job." In this research, perceived usefulness is defined as "the extent to which consumers perceive electronic invoicing technology to provide increased levels of efficiency to their lives".

16.2.5 User Awareness

User awareness was derived from studies conducted by Nienhuis and Bryant (2010) and Hernandez-Ortega (2012), in this research, the variable is defined as "the consumers' recognition of the existence of electronic invoicing technology and its benefits, both personally and environmentally".

16.2.6 Perceived Security

Perceived security was derived from studies by Dahlberg and Öörni (2007) and Hernandez-Ortega (2012). In this research, it is defined as "the extent to which consumers perceive electronic invoicing technology as a secure way of receiving invoices".

16.2.7 Provision of E-Invoicing Services on the Consumer's Smartphone

Provision of e-invoicing services on smartphones was derived from a research by Nguyen (2008) and aims at testing the impact of the provision of electronic invoicing technology on the consumer's smartphones on their willingness to adopt electronic invoicing.

16.3 Questionnaire

8.5.2019

Consent for Participation

Consent for Participation

The researcher requests your consent for participation in a study about acceptance levels of electronic invoicing in the retail sector in Austria. This consent form asks you to allow the researcher to record and view your answers and to use your comments to enhance understanding of the topic. The form also asks your permission to use related observations as data in this study.

Participants of this study will remain anonymous and the data collected will be protected by password on the researcher's laptop. All data collected in this research will be destroyed in August 2019.

Participation in this study is voluntary. If you decide not to participate there will not be any negative consequences. Please be aware that if you decide to participate, you may stop participating at any time and you may decide not to answer any specific question.

By submitting this form you are indicating that you have read the description of the study, are over the age of 18, and that you agree to the terms as described.

If you have any questions, or would like a copy of this consent letter, please contact me at daniel.mittheis@gmail.com.

Thank you in advance for your participation!

Daniel Mittheis

Questionnaire E-Invoice

Dear participants,

You are supporting a Bachelor Thesis that aims to analyze factors influencing consumer acceptance levels towards electronic invoicing on the retail sector in Austria.

Please put yourself in the following situation:

You are currently at your local retailer's checkout. You can decide between receiving a paper invoice or an electronic invoice via mail or an App on your Smartphone. Think about factors, that are influencing your decision and answer the questions below accordingly.

There are no right or wrong answers, I am interested in your personal opinion. The questionnaire is anonymous and will take about 7 minutes.

Thank you very much for your participation!

Please indicate the extent to which you agree/disagree with the following statements.

1. I expect electronic invoicing to be easy to use.

Markieren Sie nur ein Oval.

	1	2	3	4	5	6	7	
Strongly Agree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Disagree

8.5.2019

Consent for Participation

2. I expect electronic invoicing services to be easily accessible.

Markieren Sie nur ein Oval.

	1	2	3	4	5	6	7	
Strongly Agree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Disagree

3. I expect electronic invoicing to be a more efficient way of receiving receipts on a daily basis.

Markieren Sie nur ein Oval.

	1	2	3	4	5	6	7	
Strongly Agree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Disagree

4. I expect increased standards in terms of security when it comes to electronic invoicing.

Markieren Sie nur ein Oval.

	1	2	3	4	5	6	7	
Strongly Agree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Disagree

5. I expect increased measures regarding data protection when using electronic invoicing services.

Markieren Sie nur ein Oval.

	1	2	3	4	5	6	7	
Strongly Agree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Disagree

6. I expect increased safety of payment through the use of electronic invoicing.

Markieren Sie nur ein Oval.

	1	2	3	4	5	6	7	
Strongly Agree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Disagree

7. I expect increased customer support in the early stages of adoption.

Markieren Sie nur ein Oval.

	1	2	3	4	5	6	7	
Strongly Agree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Disagree

8. How regularly do you use digital technologies?

Markieren Sie nur ein Oval.

	1	2	3	4	5	6	7	
Not At All	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Very Regularly

9. How do you evaluate your information technology skills?

Markieren Sie nur ein Oval.

	1	2	3	4	5	6	7	
Good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Bad

10. Prior to this study, I have heard about electronic invoicing.

Markieren Sie nur ein Oval.

	1	2	3	4	5	6	7	
Strongly Agree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Disagree

11. I know about the benefits provided through electronic invoicing.

Markieren Sie nur ein Oval.

	1	2	3	4	5	6	7	
Strongly Agree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Disagree

12. In general, I am open to adapt electronic invoicing.

Markieren Sie nur ein Oval.

	1	2	3	4	5	6	7	
Strongly Agree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Disagree

13. I am aware of the environmental impact caused by paper invoicing.

Markieren Sie nur ein Oval.

	1	2	3	4	5	6	7	
Strongly Agree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Disagree

14. High levels of control over my finances are important to me.

Markieren Sie nur ein Oval.

	1	2	3	4	5	6	7	
Strongly Agree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Disagree

15. If new Technologies are provided, I am an early adopter.

Markieren Sie nur ein Oval.

	1	2	3	4	5	6	7	
Strongly Agree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Disagree

8.5.2019

Consent for Participation

16. The Provision of E-Invoicing Services on my Smartphone would increase my willingness to use such services.

Markieren Sie nur ein Oval.

	1	2	3	4	5	6	7	
Strongly Agree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Disagree

17. Reducing Emissions and, in the long-run, contributing towards saving the Environment is important to me.

Markieren Sie nur ein Oval.

	1	2	3	4	5	6	7	
Not At All	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	To a Great Extent

18. Gender

Wählen Sie alle zutreffenden Antworten aus.

- Male
 Female

19. Age

16.4 Additional Inferential Statistics

16.4.1 Hypothesis 3:

Factor Analysis Component Matrix:

Prior to this study I have heard about electronic invoicing..	0.841
I know about the benefits provided through electronic invoicing...	0.852
I am aware of the environmental impact caused by paper invoices	0.730

Screepplot:

