

**Understanding E-Government Competition: A Comparative UTAUT Study of the Adoption
of Government and Third-Party Digital Tax-Filing Solutions in Germany**

Master Thesis

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Summary

The goal of this research was to identify which factors influence German residents' intention to use digital tax-filing services, with a particular focus on the differences between the factors influencing the intention to use the governmental service ELSTER and those influencing the intention to use third-party software. This study was conducted using the UTAUT model and its constructs of Performance Expectancy, Effort Expectancy, Social Influence and Facilitating Conditions, with Trust in Government added as an additional independent variable. The research found that the factors influencing behavioral intention were not uniform across the two alternatives. While the UTAUT construct of Performance Expectancy was validated for third-party software as it was the most significant factor for behavioral intention, this effect was not significant for ELSTER. The most important finding, however, was the significant negative influence of Effort Expectancy on the intention to use ELSTER. This result was highly unexpected, as it suggests that those who find ELSTER easier to use are less likely to intend to use it, which in turn also means that the likelihood is higher for those that find ELSTER harder to use, making the paradox nature of this result apparent. In summary, the findings show that the factors influencing the intention to use digital tax-filing solutions differ strongly between Government and third-party software.

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1. Introduction

While the digital transformation advances globally, Germany's digitalization progress has often been criticized for its lack of ambition in comparison with its peers. Despite being one of the world's major industrialized countries, exemplified by its membership in the Group of Seven (G7), "an international forum of the seven leading industrialised nations and democracies" (Bundespresseamt, 2025, paragraph 1), Germany has struggled to provide user-friendly digital public services to its residents, often still relying on in-person or paper-based services via mail instead.

Digital tax-filing stands out as a prominent exception to this, with the Bavarian Ministry of Finance, that is responsible for hosting the service nationwide, stating: "With Elster [name of the service], the finance administration provides Germany's most successful E-Government service" (Bundesministerium der Finanzen, 2024, p. 162) [own translation]. Over 28 million tax returns were filed digitally in 2020, which accounts for 93% of total submissions (Bundesministerium der Finanzen, 2024). While the adoption rates are high, Germany's digital tax-filing service nevertheless has issues that can be addressed. In its 2024 report an expert commission highlighted the complexity of processes and fragmented IT infrastructure, particularly the lack of standardized data formats across different actors in the system, as significant barriers (Bundesministerium der Finanzen, 2024).

Germany's digital tax-filing infrastructure is anchored by the ELSTER-ecosystem. Residents can either file their taxes directly through the ELSTER-portal or use a third-party program that makes use of the same government-provided API to process tax returns but differs in terms of user interface, guidance features and overall user experience. While both ELSTER and third-party programs operate within the same ecosystem, third-party providers have positioned themselves as more performance-oriented and user-friendly alternatives to the ELSTER portal. This claim is backed by the assessment of the reputable German personal finance media portal Finanztip (2022), which states: "From detailed descriptive texts and explanatory videos to chat with the customer center - Elster can't keep up when it comes to help and tips" (Finanztip, 2022, paragraph 2) [own translation]. According to their evaluation, third-party software such as WISO Steuer or Taxfix, offers better support features and a more user-friendly interface while costing between 10 to 40€ yearly. ELSTER on the other hand is entirely free to use as it is an official government service (Finanztip, 2022). Finanztip ultimately recommends: "[I]f you have prior knowledge, you can save yourself the money for a paid program [...]. However, if you are unsure what you need to enter in line 64 of attachment N, our recommendation is: tax software" (Finanztip, 2022, paragraph 3).

The goal of this research is to test existing theory of the UTAUT model by conducting a survey that examines how constructs such as Performance Expectancy, Effort

Expectancy, Social Influence, Facilitating Conditions and Trust in Government influence residents' intentions to use a certain tax-filing method.

The notable differences between the two options lead to the hypothesis that users' perceptions of Performance Expectancy, Effort Expectancy and Facilitating Conditions may vary between the two options. For instance, users might conclude that by using third-party software they are more likely to receive a higher refund or avoid errors due to better support features and automatic error-checks, justifying the initial cost. By applying the UTAUT model to explore factors influencing residents' choices between competing digital services, specifically free government solutions versus for-profit third-party options, this study aims to generate insights for policymakers and implementing administrators to contribute to improvements to current and prospective e-government services in Germany. Understanding these factors will help to address potential shortcomings and improve user satisfaction as well as increase behavioral intention to use ELSTER.

The central research question guiding this thesis is: Which factors influence residents' intention to use online tax-filing in Germany? This broad question will be explored through the following sub-questions:

1. Which factors influencing residents' intention to use digital tax-filing systems can be identified in existing literature?
2. Which factors influence residents' intention to use the governmental platform ELSTER?
3. Which factors influence residents' intention to use third-party tax-filing software?
4. How do the factors influencing residents' intention to use ELSTER and third-party tax-filing software compare?

The relevance of this research lies in a multitude of different aspects: First and foremost, this research tests the established and validated UTAUT model in a new context. While UTAUT had previously been used to study digital tax-filing services, this research was not conducted in Germany. As there are differences in digital tax-filing services across countries, applying the model to the context of a different country contributes to research by either validating it in a new context or allowing for further refinement if the results do not align with the assumptions of the existing model.

Secondly, it addresses a gap in existing literature on e-government service adoption. While a number of studies have explored factors influencing the adoption of e-government services by applying the UTAUT model to different cases, the distinction between factors influencing the adoption of an e-government service over a third-party alternative or vice versa bridges a gap that has not yet been explored. This adds to the relevance of this research in particular.

Thirdly, in addition to the UTAUT constructs of Performance Expectancy, Effort Expectancy, Social Influence and Facilitating Conditions, this research also considers Trust as a variable. While this in and of itself is not innovative, as it has been done by scholars such as Carter and Belanger (2005) or Chaouali et al. (2016) and many more in the past, including Trust in Government in particular as a variable allows for an understanding of whether or how the direct relationship between residents and the government influences residents' behavioral intention to use e-government services, especially in instances where highly sensitive personal financial information is shared.

2. Theoretical framework (about 2500 words)

2.1 Introduction: Supply vs. demand side

According to Reddick, residents' adoption of e-government can be studied from two distinct perspectives: "[T]he supply side, [...] examines e-government offerings" (Reddick, 2005, p. 41), focusing on how governments design, implement and manage digital services. This includes considerations such as technology readiness, system integration, and the underlying strategy as well as capacity of public institutions to deploy effective and accessible e-government platforms. In contrast, „the demand side, [...] examines citizen interaction with e-government" (Reddick, 2005, p. 41), concentrating on how users engage with digital services in practice. This perspective explores factors such as user satisfaction, digital literacy, access to technology and trust in public institutions. By analyzing the demand side, researchers can help policymakers understand which factors are most important to offering an e-government service, that residents will readily use and appreciate.

This study is exploring the adoption of electronic tax-filing in Germany from the demand side, by considering which psychological, social and infrastructural factors influence residents' decisions to file taxes digitally rather than using the traditional, paper-based method. By examining variables such as ease of use, perceived usefulness, peer influence and Trust in Government, the study aims to identify the main drivers and barriers shaping residents' intention to use electronic tax-filing, contribute to a better understanding of user-centered challenges, and thereby facilitate future improvements in Germany's e-government services.

2.2 Unified Theory of Acceptance and Use of Technology Model (UTAUT)

2.2.1 Origin and Scientific Standing

Understanding residents' choice of tax-filing method and adoption of e-government, requires a theoretical framework that accounts for technological, psychological and socioeconomic variables. The Unified Theory of Acceptance and the Use of Technology Model (UTAUT) has emerged as one of the most comprehensive and widely accepted frameworks for analyzing residents' choices whether to adopt a technology or not. The

model, developed by Venkatesh et al. (2003), encompasses aspects from eight different prior models such as the Technology Acceptance Model (TAM), the Theory of Planned Behavior Model (TPB) and the Social Cognitive Theory (SCT) and was conceived with the aim of constructing a Unified Model to research and explain technology adoption.

For their 2014 literature review, Williams et al. conducted “[a] comprehensive electronic search [...] [which resulted] in 174 usable research papers” (Williams et al., 2014, p. 445) of studies that were conducted using UTAUT. This serves as evidence that the model offers a widely academically accepted blueprint for conducting studies regarding e-government and technology adoption. In fact, “UTAUT is a predominant model extensively employed in understanding technology adoption” (Xue et al., 2024, p. 2). The predictive strength of the model has been consistently confirmed in a number of meta-analyses such as those conducted by Khechine et al. (2016) or Dwivedi et al. (2020), who have demonstrated that UTAUT consistently accounts for a significant part of the variance in behavioral intention by aggregating the findings of hundreds of studies across multiple different research areas. It has also been shown to outperform “each of the eight original models” (Venkatesh et al., 2003, p. 426) in its explanatory power, which solidifies its status as the best, most comprehensive model to use for researching this specific area.

In their systematic review of studies conducted using UTAUT, Williams et al., (2014) find, “that the model has been primarily used for technology adoption and acceptance research in the areas of e-government, e-banking, e-learning and e-commerce.” It has, however, also been used successfully in the context of digital health (Philippi et al., 2021), telemedicine (Kung et al., 2024), cloud computing (Moryson and Moeser, 2016), which shows the widespread adoption and multitude of different use cases of the model in research. This study thus falls directly within the scope of what UTAUT was designed and is being used in practice for, as it is concerned with the adoption of an e-government service. This, coupled with the significant explanatory power and well-regarded status of the model within the research community, further demonstrates the relevance of the model to this particular case and justifies its use.

The goal of this theoretical framework is to establish the relevance and applicability of UTAUT in the context of Germany’s digital tax-filing system, and to build a theoretical foundation from which testable hypotheses regarding residents’ behavioral intention to use a certain tax-filing method can be derived.

2.2.2 Core Constructs of UTAUT

The model fundamentally considers four different factors, which are important to individuals’ behavioral intention regarding e-government service adoption:

1. **Performance Expectancy:** “[T]he degree to which an individual believes that using the system will help him or her to attain gains in job performance” (Venkatesh et al., 2003, p. 447)
2. **Effort Expectancy:** “[T]he degree of ease associated with the use of the system” (Venkatesh et al., 2003, p. 450)
3. **Social Influence:** “[T]he degree to which an individual perceives that important others believe he or she should use the new system.” (Venkatesh et al., 2003, p. 451)
4. **Facilitating Conditions:** “[T]he degree to which an individual believes that organizational and technical infrastructure exists to support use of the system. (Venkatesh et al., 2003, p. 453)

Perceived performance benefits such as time savings, accuracy and faster processing are a key factor influencing residents’ intention to adopt electronic tax-filing systems. This has been consistently observed in prior studies concerning technology adoption (Wang, 2003) (Chaouali et al., 2016). As Germany’s traditional paper-based system is known for its bureaucratic complexity (Bundesministerium der Finanzen, 2024), digital tax-filing systems potentially offer significant performance advantages such as transfer of data from the previous year, eliminating the need for manual reentry and pre-filled tax returns, referring to the ability to automatically retrieve data from official sources such as wage statements (Elster, n.d.). Furthermore, experts suggest that digital filings are being treated with priority (ING, 2022). Plausibility checks flag potential errors, thereby lowering the chances of mistakes (Elster, n.d.). For these reasons, it is probable that residents attribute better performance to e-filing in comparison to paper-based filing. This effect is likely stronger for third-party software, as it can help users maximize their tax returns through the identification of possible deductions and provision of tips (Buhl, n.d.).

Besides performance benefits, the effort required to use a certain system also influences residents’ intentions to adopt significantly (Venkatesh et al., 2003). Features such as data transfer from previous years, automatic data retrieval and a digital folder for storing receipts (Elster, n.d.), to have them on hand in case of an audit, impact the perceived effort of tax-filing. ELSTER further allows users to view their official tax assessment notice digitally, enabling a direct comparison between the submitted data and figures used by the tax office in its final assessment (Elster, n.d.). This simplification reduces effort associated with verifying the validity of or identifying discrepancies in the return. Based on these features, residents are likely to assess that the level of effort necessary for digital filing is comparatively lower. As third-party programs offer guided input instead of blank sheets, leading the user through a pre-structured set of steps in order to complete the filing process, tips in text or video form, an AI-chatbot and a review service, the effort expectancy is likely amplified for third-party software. This is

especially likely as ELSTER is often criticized for its lack of user friendliness, being described as “not easy to grasp” (Finanztip, 2022, paragraph 4) [own translation]

According to Boone (2012) peer behaviors and social norms also play an important role in adoption decisions. While peer behaviors are also likely to influence the usage of e-government services, this has not been explicitly studied in the context of e-filing in Germany.

Finally, Reddick (2009) and Liang & Lu (2013) stress the importance of support systems and infrastructure, as strong support increases users’ confidence and therefore also their actual usage. In the context of Germany, such systems and infrastructure include compatibility with national ID systems, integration with third-party software, and digital availability of data.

In their 2012 extension of the model, called UTAUT 2, Venkatesh et al. incorporated new aspects such as hedonic motivation, price value, and habit (Venkatesh et al., 2012) to adapt the model to better suit consumer contexts. However, for this particular study, the original UTAUT is sufficient as hedonistic motivations play a lesser role in the utilitarian context of tax-filing.

2.2.3 Control Variables

Several factors act as control variables for the core constructs of the UTAUT model. According to Venkatesh et al. (2003), age impacts the relation between the constructs, as younger users tend to value Performance Expectancy more, while older users are more influenced by Effort Expectancy and Facilitating Conditions. There are also gender differences present, with men typically being more task-focused and women valuing ease of use and relying more on Social Influence (Miller 1976) (Venkatesh et al., 2000 as cited in Venkatesh et al., 2003). Experience with the technology in question controls for all UTAUT variables, as it has an impact on perceived Effort Expectancy and Performance (Venkatesh et al., 2003). This effect is very comprehensible, as users who have experience using a certain technology better know how to use the technology, which makes its use easier for them, and are better able to maximize the full usage potential of the technology, leading to better performance. Voluntariness of use was deliberately excluded from this research for several reasons. For one, digital tax-filing is not mandatory for employees, who represent the overwhelming majority of the German workforce (Statistisches Bundesamt, n.d.). As this study is focused on personal tax-filing, the only subjects of this study required to file digitally are those that are self-employed and without staff. At just 3,8%, they account for just a very small fraction of residents (Statistisches Bundesamt, n.d.). In addition to this, this study is not just concerned with paper-based vs digital tax-filing, but also ELSTER vs third-party software. Because of this, even the 3,8% required to file digitally still have the choice between those two options and thus contribute. Thirdly, Venkatesh et al. (2003) measured perceived voluntariness of use. In a setting where factual voluntariness is clearly

established, perceived voluntariness is redundant as a control. The related factors relevant to the study are well covered under the construct of Social Influence.

2.2.4 Behavioral Intention

In constructing survey questions, UTAUT relies on behavioral intention, an individual's motivation to use a particular technology (Venkatesh et al., 2003), instead of studying actual usage. The four core constructs previously introduced thus act as predictors of behavioral intention, which in turn drives actual system use. There are several reasons for and benefits of researching behavioral intention rather than actual usage: Measuring actual usage is considerably more complicated than asking respondents about their intention in a survey, which comparatively allows for broader and easier data collection, especially in large-scale public administration studies. Further, for services that are just being rolled out or have only been available for a short period of time, studying behavioral intention allows researchers to include users who are considering adoption, that may not have had the chance to use the system yet. Looking at behavioral intention thus allows for the finding of trends at an early point in the adoption process. Venkatesh et al. (2003) also show that "[i]n predicting usage behavior, both behavioral intention [...] and facilitating conditions [are] significant" (Venkatesh et al, 2003, p. 461), meaning that behavioral intention is a reliable predictor of actual usage behavior and therefore can be used to research acceptance and adoption of e-government services or technology.

2.2.5 Trust as an extension of UTAUT

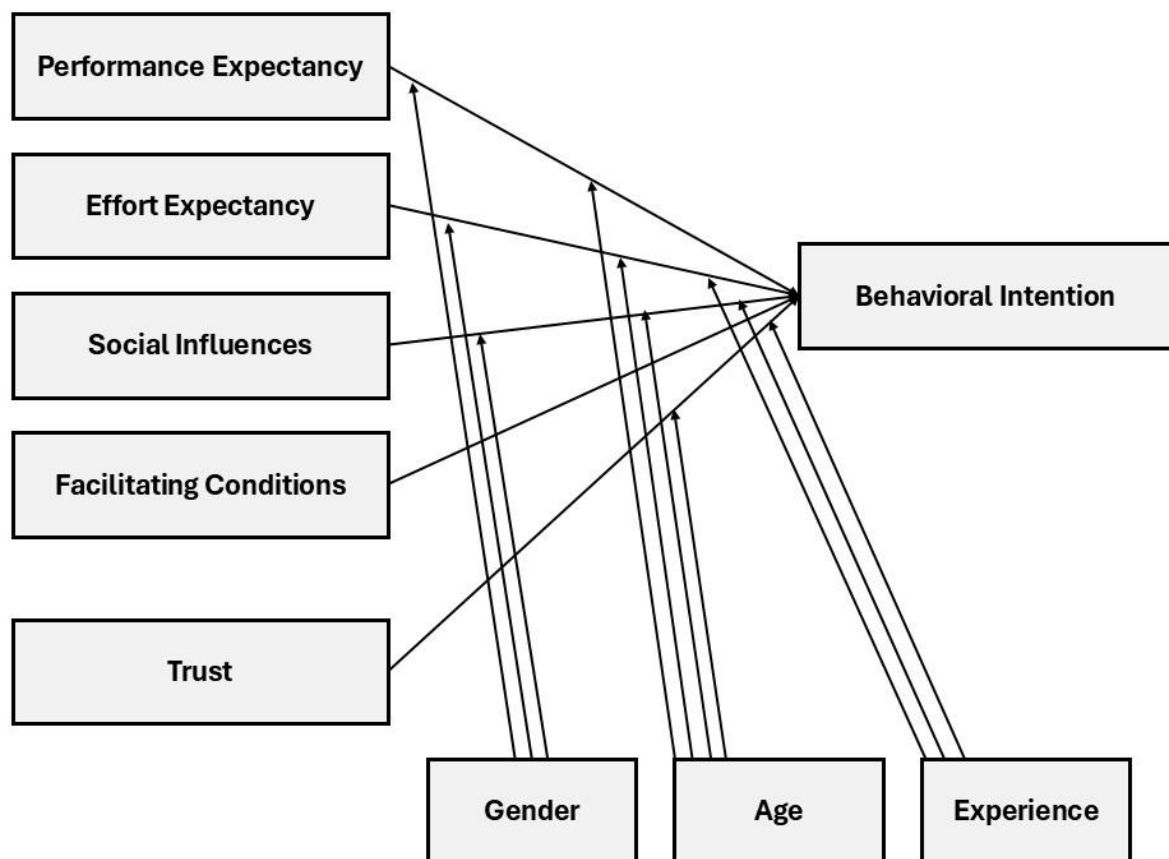
This study also incorporates Trust, specifically Trust in Government as an extension of UTAUT. While the original UTAUT model does not explicitly include trust as a core construct, it is nevertheless an important component to the acceptance and usage of e-government services and has been highlighted as such in prior studies. Carter and Bélanger (2005) were among the first to integrate trust into a technology acceptance model for e-government. Their work distinguishes between two types of trust: Trust in the internet as a medium through which services are delivered and Trust in Government as an institution delivering a service (Carter and Bélanger, 2005). Carter and Bélanger (2005) argue that while trust in the technological infrastructure might be important, Trust in Government plays a more significant role in residents' intentions to adopt e-government services. Chaouali et al. (2016) further incorporated the multi-dimensional trust constructs benevolence, competence and integrity into their analysis of electronic tax-filing adoption. They found that trust influenced behavioral intention both directly as well as indirectly as users who trusted the government were also more likely to see digital service as useful and easy to use, thereby amplifying core mechanisms of the UTAUT model (Chaouali et al., 2016). Trust is especially important in the context of tax-filing due to tax-related data being highly sensitive. Users not only have to feel confident in their own ability to use an e-government service but also be sure that their data will be handled securely. For this reason, trust effectively acts as a gatekeeper: without it, even

well-designed systems may fail to achieve widespread adoption. Following Carter and Bélanger's assessment that Trust in Government plays a more significant role in influencing residents' behavioral intention to adapt e-government services, this study omits trust in technology, instead strictly focusing on Trust in Government. To test for this variable, survey questions previously used and validated by Homburg et al. (2020) have been translated into German.

2.4 Hypotheses:

- H1: Performance Expectancy will positively influence residents' behavioral intention to use online tax-filing.
- H2: Effort Expectancy will positively influence residents' behavioral intention to use online tax-filing.
- H3: Social Influence will positively influence residents' behavioral intention to use online tax-filing.
- H4: Facilitating Conditions will positively influence residents' behavioral intention to use online tax-filing
- H5: Trust in Government will positively influence residents' behavioral intention to use online tax-filing

3. Conceptual Framework



4. Research design and methodological justification (about 2000 words)

4.1 Why deductive research?

A deductive approach was chosen for this research due to several reasons. First and foremost, its counterpart, inductive research is most important and valuable when researching a new phenomenon, on which an established theory does not yet exist, or in cases in which existing theories might not offer sufficient explanatory power.

The subject of this research, however, is the adoption of an e-government service. This falls well within the scope of the UTAUT model (Venkatesh et al., 2003). The model already provides established theory on the subject matter and combines aspects of several previous models about technology and e-services adoption into one comprehensive model that offers better explanatory power than its predecessors (Venkatesh et al., 2003). The primary goal of this research is thus not to generate new theory but to empirically test the relationships proposed by the UTAUT model and its extension with trust within the specific context of digital tax-filing in Germany.

With ELSTER being one of the most successful e-government services in Germany (Bundesministerium der Finanzen, 2024), a country that is otherwise often considered a laggard of digitalization, it is especially valuable to collect large-N data as this makes it possible to project findings among a sample, about which factors drive behavioral intention to adopt e-government services, onto an entire population. This goal can best and most practically be achieved by collecting and analyzing quantitative survey data. Conducting a survey first requires the design of a questionnaire. It is highly important to keep the questionnaire concise, as this impacts the rate of response (Fan and Yan, 2010). Designing a concise questionnaire without pre-determined theory in mind is not feasible. For this reason, the deductive approach of building a questionnaire based on a pre-established theoretical model like UTAUT best fits the goals of this research.

By deductively applying UTAUT in a new context, this research can further contribute to the academic discourse by confirming, refining or potentially extending the applicability of UTAUT. Even if the findings align perfectly with the assumptions made by UTAUT, it will provide empirical validation of the model's relevance in the specific context of digital tax-filing in Germany and in turn strengthen the predictive power of the model.

Another significant benefit of working deductively is that using a well-established model like UTAUT allows for the direct formulation or even just translation of testable hypotheses as well as survey items. This makes the research process more efficient and especially lends itself to the circumstances of a limited-scope master thesis.

4.2 Data collection

As previously mentioned, this research was conducted in the form of a survey. For this specific survey, the abovementioned option to utilize items from Venkatesh et al. (2003),

who developed the model, was used. This offered the benefit of eliminating the need for pre-testing the survey items, as they have previously been validated by a multitude of studies, due to UTAUT being an established and widely used model. The survey items were thus simply adapted from Venkatesh et al. (2003), by translating them into German and replacing the general term “the system” with “online tax-filing system” for the purpose of specifying.

The three survey items for behavioral intention were used twice in this research, as this allowed for distinction between the intention to use government- or third-party software. As this study is particularly interested in exploring potential differences in factors influencing behavioral intention between the two, this was a necessary adaptation of the original UTAUT model, that focuses on one particular technology or e-service at a time.

The survey items regarding trust were taken from Homburg et al. (2020) and translated into German. Their research also extended the UTAUT model by Trust, in particular Trust in Government. This perfectly fits the underlying goals and theoretical framework of this study, justifying the decision to use these pre-validated items.

While the original UTAUT research by Venkatesh et al. (2003) was conducted using a 7-point Likert scale, this research chose to use a 5-point scale instead. The 5-point scale offered the best compromise between both a detailed and accurate depiction of user's agreement or disagreement with a certain question and sufficient clarity and simplicity, as it scores high in the categories ease of use and quick to use, while still allowing users to express their feelings adequately, which is not sufficiently ensured by 2, 3 or 4 point scales (Preston and Coleman, 2000). As the surveys were conducted by a single researcher with limited time and capabilities to support participants, most of which did not fill out the survey on the spot, ease of use was a priority, thereby justifying the deviation to a 5- instead of a 7-point scale.

The control variable age was measured on an ordinal scale by asking participants to select the age bracket that they belong to. As this study is targeted towards adult German (tax-)residents, the first bracket stretched from 18-24, while each subsequent bracket encompassed exactly 10 years. The last bracket was open-ended at age 65 or above. This choice was made because of the standard retirement age being between 63 and 67 depending on the age cohort, the number of years worked in total and the use of early retirement schemes. People retiring at 67 or working in their retirement are thus still accounted for, but no further distinction upwards was deemed necessary.

In line with current trends, three options were given to record participants' gender: male, female and diverse/non-binary. This ensures the inclusion of all possible participants. An option such as “prefer not to answer” was not given, as this would have had to be counted as a non-response.

The survey item for the last control variable experience included indicators for which number of uses correlated to which level of experience. This was done to ensure the objectivity of this particular item. The decision to give numbers of uses as indicators, instead of a timespan, was made consciously. Tax returns are only filed once a year, thus the timespans in question would be especially long, making a reference to the amount of times used more intuitive.

As this research aims to produce generalizable results, survey participants were selected via random sampling. For this reason, a highly frequented public park in Berlin was chosen as the survey location of choice, as it is accessible for anyone regardless of socioeconomic or demographic factors. The surveys were conducted by a single researcher over the course of four days on three separate weekends. While this approach suited the practical constraints of surveying a significant number of participants as a single researcher in a limited timeframe, it accepted a sampling bias, created by systematically underrepresenting those who work on weekends as a tradeoff. Approximately 25% of Germans occasionally work on Saturdays, 15% on Sundays (Statistisches Bundesamt, 2025a), which potentially limits the generalizability of the findings to the entirety of the German workforce.

Individuals were made aware of the survey by holding up a poster with a request for participation and a QR code that led to the survey on Qualtrics. Additionally, people walking by were approached verbally, to gain their attention. This was successful due to the high volume of passersby in the particular location selected. The survey was available both digitally, via the QR code, as well in paper form on clipboards. The overwhelming majority of participants participated digitally by scanning the QR code and completing the survey at a later time of their choosing. This was an additional strategy employed by the researcher to encourage participation, as most people were not willing to participate on the spot but were willing to scan the QR code, and participate at a time convenient to them.

The targeted sample size was 300, as 150 serves as a baseline to achieve statistically significant results and this research had two dependent variables, therefore necessitating a higher number of participants. For the large majority of participants, the data was collected via Qualtrics, 12 respondents chose to fill out the survey on paper. A total of 436 surveys were started. Most participants did so by scanning the QR code on the poster held up by the researcher and loading the page in their browser.

4.3 Justification of scale construction and regression analysis

As UTAUT is a well-established model to research technology adoption and the items have just been specified to the research subject and translated into German, the language in which the research was conducted, the expectation was to achieve a Cronbach's Alpha of at least 0.7, a common threshold for the construction of valid scales according to Hair et al. (2019), for all constructs that were measured. The scales

for behavioral intention to use both ELSTER and third-party software achieved this, with reliability coefficients of 0.9844 and 0.9858 respectively. Performance Expectancy and Effort Expectancy achieved an alpha of 0.9221 and 0.9086, which shows high reliability and validates scale construction. Facilitating Conditions and Trust both managed to achieve the common threshold for reliability of 0.7 as well, with values of 0.7049 and 0.7736. The items that measured Social Influence came in at the lowest reliability coefficient of just 0.6113. In addition to this, no combination of 3 out of the 4 items scored higher than 0.61. Dropping Item 4 would have slightly improved the coefficient to 0.6157, an improvement of just 0.0044. Due to the very small margin of this difference, the item was not excluded before constructing the scale. While the threshold of 0.7 can thus not be achieved when constructing a scale for the variable Social Influence, 0.6113 is acceptable for scale construction in this particular case due to the well-established nature of the UTAUT model. The scales of these particular survey items were validated in numerous prior studies, as referenced in the Origin and Scientific standing section, thus making a minor fluctuation in the reliability coefficient (0.6113 instead of 0.7) acceptable. An analysis by Bujang et al. (2018) supports this by showing that even with a scale of three or five items (this study uses three four or five), an alpha of 0.65 represents a statistically significant improvement when compared to a baseline of 0.5. The study's power analysis indicates that with an appropriate sample size (250 for 3-item scales, 209 for 5 item scales), there is a 90% probability of detecting this difference. Given this high level of confidence and the comparable sample size of this study with $n=236$, an alpha of 0.61 should be viewed as a significant improvement over a lower threshold and therefore acceptable.

4.4 Internal and external reliability and validity

In this research, reliability was ensured by clearly outlining and critically discussing all methodological steps that were taken. Additionally, the exact questionnaire used for the survey was provided in the appendix, allowing for a possible one-to-one replication of the study under similar circumstances. The high Cronbach's alpha values for most variables further confirm the consistency and reliability. This is aided by the fact that the survey was constructed using pre-validated survey items and scales. The choice to use items directly from the original UTAUT model by Venkatesh et al. (2003) as well as by Homburg et al. (2020) for the construct of Trust in Government, also aided the study's internal validity, meaning the extent to which confidence in a causal relationship between the variables can be established, as they were already known to accurately capture the intended constructs from a wide variety of previous research, as established in 2.2.1.

While the case for the reliability and internal validity of this study is strong, there are some potential limitations to its external validity that have to be acknowledged. External validity refers to the generalizability of the findings to the entirety of the German or even other populations. The sample of this study, while collected in a methodically sound

way, is not representative of the entire German population due to its age bias. Most of the participants were between ages 25 and 44, leaving gaps towards the older age ranges, which are significantly underrepresented in this sample. While valuable results for an important part of the German workforce, namely those that will still work and file their taxes for 20-30 years, were produced, this study cannot claim its validity for older groups of German workers including individuals close to or in retirement age. This applies to gender distribution to a lesser extent, as women are slightly overrepresented in the sample. A further limitation is the generalizability of the results to other countries, as this study was focused exclusively on the German tax-filing system and the software solutions available in Germany. The findings can however indicate some sentiments in parts of the German population, allowing for partial applicability to other future e-government services in Germany.

4.5 Ethics

To ensure that this research is conducted ethically, the first page of both the online version as well as the paper-based version of the survey was a consent form (see appendix). The form outlined the subject of the research, the identity of the researcher and the name of the research institution. An approximate time for completion was given, and the voluntary nature of participation as well as the option to stop at any time was clearly stated. Most importantly, the promise of anonymity and the responsible use of data only for the intended research purpose by the researcher and his institution was included. On the print version, the participants crossed the clearly indicated checkbox at the bottom of the page to give their consent. The online version did not have such a clearly indicated checkbox due to a formatting choice that allowed participants to click the answer in its entirety. For all subsequent answers this simplified and sped up the answering process, however for the first page this format did not make it apparent that the box should be clicked to signal consent. However, all participants had to scroll through the page and click an arrow icon at the bottom of the page to proceed with the survey. This action of actively clicking the arrow to proceed, after being given the information outlined above marks informed consent.

In addition to obtaining informed consent, this research tried to minimize the amount of personal data required of participants. The only personal data obtained about participants was their age in a 10-year bracket and their gender. The promise of anonymity and confidentiality was therefore maintained.

To uphold data security standards, the survey responses were collected through Qualtrics, which was recommended by the University for its robust security measures. After data collection the raw data was downloaded and stored anonymized in GDPR compliant cloud storage that was only accessible to the researcher. The only other person that accessed the anonymized data was the researcher's thesis coordinator, who received the data via the university e-mail system.

To ensure transparency, it should be declared that participants were offered small packages of gummy bears as a token of appreciation for their participation. The packages were given out when scanning the QR-code, even if participants kept walking afterwards. This shows that they were not given with the intent to coerce. Additionally, the small value of the item is too low to possess significant coercive powers and is thus appropriate as a kind gesture for participants. A total of 180 small packs valued at a combined 22.50€ were given out, which comes out to 12,5 cents per individual participant that accepted the offer.

5. Empirical findings & analysis

5.1 Data Screening

The initial number of 436 started surveys was reduced substantially through a rigorous screening process. Between 50-60 people started the survey by scanning the QR code and loading the page, and were therefore included in the initial 436 number, but never actually participated in the survey. Another 50 participations likely occurred through some form of sharing the link, as they came in during a time period in which no surveys were actively being conducted and none of those specific entries was completed. This brings the number of participants that completed the survey down to approximately 330. However, after exporting the data from Qualtrics to Excel, deleting all lines with missing values and manually entering all paper-based responses into the file, only 240 participants fully filled out the survey without any missing data points. Thus, only this number could be taken into account for the statistical analysis.

To ensure that only legitimate entries were analyzed, a straight-line check was conducted across all variables. A total of 4 out of 240 entries were answered in the exact same way for all items, necessitating them to be dropped.

5.2 Sample demographics and descriptive statistics

Table 1: Sample demographics

	German Population	Sample (2025)
Age	Mean: 44.9 ¹ 2024 data	Mean: 2.44 scale points (2= 25-34; 3= 35-44). Estimated mean age: 34.1
Gender	Male: 49.35% ² Female: 50.65% Note: division by sex, not gender, 2023 data	Male: 41.53% Female: 57.20% Nonbinary / Diverse: 1.27%
Level of Experience		Mean 2.76 scale points (2 = 1 time, 3= 2-3 times)

¹ Statistisches Bundesamt, 2025b; ² Statistisches Bundesamt, 2024

In order to be able to assess the generalizability of the findings of this study, it is important to take the demographics of the sample into account. As previously discussed in Section 4.4, this sample differs significantly from the German population in its entirety. With an estimated mean of just 34.1, calculated by multiplying the halfway point of each age category with the number of respondents in said category, adding up these values and dividing by the number of total respondents, the sample of this study is considerably younger compared to the 44.9 years mean age of the German population in its entirety according to 2024 data from the federal statistical office (Statistisches Bundesamt, 2025b). While the distribution by sex is 49.35% to 50.65% in favor of women, according to data from 2023 (Statistisches Bundesamt, 2024), this sample has a higher share of female participants at 57.2%. The remaining share is divided between 41.53% male and 1.27% nonbinary or diverse respondents. An important note to be made is that the data of the federal statistical office refers strictly to biological sex, while the survey of this research asked about respondents' gender, although the same term is used for both sex and gender in German, and gave the option to select "non-binary / diverse". While the gender distribution differs from that in the population, the large n ensured significant numbers of both male (98) and female participants (135). The respondents have a mean experience of 2.67 scale points, which roughly translates to having used the software 2-3 times according to the examples given along with the question.

Table 2: Descriptive Statistics

Variable	CA	M	SD
ELSTER	0.9844	3.0876	1.6067
Third-Party Software	0.9858	3.0537	1.5415
Performance Expectancy	0.8950	3.8814	0.9657
Effort Expectancy	0.9086	3.4619	0.9872
Social Influence	0.6113	2.8941	0.7769
Facilitating Conditions	0.7049	3.8845	0.7276
Trust	0.7736	2.4280	0.8083

As previously discussed in section 4.3, Cronbach's alpha values for the intention to use ELSTER or Third-Party Software as well as the Performance Expectancy and Effort Expectancy were all above 0.89, showing a high level of internal consistency. Facilitating Conditions and especially Social Influence were lower (0.7949 and 0.6113), but still acceptable. The scales, while less internally consistent, therefore remain useable for analysis.

Performance Expectancy has the second highest mean score at 3.8814, indicating that participants generally perceive digital tax-filing software as a more performant method than traditional paper-based filing. When further examining the item- instead of the scale-level, the factors contributing most to this perception are the simplification of the tax process, at a mean of 4.0678, higher efficiency, at a mean of 4.0466 and time savings, at a mean of 4.0212. Better quality of the tax returns and more control over the tax-filing process have a slightly lower impact on the overall perception of better performance efficiency, with means of 3.6144 and 3.6568 respectively.

Effort Expectancy has a mean score of 3.4619, which suggests that while participants find tax-filing software relatively easy to use, it offers more performance benefits to them rather than just requiring lower levels of effort to operate.

Facilitating Conditions has the highest mean of any factor with 3.8845, however this is strongly influenced by a single item. When asked about having the necessary technical resources such as a computer or internet access, 96.61% of respondents answered affirmatively with agree or strongly agree, leading to a high mean of 4.6610 on a five-point scale. While item one is thus an outlier, the general perception of good Facilitating Conditions is indicated by means of 3.8983 and 3.7881 for items asking about whether respondents possessed the necessary knowledge to use digital tax-filing systems and whether they are compatible with their current method of storing documents. A comparatively lower mean of just 3.1907 for item 4 shows respondents' mixed evaluation of their access to help when filing their taxes digitally.

Trust and Social Influence have mean scores below 3, with 2.4280 and 2.8941 respectively, indicating that participants do not have high levels of trust in the German government and are not strongly influenced in their behavioral intention by others' opinions.

Table 3: Pairwise correlation [$*$ = $p < 0.05$ | $**$ = $p < 0.01$ | $***$ = $p < 0.001$]

Variable	E	TP	PE	EE	SI	FC	T	VIF
ELSTER	1.0000							
Third-Party Software	-0.1905**	1.0000						
Performance Expectancy	0.1883**	0.4150***	1.0000					1.86
Effort Expectancy	-0.0325	0.2889***	0.5230***	1.0000				1.77
Social Influence	0.0688	-0.0023	0.1233	-0.0032	1.0000			1.14
Facilitating Conditions	0.1252	0.2743***	0.5566***	0.6055***	0.1034	1.0000		1.85
Trust	0.0147	0.0521	0.1224	0.0668	0.0894	0.1205	1.0000	1.07
Age	0.1520*	0.0165	0.0816	0.1140	-0.1551*	0.0606	0.0201	1.17
Gender	0.0392	-0.0155	-0.1080	-0.0532	0.0470	-0.0874	0.0350	1.04
Experience	0.2010**	0.2749***	0.4726***	0.3899***	-0.2065**	0.3572***	-0.0806	1.69

Table 4: Pairwise correlation of control variables [$*$ = $p < 0.05$ | $**$ = $p < 0.01$ | $***$ = $p < 0.001$]

Variable	Age	Gender	Experience	VIF
Age	1.0000			1.17
Gender	0.0277	1.0000		1.04
Experience	0.3482***	-0.0872	1.0000	1.69

When examining the pairwise correlation table(s), a strong positive correlation between Performance Expectancy and both Effort Expectancy ($r = 0.5230$) and Facilitating Conditions ($r = 0.5566$) becomes apparent. This shows that participants who find tax-filing software performant also find it easier to use and better supported, suggesting that the perceived performance of tax-filing software is linked closely to its user-friendliness and the availability of help-resources.

A weak negative correlation between ELSTER and Third-Party Software ($r = 0.1905$) shows that individuals who intend to use ELSTER are less likely to intend to use third-party software and vice versa. While this is a logical reflection of the substitutive relation between the two options, the fact that the correlation is relatively weak leads to the conclusion that a significant number of respondents reported the intention to use both ELSTER as well as third-party software.

The VIF values are all well below the commonly applied threshold in social sciences of 10, with Performance Expectancy hitting a high of 1.86. This means that multicollinearity is not an issue for the following regression analyses. The histograms created as part of the regression diagnostics for both regressions were relatively normally distributed.

5.3 Hypothesis Testing: Factors Influencing the Intention to use ELSTER

Table 5: ELSTER Regression [*= $p < 0.05$ | **= $p < 0.01$ | ***= $p < 0.001$]

Variable	Model 1	Model 2
Performance Expectancy		0.2768
Effort Expectancy		-0.4401***
Social Influence		0.1736
Facilitating Conditions		0.2849
Trust		0.0029
Age	0.1416	0.1816
Gender	0.1260	0.1562
Experience	0.2487*	0.2344*
F	3.17	3.30
R ²	0.0520	0.1163

To test the hypotheses, a total of four different regressions were calculated. Model 2 shows the impact of the independent variables on the intention to use ELSTER, while Model 4 shows the impact on the intention to use third-party software. Model 1 and 3 only contained the respective dependent and the three control variables, with the UTAUT constructs and Trust in Government being left out in order to calculate the effect of just the control variables on the regression as a whole.

The regression model for the intention to use ELSTER is statistically significant with $p = 0.0008$ and an F-Value of 3.3. This indicates that the independent variables including control variables can predict the intention to use ELSTER. The model has an R² of 0.1163, meaning that it explains approximately 11.63% of the variance in ELSTER usage. The strongest statistically significant predictor among the independent variables is Effort Expectancy with a coefficient of -0.4401 with $p = 0.001$). The result is thus counter-intuitive and not in line with expectations and the hypothesis. The significant negative coefficient suggests that individuals who perceive the software as easier to use are less likely to use ELSTER.

The second strongest significant predictor is the control variable Experience with a coefficient of 0.234 and $p=0.044$. This shows that the more people have used ELSTER, the more likely they are to intend to use ELSTER again. Model 1 which only contains the control variables age, gender and experience is also statistically significant with $p = 0.0147$ and $F= 3.17$. This shows that although there is a significant influence of the control variables, they are not the main factor in the predictive strength of Model 2. With an R^2 of 0.0520 the control variables can only explain slightly more than 5% of the variance, less than half of the explanatory strength of the model containing all the variables. Consistent with Model 2, Experience is by far the strongest predictor among the control variables with a coefficient of 0.248 ($p= 0.012$). The other control variables, namely the demographic variables age and gender are not statistically significant. This further shows that while the control variables overall have a small but significant effect, this is due to the impact of experience on the behavioral intention, not factors such as age and gender.

The most important finding of this regression analysis is the inverse effect of Effort Expectancy on intention to use ELSTER. The initial hypothesis assumed that higher Effort Expectancy would be correlated with higher intention to use ELSTER, however this is not the case. While there is a significant correlation, it was not positive, as expected, but negative instead, showing that respondents that perceived digital tax-filing systems as easier to use were less likely to intend to use ELSTER. In light of these findings, Hypothesis 2 must be rejected.

While a significant effect of Performance Expectancy on behavioral intention to use ELSTER was assumed, the effect in the survey data is not statistically significant with a p-value of 0.052. For this reason, Hypothesis 1 also has to be rejected.

Hypothesis 3, that Social Influence will positively influence residents' behavioral intention to use online tax-filing, has to be rejected, as the p-value of 0.210 is too high to attest to statistical significance.

This is also the case with Hypothesis 4 about the impact of Facilitating Conditions. The p-Value of 0.131 is well above the thresholds set for statistical significance. H4 therefore also has to be rejected.

Hypothesis 5, however, is a clear-cut case for rejecting. The p-Value was extremely high at 0.982. This shows that there is no relationship between the user's Trust in Government and their intention to use ELSTER.

5.4 Hypothesis Testing: Factors Influencing the Intention to use Third-Party Software

Table 6: Third-Party Software Regression [*= $p < 0.05$ | **= $p < 0.01$ | ***= $p < 0.001$]

Variable	Model 3	Model 4
Performance Expectancy		0.5486***
Effort Expectancy		0.1088
Social Influence		-0.0812
Facilitating Conditions		0.0159
Trust		0.0043
Age	-0.1406	-0.0970
Gender	0.1874	0.2634
Experience	0.4184***	0.1334
F	6.83	6.84
R ²	0.1057	0.2140

The regression model for the behavioral intention to use third-party software is highly significant at $p=0.0000$ and $F=6.84$. The R^2 of 0.2140 shows, that the model explains 21.40% of the variance in the intention to use third-party software. The independent variables thus have a strong predictive power on the intention to use third-party software. With a coefficient of 0.549 and a p-value of 0.000, Performance Expectancy is the strongest factor in influencing residents' intention to use third-party software. This leads to the conclusion that the more a person believes tax software to be useful and effective, the more likely they are to intend to use it.

Model 3, which just contains control variables, is also highly statistically significant with $p = 0.000$ and $F=6.83$. The R^2 of 0.1057 shows, that the control variables explain just over 10% of the variance. Just like in Model 1 and 2, Experience is a significant factor with a coefficient of 0.418 and $p=0.000$. The Diverse Gender dummy variable is also technically a significant predictor, but this effect is likely skewed by the very small sample size of just 3. Therefore, this effect will not be further discussed in the analysis.

Hypothesis 1, which assumes a relation between Performance Expectancy and behavioral intention, is confirmed with a coefficient of 0.549 and $p=0.000$. This strongly supports the hypothesis that the perceived usefulness of the software is a key driver for its adoption. Hypotheses 2 about the Effects of Effort Expectancy, 3 about Social Influence, 4 about the impact of Facilitating Conditions and 5 about the Trust in Government all have to be rejected. The effect between Effort Expectancy and intention

to use third-party software is not significant with $p=0.375$. The Effects of Social Influence and Facilitating Conditions are both not significant with p -values of 0.517 and 0.925 respectively. Similarly to the ELSTER-model, Trust in Government is far away from being significant with $p=0.970$. There is thus no evidence of an effect of Trust in Government on the intention to use third-party software when observing this dataset.

5.5 Comparison

In order to be able to derive sound conclusions, it is important to first compare the findings from both Model 2 and Model 4 to show similarities as well as differences between the impact of the UTAUT constructs on the intention to use ELSTER versus the intention to use third-party software. While Performance Expectancy is the most important factor influencing respondents' behavioral intention to use third-party software, this is not the case for ELSTER usage, as the effect is just outside of the threshold for statistical significance ($p=0.052$). Perceived performance benefits are thus the main driver behind respondents' intention to use third-party software, while it does not have a statistically significant effect on the intention to use ELSTER. The most unexpected and therefore interesting finding is the divergence between how the intention to use ELSTER and third-party software is influenced by Effort Expectancy. In direct opposition to the initial assumption, Effort Expectancy is a statistically significant negative predictor of the intention to use ELSTER. This means that users who find digital tax-filing software easier to use are less likely to use ELSTER. Experience of using digital tax-filing software is a significant factor for the intention to use ELSTER and among the control variables for third-party software with coefficients of 0.234 ($p=0.044$) and 0.418 ($p=0.000$) respectively. It is, however, not significant for the third-party software model containing all independent variables, indicating that the independent variables account for more of the variance. Social Influence, Facilitating Conditions and Trust were not found to have a statistically significant impact on either of the dependent variables, with trust in particular having a near-zero effect. In addition to the individual factors, it is also important to mention that Model 4 for third-party software explains almost twice as much of the variance with an R^2 of 0.2140 than Model 2 which has an R^2 of 0.1163.

6. Conclusion and discussion

This research was conducted to find out which factors influence residents' intention to use online tax-filing in Germany. While the expectations were that the constructs of the UTAUT model could be validated in this context, the results show something different.

When examining these findings, it became apparent that factors influencing behavioral intention are not uniform among the Government system ELSTER and third-party software. Performance Expectancy is the significant factor with the highest explanatory power on the intention to use third-party software, while this effect is not significant for the intention to use ELSTER. At the same time, Effort Expectancy is not significant for the intention to use third-party software but significantly negatively impacts the intention to

use ELSTER. Experience is a significant factor in the intention to use ELSTER but does not significantly impact the intention to use third-party software.

The factors influencing residents' intention to use online tax-filing in Germany are thus Performance Expectancy, Effort Expectancy and Experience, although they are context specific depending on which digital tax-filing solution is intended to be used.

After depicting the key findings, this particular section further aims to interpret these results and confront them with prior theory as well as discuss real-world implications.

Hypothesis 1, stating that Performance Expectancy positively influences behavioral intention, was confirmed for third-party software but rejected for ELSTER. While the initial assumption was to find a positive effect for both, albeit a stronger one for third-party software due to better performance being integral to attracting customers to their product. This finding confirms the previously discussed observation that third-party software solutions position themselves as performance-oriented alternatives to ELSTER by offering and advertising better features such as guided input instead of blank sheets, tips in text or video form, an AI-chatbot and a review service. It further suggests that a user's perception of a system's performance is the most important factor in adoption behavior, which validates the UTAUT Construct of Performance Expectancy in the context of commercial software solutions. One possible explanation for the lack of a significant effect of Performance Expectancy on ELSTER could be that users are drawn to ELSTER by its status as the official Government-provided tool, rather than because of performance benefits. With the high adoption rate of 93% of digital tax-filing (Bundesministerium der Finanzen, 2024), and the unpopularity of paper-based filing exemplified by this, ELSTER is likely viewed as the "new normal" way of tax-filing. In addition to this, the significant effect of Experience on the intention to use ELSTER could point to habitual usage patterns, meaning that once users have established ELSTER as their choice of tax-filing method, they might not be motivated to switch easily.

The significant negative influence of Effort Expectancy on ELSTER is the most interesting finding of this study, as it contradicts a core construct of the UTAUT model and falsifies the hypothesis that perceived ease of use positively influences behavioral intention. In practice this result means that the lower the Effort associated with using ELSTER is, the lower the intention to use ELSTER will be. Conversely, the more difficult a user finds ELSTER to be, the higher their intention to use it will be, which makes the paradoxical nature of the result even more apparent.

While the result seems contradictory in nature, there are multiple possible explanations that can account for at least some of the variance. These, however, only become apparent when considering the specific way the items were formulated and possible individual cases that would lead to the answer pattern necessary to achieve this result.

One possible explanation could be that some of the users might simply choose not to file taxes at all if they are not legally required to do so. These users might, however, still expect ELSTER to require less effort than paper-based filing. This group would therefore have rated Effort Expectancy highly on the scale provided but still reported no intention to use either tax-filing software, accounting for some portion of the effect.

Similarly, some users choose to use a tax-advisor who handles tax-filing for them. They thus might think that digital tax-filing software is easier to use than filing the traditional paper-based way but still choose not to use ELSTER or third-party software, which would lead to the identical answer-pattern, and could equally explain the effect.

While the original UTAUT model by Venkatesh et al. (2003) considered voluntariness as a factor, this study chose to leave it out of its design, due to the voluntary nature of choice regarding the tax-filing method. This now turns out to be a shortcoming of this study. To further explore this particular phenomenon, however, it would be necessary to collect data on the impact of voluntariness not on any particular way of tax-filing, but on the decision whether to file taxes at all.

In their study on performance and customer service delivery in the banking industry, Aliyu and Tasmin (2012) point to cost as another potential factor influencing consumer behavior regarding e-service adoption. This effect could also be a factor influencing consumer choices to use ELSTER instead of third-party software. As ELSTER is an entirely free government service, potential users might associate a high degree of effort with its use but still be willing to use it because of the costs associated with switching to third-party software.

The significant effect of experience on the intention to use ELSTER shows an avenue to another possible effect contributing to this result. This significant effect means that users are more likely to stick to digital tax-filing software once they have learned how to use it. Users could therefore find ELSTER hard to use, but still use it regardless, as they have mastered the hard system over time. Unfortunately, the item for experience was posed to respondents in a way that does not account for continuous use of one or switches between different methods of digital tax-filing, namely ELSTER and third-party software.

The lack of effect of Social Influence on behavioral intention in the context of this study could be explained by the utilitarian nature of tax-filing. As factors such as performance play a significant role, at least among those intending to use third-party software, this focus on a purely utilitarian factor could mean that respondents likely decide based on what they think will perform best or what they have used before, as seen by the impact of experience, even though this survey did not specifically distinguish between experience with one digital tax-filing solution versus another. In addition to this, survey participants sometimes voiced not knowing the stances on digital tax-filing of those close to them, indicating that this topic is not widely discussed, which could further

explain the result. Anecdotal evidence from surveying however has to be taken with appropriate caution and must be understood as an avenue for further research, not a concrete finding.

While Venkatesh et al. stated that “[i]n predicting usage behavior [...] facilitating conditions [are] significant” (Venkatesh et al, 2003, p. 461) Facilitating Conditions were not found to have a significant impact on the intention to use ELSTER or third-party software in this study. The high mean of 3.8845 on a five-point scale indicates that the Conditions for using digital tax-filing software were largely present among the participants. This is especially the case for Item 1, which asks about the technical resources. The widespread availability of smartphones, computers and the internet leads to the necessary technological resources being widely available which are therefore no longer a concern that impacts adoption. To account for this development, UTAUT could be modified for future research in the context of developed countries by moving the item in question to the control variables. The rejection of Hypothesis 5 for both ELSTER and third-party software directly challenges the work of Carter and Bélanger (2005) and Chaouali et al. (2016), which found Trust in Government to significantly influence behavioral intention. This could be explained by the fact that both ELSTER and third-party software use the same, government-provided API. Awareness of this could have led to Trust in Government not being a concern. In addition to this, respondents are very likely aware of their data being provided to a government institution, in this case the tax office. If there is a monopoly of government on the data-receiving institution, Trust in Government may not be a significant concern for the delivery mechanism of how the data gets there. Trust in Technology might be a more relevant factor here, although differences between ELSTER and third-party software in this respect would likely get mitigated by using the same API. Furthermore, the context of tax-filing is a very transactional one. Users might ultimately be motivated by the prospects of receiving a tax refund and therefore ignore potential mistrust in favor of the financial benefits associated with filing.

7. Recommendations

As there is no affiliation with neither the German Government nor third-party software providers and the results of this study are especially interesting due to their partly contradictory nature, especially regarding the UTAUT construct of Effort Expectancy, the following recommendations are specifically addressed towards researchers in the field of public administration.

To explore the highly contradictory and unusual result of a significant negative correlation between Effort Expectancy and the intention to use ELSTER, public administration researchers should use qualitative methods to explore this anomaly. For this purpose, I recommend semi-structured interviews, as they allow for following a structure while also giving the participant space to express valuable thoughts and

opinions. The group of interviewees should be assembled by random sampling if possible, so that they include not only ELSTER or third-party software users but also people who use neither because they file through a tax advisor or because they do not file at all. If random sampling is not possible due to practical limitations, researchers should ensure that all four groups mentioned are represented by multiple individuals. The goal of this research is to create a theory that is able to explain the results of this quantitative study.

The second recommendation derived from the results of this study is targeted at future quantitative studies on this topic. Researchers should split the survey item for Experience into two, instead asking about Experience with ELSTER and third-party software separately, as this would allow for identifying habitual usage patterns that could be contributing to the interesting effect observed in this study.

Similarly, voluntariness of use should be included as a control variable, as this can allow for some insight on whether respondents use ELSTER fully voluntarily, or whether they are strongly influenced by being mandated to file tax returns, even in the specific system itself is not mandated. This addresses a limitation of this study design, that the original UTAUT model did not have. While the logic for the exclusion of voluntariness, that the choice of tax-filing method is voluntary in the overwhelming majority of cases, still applies, the potential impact of the obligation to file taxes for certain groups was not taken into account, which now turns out to be a mistake.

One possible explanation for the lack of significance of social influence on the intention to use either digital tax-filing solution is the possibility that financial topics, especially tax-filing are not commonly talked about among friends and acquaintances. This should be accounted for in the design of future studies, by asking participants how often they talk about filing taxes and other financial information such as their income with other people who are not part of their immediate family.

Further, the impact of cost on behavioral intention should be studied in cases where e-government and third-party services compete, as this is a major differentiator between the two alternatives of the free Government service ELSTER and third-party software offered by for-profit businesses. To achieve this, researchers should integrate a cost variable into their framework. If the resulting coefficient was significantly negative, this would indicate that an increase in cost would result in the intention to use ELSTER decreasing, which would confirm the assumption derived from the results of this study, that ELSTER being free to use is a significant factor in respondents' intention to use it.

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9. Appendix

9.1 Consent Form

Sehr geehrte Damen und Herren,

vielen Dank, dass Sie sich die Zeit nehmen, an meiner Umfrage teilzunehmen. Im Rahmen dieser Umfrage untersuche ich die Motivationen von Bürgerinnen und Bürgern in Deutschland, elektronische oder Online-Steuererklärungssysteme zu nutzen. Mein Ziel ist es, die Faktoren zu identifizieren, die die Entscheidung von Bürgerinnen und Bürgern beeinflussen, ihre Steuererklärung digital (entweder über das staatliche ELSTER-Portal oder Drittanbieter-Software) oder über den traditionellen papierbasierten Weg einzureichen. Alle von Ihnen bereitgestellten Informationen werden vollständig anonymisiert behandelt. Ihre Antworten werden nicht in einer Weise veröffentlicht, die Rückschlüsse auf Ihre Person zulässt, und sie werden weder für andere Forschungszwecke verwendet noch an Dritte außerhalb der Erasmus Universität Rotterdam, an der ich diese Forschung durchführe, weitergegeben. Die Beantwortung der Fragen wird voraussichtlich 5 Minuten in Anspruch nehmen. Ihre Teilnahme ist freiwillig, und Sie können die Umfrage jederzeit ohne Angabe von Gründen abbrechen.

Vielen Dank für Ihren wertvollen Beitrag zu meiner Forschung.

Freundliche Grüße,
Max Schnorr

Masterstudent an der Erasmus Universität Rotterdam

9.2 Questionnaire

1. Nutzungsintentionen (Use intentions – ELSTER / tp)

- Ich beabsichtige, in den nächsten 12 Monaten ELSTER zur Abgabe meiner Steuererklärung zu nutzen.
- Ich sage voraus, dass ich in den nächsten 12 Monaten ELSTER zur Abgabe meiner Steuererklärung nutzen werde.
- Ich plane, ELSTER in den nächsten 12 Monaten zur Abgabe meiner Steuererklärung zu nutzen.

- Ich beabsichtige, in den nächsten 12 Monaten Steuersoftware von Drittanbietern (z.B.: WISO Steuer, Taxfix) zur Abgabe meiner Steuererklärung zu nutzen.
- Ich sage voraus, dass ich in den nächsten 12 Monaten Steuersoftware von Drittanbietern (z.B.: WISO Steuer, Taxfix) zur Abgabe meiner Steuererklärung nutzen werde.

- Ich plane, Steuersoftware von Drittanbietern (z.B.: WISO Steuer, Taxfix) in den nächsten 12 Monaten zur Abgabe meiner Steuererklärung zu nutzen.
2. Leistungserwartung (Performance Expectancy – pe)
 - Die Nutzung der Online-Steuererklärung hilft mir, meine Steuererklärung effizienter zu erledigen.
 - Die Online-Steuererklärung vereinfacht für mich den Steuerprozess.
 - Durch die Online-Steuererklärung spare ich Zeit.
 - Ich glaube, dass die Nutzung der Online-Steuererklärung die Qualität meiner Steuererklärung verbessert.
 - Die Online-Steuererklärung gibt mir mehr Kontrolle über den Steuerprozess.
 3. Aufwandserwartung (Effort Expectancy – ee)
 - Es fällt mir leicht, zu lernen, wie ich das Online-Steuerklärungssystem nutzen kann.
 - Ich finde das Online-Steuerklärungssystem einfach zu bedienen.
 - Es ist für mich leicht zu verstehen, wie ich meine Steuererklärung online ausfüllen kann.
 - Es wäre einfach für mich, Sicherheit im Umgang mit dem Online-Steuerklärungssystem zu gewinnen.
 4. Soziale Einflüsse (Social Influence – sil)
 - Menschen, die mir wichtig sind, finden, dass ich die Online-Steuererklärung nutzen sollte.
 - Personen, deren Meinung ich schätze, ermutigen mich dazu, meine Steuererklärung online einzureichen.
 - Ich fühle einen sozialen Druck, die Online-Steuererklärung anstelle der Papierform zu verwenden.
 - Informationskampagnen oder Werbung der Regierung beeinflussen mich, die Online-Steuererklärung zu nutzen.
 5. Unterstützende Bedingungen (Facilitating Conditions – fc)
 - Ich habe die technischen Ressourcen (z. B. Computer, Internet), um das Online-Steuerklärungssystem zu nutzen.
 - Ich verfüge über das nötige Wissen, um meine Steuererklärung online einzureichen.
 - Das Online-Steuerklärungssystem ist mit meinen bisherigen Methoden zur Dokumentenverwaltung kompatibel.
 - Wenn ich Schwierigkeiten mit der Online-Steuererklärung habe, kann ich problemlos Hilfe bekommen.

6. Vertrauen (Trust - T) (Homburg et al., 2020) [own translation]
- Die Informationen, die Bürger von meiner Regierung erhalten, sind klar und deutlich.
 - Meine Regierung hält im Allgemeinen ihre Versprechen
 - Ich fühle mich bei meiner Regierung gut aufgehoben
7. Bitte geben Sie ihre Altersgruppe an:
- 18 - 24
 - 25 - 34
 - 35 - 44
 - 45 - 54
 - 55 - 64
 - 65+
8. Bitte geben Sie Ihr Geschlecht an:
- Weiblich
 - Männlich
 - Divers / Nicht-binär
9. Wie viel Erfahrung haben Sie mit der Nutzung von Online-Steuererklärungssystemen?
- Keine Erfahrung
 - Wenig Erfahrung (1-mal)
 - Mittlere Erfahrung (2–3-mal)
 - Viel Erfahrung (4 oder mehr mal)