Johanna Sturm

"eLicense and Registration, Please": Awareness, Perceived Equivalence and Confidence in Using Austria's Digital Identity Wallet ('eAusweise')

Master Thesis

at the Chair for Information Systems and Information Management
(Universität Münster)

Supervisor: Prof. Dr. rer. pol. Michael Räckers

Presented by: Johanna Sturm

Date of Submission: 2025-06-02

Content

Figures

Tables

Equations

Abbreviations

A	Attitude
ATDI	Austrian Digital Identity
BI	Behavioral Intention
BRZ	Austrian Federal Computing Center (‘Bundesrechenzentrum‘)
CC	Citizen’s Card (‘Bürgerkarte’)
CP	Controlling Party
CRR	Central Register of Residents
DO	Digital Office (‘Digitales Amt’)
E-GovG	Austrian eGovernment Law (‘E-Government-Gesetz’)
eID	Electronic Digital Identification
eIDAS	Electronic Identification, Authentication and Trust Services
EU	European Union
EUDI	European Union Digital Identity
EVT	Expectancy-Value Theory
eWOM	Electronic Word of Mouth
FIDO	Fast Identity Online
GWK	‘Gemeindewachkörper’ (‘Municipal Security Service’)
ICT	Information Communication Technology
ID	Identification
IdM	Identity-Management
IdP	Identity Provider
LoA	Levels of Assurance
MPK	‘Mobile Polizei Kommunikation’ (‘Mobile Police Communication‘)
MPS	Mobile Phone Signature (‘Handy-Signatur’)
OESD	Austrian State Printing House (‘Österreichische Staatsdruckerei‘)
PEOU	Perceived Ease of Use
pWOM	Personal Word of Mouth
PU	Perceived Usefulness
SN	Subjective Norm
STORK	Secure Identity Across Borders Linked
SP	Service Provider
SSI	Self-Sovereign Identity
TAM	Technology Acceptance Model
TRA	Theory of Reasoned Action
UTAUT	Unified Theory of Acceptance and Use of Technology

Symbols

MoE	Margin of Error
n_0	Targe Sample Size
p	p-value
χ	Chi
Z	Z-score

1 Introduction

Since their inception, smartphones, the internet and digital technologies more generally have evolved from exciting novelties, which open doors to new worlds of entertainment, information and global connectivity, into essential components of everyday life. Acting as constant companions, digital technologies are embedded in our homes, help us maintain connections to our friends and family, grant instant access to the world's knowledge and function as digital workspaces, designed to increasingly alleviate professional workloads (Sidoti et al., 2024; Teodorescu et al., 2023). As the digital realm continues to expand, becoming ever more pervasive, secure identification and authentication in digital transactions becomes increasingly critical. Recognizing this need, governments around the world have started to provide verified and assured digital means of identification, commonly referred to as electronic identification (eID) (Leitold & Posch, 2012).

While human life increasingly unfolds in the digital realm, technology is likewise permeating the analog world. From digital event tickets and virtual boarding passes to contactless payment via Apple or Google Pay, smartphones are gradually taking the place of wallets, now serving not only as gateways to the digital sphere, but interfaces to everyday physical interactions. This shift gives rise to a second essential function of digital public identity services: the enablement of secure and digital proof of identity and qualifications in face-to-face scenarios (DG Connect, 2024e).

While in some areas of the world the transition towards digital wallets has already started years ago, most Western countries are still at the beginning of their journey towards smartphone-based identification means for proximity cases (Ru, 2017; Kouliaridis et al., 2023). Among others, these efforts include the European Union Digital Identity (EUDI) Wallet, building on earlier harmonization efforts of eID within the scope of the European Union's (EU) Electronic Identification, Authentication and Trust Services (eIDAS) legislation. While the supranational wallet is planned to be rolled out by the end of next year, some early movers, including Austria, have launched national solutions ahead of time (Kouliaridis et al., 2023). With many of the virtual functionalities of EUDI already included in the country's eID scheme ID Austria the nation has placed special focus on proximity cases in the implementation of Austria's Digital Identity (ATDI) wallet application 'eAusweise'.

Built in a public-private partnership involving many public-sided stakeholders, the ATDI wallet launched in 2022, providing access to a digital driver's license credential (Austrian Federal Computing Center, 2022). Ever since, its application area has grown to also encompass a digital proof of age, the digital vehicle registration, as well as a digital proof

of identity, with the addition of a student ID credential planned for the first quarter of 2026 (Federal Chancellery, 2025). Building on authentication via ID Austria, the application emphasizes user control and data minimization principles, enabling citizens to securely prove their identity and qualifications to government authorities and third parties in real life (Federal Chancellery, n.d.b). The wallet has received substantial public recognition, winning the eAward 2024 in the category "Services and Processes", and achieved more than 1.5 million credential activations on their platform by 2024 (Initiative D21 & Technische Universität München, 2024; Mein Bezirk, 2024; OeSD, 2024).

Despite increasingly prominent discussion on digital identity wallets in the public sector and the implementation of early examples, such as ATDI, the research field of digital identity wallets, especially in a public sector context, is still relatively new, with no universal definition of the concept having emerged. Indeed, while the term has found mention in multiple disciplines, it frequently refers to different technical concepts and functional ideas (Podgorelec et al., 2022). Furthermore, contributions that do follow similar notions as the ATDI wallet remain largely focused on technological underpinnings, system architecture, interoperability and security standards (e.g. Kouliaridis et al., 2023; Babel et al., 2025; Podgorelec et al., 2022). In contrast, the human dimension of diffusion and adoption, especially in the context of similar eGovernment efforts, has so far hardly been addressed beyond superficial reports.

Addressing this research gap, this thesis strives to contribute to eGovernment adoption literature, as well as to the academic field of digital identification by providing early exploratory insights into adoption, understanding and perceived equivalence of digital identity wallets from the citizen's perspective. Following a case study approach centering the ATDI wallet, this research explores beliefs about the public identity wallet service's most established credentials: the digital driver's license, and the digital vehicle registration. This is done by operationalizing the following research questions:

Are Austrian citizens aware, clear and confident about the country's digital identity wallet service offering and do they believe its driving and vehicle credentials are equivalent to their physical counterparts in usage scenarios?

a. *To what extent are Austrian citizens and residents familiar with, knowledgeable about, and feeling informed regarding the country's digital identity wallet service offering, including where and when it must be accepted?*
b. *Do Austrian citizens and residents think the country's digital identity wallet credentials can be used and will be accepted in the same way as their physical counterparts?*

To address and operationalize the research questions, a cross-sectional study was conducted, yielding 405 responses on a 16-item online questionnaire. While not representative of the Austrian population, the sample data provides exploratory insights into adoption behavior, information diffusion about the wallet, as well as perceptions of equivalence between digital credentials and their analog counterparts. Thus, while limited in external validity, this thesis offers early indications of the mindset of both potential and actual adopters of the ATDI wallet. Consequently, this thesis can serve as a starting point for future academic inquiry, and provide practical takeaways for practitioners by shedding light on the diffusion dynamics of one of Europe's most established digital identity wallet services for proximity use, ahead of Union-wide implementation

The following chapter introduces the Austrian case, providing detailed information about the ATDI wallet's functionalities, development and promotion, as well as discussing the historical context of electronic identity management in the country. Subsequently, the theoretical background is covered, including definitions and a contextual framing for this paper. Having established the background and context, the methodology section provides an overview of methods and tools used for both preliminary and empirical research. It is followed by a chapter presenting the results, and another one interpreting the findings and addressing potential limitations. Finally, a conclusion is provided synthesizing the research process and outputs.

2 ‘eAusweise’ – Austria’s Digital Identity Wallet in Context

This chapter centers the thesis’ research object, the Austrian Digital Identity Wallet, introducing not only its functionalities, implementation partners, diffusion strategy and technical setup, but also its setting in a wider context. Opening with its placement in the Austrian eGovernment landscape and the population’s general readiness for digital public services, the first subsection provides an overview of digital identity developments in Austria. This macro-overview is followed up in the second subsection by a deeper dive into the ATDI wallet specifically. First shedding light on the adopters’ perspective, the application’s functionalities and user journey are introduced, with a focus on the driving credential and vehicle registration use cases. Secondly, the more institutional project set-up is discussed, providing insights into development partners and stakeholders, both within Austria and in context with joint European digital wallet efforts, as well as aspects of diffusion promotion and legal embedding.

2.1 Digital Identity in an Austrian Context

Austria’s approach to digital governance is characterized by a coordinated national strategy aimed at expanding the availability, usability, and security of electronic public services. Closely aligned with broader European objectives, this strategy encompasses not only the development of digital infrastructure and skills, but also efforts to enhance the accessibility and integration of digital identity systems. The following subsections place digital identity in the context of Austria’s eGovernment strategy, shed light on patterns of adoption and digital readiness among the population, and the historical evolution of electronic identification (eID) platforms, culminating in 2023’s introduction of ID Austria as the current standard for secure digital identification.

2.1.1 Austrian eGovernment Strategy

Ranking among the European frontrunners in eGovernment (DG Connect, 2024a), the nation pursues the vision of *“[p]eople us[ing] trusted services in digitally sovereign Austria.”* (Digital Austria, 2023). Closely aligned with the EU’s Digital Decade plan, the strategy’s foremost action areas are further development of digital competences and the formation of an ICT workforce, safe and sustainable digital infrastructure, the successful digital transformation of businesses and the digitalisation of government services. As such, the program mandates increased digital competence training, e.g. via local workshops (‘Digital Überall’), focuses on interoperability, as well as pushes for increased 5G coverage and further legal embedding of new technologies, such as AI, and strives to create a one-stop-shop for citizen-facing digital government services (DG Connect, 2024b; Digital Austria, 2023; Austrian Ministry of Finance, 2023a).

Characterized by a cooperative federalist approach, involving intensive collaboration between the federal government, federal states (‘Länder’), municipalities, and local communities approach across all levels of government, Austria’s eGovernment strategy targets four impact areas: citizens, businesses, administrative agencies, and overall architecture and basic components. Beyond emphasizing system reliability, security and national digital sovereignty, the strategy’s initiatives highlight the need to focus on a functionally expanded, operationally simplified and accessible user journey for citizens, all the while strengthening back-end efficiency (Digital Austria, 2023; Austrian Ministry of Finance, 2023a).

Recognizing the country’s high number of access points to already established digital public services, including the ‘Digital Office’ (‘Digitales Amt’) (DO) app and the general government information portal oesterreich.gv.at, as well as more specialized service points, such as the tax portal ‘FinanzOnline’, special focus is placed on easy-to-find, accessible, mobile-compatible and multilingual service provision towards citizens, but also on back-end integration and interoperability. Accordingly, one of the 2023 strategy’s core tenets is that of increasingly interlinked services promoting ID Austria, the country’s identity verification platform, as a single entry-key. In this area, initiatives include i.a. the provision of proactive and personalized information about digital services, such as ID Austria, the promotion of ‘once-only’ and 'privacy by design' principles during new service development, the expansion of use cases for digital identity management, and setting up joint architecture management and standardized operating structures (Digital Austria, 2023).

2.1.2 Austrian eGovernment Adoption and Readiness Among the Population

Alongside increased digital public service provision, Austria’s eGovernment strategy heavily features initiatives to upskill the population in the digital domain, strengthening the country’s economy and workforce, as well as powering the transition towards digital-first public services. Having proposed the very ambitious target of ensuring 100% of its population aged 16-74 having at-least-basic digital skills by 2030, many measures from stronger integration of digital means into school curricula to targeted initiatives, such as the ‘Digital Überall’ progam, providing educational workshops in local communities are continuously being implemented (DG Connect, 2024b).

More specifically consulting statistics on Austrian eGovernment usage, an uptick in citizens adopting the state’s digital service offering is clearly noticeable, with some accelerated diffusion associated to the times of COVID-19 lockdowns (Digital Austria, 2023). Already in 2018, 66.1% of Austrians reported the use of eGovernment services, including online research, download and return of official forms and documents

(Djahangiri et al., 2019). By 2024, both the country's offer and its uptake had risen, with 75% claiming use of eGovernment platforms in the past 12 months. While research on government websites still ranked among the top activities among users (43.9%), citizens requesting information about their own person via government portals ranked the highest (51.9%), closely followed by other top contenders, including the usage of digital government inboxes (45.4%) and the submission of tax filings and employee assessments in Austria's 'FinanzOnline' portal (45.1%) (Peterbauer & Kropfreiter, 2024b). Peterbauer and Kropfreiter's (2024a[1], 2024b) studies also showed how electronic identification had gained popularity, with 46.4% of Austrians reporting an activated mobile phone signature (MPS), ID Austria or Citizen's Card (CC) ('Bürgerkarte') in 2024, and 33.7% having declared awareness of these tools without activation in 2023. In 2024, about a third of users with at least one of these tools declared usage of them in the past 12 months.

While frequently suggested reasons for non-adoption or rejection of digital public services, such as security and privacy concerns were mentioned by about a third of non-using respondents, when asked why they did not have an activated electronic identity verification tool, such as ID Austria, the highest ranked reason, at 72.7% was a lack of need for these tools. However, 33.5% reported a lack of knowledge about the tools' use cases and 31.8% a lack of knowledge about how to get and activate them. Among the roughly two thirds of adopters, who did activate the digital identity verification tool in the past, but did not use it in the previous 12 months, common non-usage criteria, such as technical problems, a lack of user-friendliness, or privacy and security concerns ranked even lower, while 80.8% cited a lack of need for using it (Peterbauer & Kropfreiter, 2024b).

2.1.3 A History of Austrian Electronic Identification Platforms

Starting in the late 1990s, governments began developing electronic complements to state-issued analog identity documents, providing personal identity data in electronic form that allow for the unique representation of a person online. Though having evolved since then in form, complexity, cross-border harmonization and security, such eID services enable citizens to digitally enter contracts, access government services and prove their identities in digital spheres to this day, probably now more than ever (Leitold &

[1] The most current report on Austrian ICT-usage in households is not yet published, however some of its data, gathered between April and July 2024, is already available in Peterbauer & Kropfreiter, 2024b, and used preferentially in this thesis. Beyond the matter of currency, the Peterbauer & Kropfreiter, 2024a report on the previous year was published with some faulty data, corrected in the dataset idem, 2023 (J. Peterbauer [Statistik Austria], personal communication, February 17, 2025). While the 2024a report was referenced for interpretation purposes, data from the 2023 source was substituted where necessary.

Posch, 2012). The following subsections provide a picture of the Austrian eID landscape and how it evolved from the early-2000s CC to its current version 'ID Austria'.

2.1.3.1 Austrian Citizen's Card and Mobile Phone Signature

Among the early eID implementers in Europe, Austria's smart card system was built on initial successes with smart health and social services cards ('eCards'). Followed up by a government resolution in November 2000, this first exploration into smart card usage in the public sector gave rise to the Austrian CC concept. Originally intending to add eID functionalities to either the newly established eCards or official personal identity cards, like many other European countries were doing, Austria was confronted with low diffusion rates of personal ID cards among the population (around 10% at the time). Given Austria's longstanding tradition of no mandatory ID card, identification documents were, and are still, presented depending on situational identification needs (e.g. driver's license, health insurance card, student ID, passport), with the driver's license especially filling a similar function, as ID cards do elsewhere. Concerned about diffusion numbers on the one hand, and facing political and privacy concerns in the case of eCards, given that social insurance numbers would have been used as unique identifiers, the country opted for a third option, basing its eID scheme on encrypted identifiers from the newly established Central Register of Residents (CRR) (Aichholzer & Strauß, 2010).

Piloted in 2002, and legally underpinned by 2004's eGovernment Act, the roll-out of the CC was finalized in 2005 and eID made available to every Austrian citizen via an opt-in model free of cost. Contrary to other country's implementations, in which eID functionalities were either added to newly issued government ID cards (e.g. Germany, Belgium, Estonia), or implemented via existing private sector infrastructure, for example by authorizing banking credentials to be used in government transactions (e.g. Sweden), Austria's CC model was finally not based on a specific card, but rather a card- and later technology-agnostic virtual concept. This way, eID functionalities could be activated on both private- and public sector issued cards (e.g., ATM cards, eCards), provided they were equipped with the necessary cryptographic functionality and activated by the citizen, with later expansion to USB tokens and mobile phone devices (Aichholzer & Strauß, 2010; Hemesath & Gerrits, 2023; Leitold & Posch, 2012).

Technically, the CC was diffused rather quickly, and all ATM and eCards were issued with the "sleeping" eID capability from 2005 onwards, with CCs combining two core functionalities: verifying the card holder's identity and authenticating their digital requests by providing a means for digitally signing in online transactions, as well as encrypting and signing documents virtually. However, while theoretical market penetration was given, actual activation and usage of CCs was significantly below

expectations, despite multiple attempts at stimulating uptake. Facing similar diffusion issues as its German equivalent, the CC solution was plagued by the opt-in set-up and additional effort required for activation, the hardware and software requirements (card reader, special software client) for usage, a general lack of user-friendliness, as well as the fact that less certified digital signatures were still widely accepted (Aichholzer & Strauß, 2010; Beck, 2021; Hemesath & Gerrits, 2023; Zefferer et al., 2011; Zeiler, 2023).

Despite the characterization of CC as a technology-agnostic concept, rather a than smart-card dependent configuration from the start, mobile phones were only introduced as CC tokens in 2009. With centrally stored certificates, validated using two-factor authentication in the form of a password and either a SMS-TAN or confirmation in a specialized app, the MPS, proved a great accelerator to CC diffusion, in large parts replacing traditional carriers by providing a better fit with users' lived realities at the time. Indeed, by 2018, around 1 million MPSs were activated, compared to around 98,000 card carriers, most of which were public employee ID cards (Leitold & Konrad, 2018; Zefferer et al., 2011; Zeiler, 2023).

In line with the widespread takeover of CC in the form of MPS, the chip card model is slowly being phased out since 2019, when the CC functionality of newly-issued eCards was formally revoked (Zeiler, 2023). While a strong additional boost in user numbers of MPS was noticed during the early years of the COVID-19 pandemic, especially when vaccination and testing certificates could be accessed via the eID, the CC program, including MPS, have formally been replaced by ID Austria, the country's new eID scheme with extended functionality at the end of 2023. Since then, users with already issued and activated versions of CCs, be they phone- or card-based, are automatically prompted to transition to the new scheme, as it is required for eGovernment transactions today. Switching from a CC to ID Austria's basic version does not require an additional face-to-face visit to the authorities and does not incur additional monetary cost (Amon, 2024; Federal Chancellery, 2024a; Polzer & Meyer, 2023).

2.1.3.2 ID Austria

Piloted in 2023, and officially replacing CCs in December of the same year, ID Austria is the country's current and only eID model. Like its predecessor, ID Austria is mostly smartphone-based, operated via the DO app with the alternative to use a Fast Identity Online (FIDO) security key or signature card for those who do not have the means or wish to use such a device (Federal Chancellery 2024a, 2024b).

For the transitional phase from CC, two iterations of ID Austria are concurrently available: ID Austria 'Full functionality' ('Vollfunktion') and 'Basic Functionality'

('Basisfunktion'). Newly registered users and previous CC users, who activated and certified their identity at an official authority service (e.g. FinanzOnline or a magistrate office) are directly entered into the former option. Former CC users, who registered at other stations, including for example post offices and social insurance offices, which used to act as certified registration points for CC, are initially entered into ID Austria 'Basic Functionality', pending re-certification at an official authority. While the 'Basic Functionality' option provides access to all services previously available in CC and still allows for SMS-TAN identification, the 'Full functionality' model offers access to additional services, including i.a. access to the ATDI Wallet (Federal Chancellery, 2024a, 2024b).

To activate and use the application, users must be aged 14 years or older, in case of authentication via the smartphone, have the DO app downloaded updated, and secured via biometrics (e.g., requiring a finger print or facial scan, such as FaceID), and have completed their registration, proving their identity face-to-face at a recognized authority for ID Austria activation. In accordance with eIDAS regulations (see 2.2.3), ID Austria's functionalities (e.g., log-in to government service portals, wallet applications) are also made available to users of other eIDAS-notified eID schemes (Federal Chancellery, 2024b).

As of January 2025, more than 500 official procedures could already be completed using ID Austria, with the service being used by around 3.8 million Austrians in April 2025. To further boost user numbers, the Austrian state secretary for Digitalization, Alexander Pröll, who entered office in March 2025, announced a relaunch of the eID tool for the summer of the same year. Updates are slated to include improvements in user-friendliness for the DO app, the automatic registration in the system upon birth, additional authorized registration offices, as well as a simpler access for citizens of other EU countries. Additionally, it is planned to eliminate fees for government transactions conducted digitally (Der Standard, 2025; Federal Chancellery, n.d.a).

2.2 Austrian Digital Identity Wallet Implementation: Use Cases, Architecture and Implementation Strategy

Optimized for proximity cases, the ATDI wallet provides a means for Austrian citizens and foreigners with relevant interest in the solution with a convenient way to establish their identity vis-à-vis authorities and third parties. In the following subsections its application and use cases are introduced, including an overview of the ATDI wallet's driving credentials' user journey. Subsequently, an overview of the wallet's origin and development, as well as government-enabled diffusion efforts is provided, and the gap

between promotion- and assumption-based public expectations, and the application's legal embedding is discussed.

2.2.1 Application Overview and Use Cases of the Austrian Digital Identity Wallet

Expanding on the electronic identification options enabled by ID Austria, the ATDI wallet application, 'eAusweise', provides a convenient smartphone-based way to use government-issued credentials about one's person in proximity cases, i.e. in real-life verification scenarios. Accordingly, the app allows users to fetch, save, display and electronically verifiably prove their own data from Austrian registries (e.g. driver's license registry) to third parties in an offline and ISO-compatible process. Verifiers can include both fellow civilians, including private sector parties, and members of executive bodies, such as the police. However, while in these verification situations the displayed credentials serve the same function as their physical counterparts, these analog documents are not replaced or lose validity upon activation of digital ID credentials. The app will be part of the European Digital Identity Wallet, put forth in the eIDAS 2.0 legislation (see 2.2.3) and should as such be operationally recognized even beyond the country's borders by the end of 2026 (Austrian Ministry of Finance, 2024a; Federal Chancellery, 2024c; Polzer & Meyer, 2023; Austrian Federal Computing Center, 2022).

Launched in autumn 2022, the ATDI wallet app was initiated to allow for the display of cryptographically signed driver's license credentials. Targeting a younger demographic, the next addition to the app followed around a year later: The digital proof of age provides a way to prove fulfilment of minimum or maximum age credentials to third parties. Strongly based on principles of personal data sovereignty and self-disclosure, it could for example be used to verify being in the required age group to enter a club, without sharing one's name or date of birth. The two credentials were followed up with another traffic-related application in early 2024: The digital vehicle registration certificate, which allows for users to present and even share with others the vehicle registrations for up to 50 cars. The last addition came in June 2024, in the form of a digital proof of identity, allowing for authorities and third parties to verify someone's identity in proximity cases more generally (Austrian Federal Computing Center, 2022, 2023; Der Standard, 2024; Federal Chancellery, 2024d, 2024e, n.d.b).

Beyond the official ATDI wallet app, another digital credential was piloted in 2023 and fully rolled out since: The digital pupil card 'edu.digicard' was launched as a digital extension to Austria's standardized physical student card 'educard', certifying students' attendance at their school. While during the pilot phase, the application was deliberately

integrated into a separate app, it is unclear, why this was not done later[2] (Austrian Ministry of Education, n.d.; Der Standard, 2023). Due to its separate organization, being administrated by the Federal Ministry of Education, it is excluded from further discussion in this thesis.

As with ID Austria, the recently sworn in government also announced an expansion of the ATDI wallet, announcing in May 2025 that a digital student ID credential will be launched at the start of the 2026 summer semester. With the new addition, the government hopes to onboard Austria's 394,000 students at public universities, universities of applied sciences and teachers' colleges to the ATDI service (Federal Chancellery, 2025).

A more detailed overview of the different use cases within the official ATDI application, including among other things, details on promoted target use cases, functionality-specific set-up requirements, target user and verifier bases, as well as adoption rates and technical requirements, can be found in Table 1.

2.2.1.1 User Journey of the Austrian Digital Identity Wallet

This subsection explains ATDI wallet usage from a citizen user's perspective. Given the discussion of promotion and diffusion in section 2.2.2, the user journey presumes awareness and willingness to use the wallet, starting with onboarding and initial set-up. Given this thesis' focus on driver's license and vehicle registration credentials, the user journey is reduced to these use cases for the sake of simplicity.

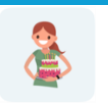
2.2.1.1.1 Onboarding and Initial Setup

From the perspective of a citizen aware and willing to use the app, the user journey with the ATDI wallet application starts at complying with the requirements for activation of digital credentials. Assuming they do not hold an ID Austria with full functionality (see 2.1.3.2) already, this means registering for the national eID service, as ID Austria acts as log-in key for the ATDI app. As discussed in previous sections, this can either be done by transferring an existing MPS, if it was registered at an ID Austria authorized office, by upgrading an MPS-transferred ID Austria to full functionality at an official appointment for personal identity verification, or by registering a new ID Austria. To do the latter, users are asked to install the DO app and pre-register before activating their new ID Austria account via smartphone-TAN at an official registration point. For foreign citizens registration is only possible at state police directorates or branches of the Austrian tax authority.

[2] An inquiry for further details on the edu.digicard, as well as usage data was sent to the responsible Ministry of Education on May 7th, 2025. No response has been received as of the submission of this thesis.

Table 1 – Austrian Digital Identity Wallet Use Cases

Note: Own table (cf. (1) Federal Chancellery, n.d.b.; (2) Federal Chancellery, 2024f; (3) Federal Chancellery, 2024e; (4) Federal Chancellery, 2024g; (5) Federal Chancellery, 2024h; (6) Austrian Ministry of Finance, 2023b; (7) Statistik Austria, 2025a; (8) Austrian Federal Computing Center, 2022; (9) Mein Bezirk, 2024; (10) Initiative D21 & Technische Universität München, 2024 ; (11) Christof, 2025; (12) Federal Chancellery, 2024i; (13) B. Allex [Statistik Austria], personal communication, November 27, 2024; (14) Statistik Austria, 2025b)

Use case	Digital Driver's License	Digital Vehicle Registration Certificate	Digital Proof of Identity	Digital Proof of Age
Icon				
Launch	October 2022	General: February 2024 Forwarding: January 2025	June 2024	September 2023
Amount of credentials per person	max. 1	max. 50 (3)	max. 1	max. 1
Targeted / promoted usage situation	Traffic control, third parties	Traffic control, third parties	Proof of identification, third parties	Entering a night club, cinema, buying age-restricted substances (5; 6)
Use-case-specific set-up requirements	Valid Austrian cheque card driving licence (1)	Vehicle license (paper or cheque card) issued in Austria (1); vehicle is registered to a natural person (3)	-	-
Combined presentation with another 'eAusweise' accreditation possible	Possible with digital vehicle registration certificate, not required (1)	Possible with digital driver's license, not required (1)	NO	NO
Transfer mechanism	Bluetooth connection established via real-time generated QR code (2)	Bluetooth connection established via real-time generated QR code (3)	Bluetooth connection established via real-time generated QR code (4)	Bluetooth connection established via real-time generated QR code (5)
Credential refresh	Passively refreshing; Refresh within the past 30 minutes required for display (2)	Active data refresh required within the past 12 months (3)	Active data refresh required within the past 12 months (3)	Active data refresh required; Refresh needed to reflect age change (5)
Active internet connection required	For third party checks (2)	Only for refreshing data (see above)	Only for refreshing data (see above)	Only for refreshing data (see above)
Target user base	Drivers	Vehicle owners & drivers	Anyone (Austrians)	Younger people (14-25)
Estimated size of target user base	n/a (13)	~ 8.36 million motor & support vehicles; potential user count n/a (14)	~ 9.198 million Austrians (7)	~ 1.148 million Austrians (7)
Targeted verifying entity	Police authorities, (third parties)	Police authorities, (third parties)	Authorities, third parties	Private sector third parties (e.g. cashier)
Data displayed to verifying entity	Third parties: driving credentials, first name, surname, photo; Police: extended data from additional databases (8)	Vehicle data, no supplementary sheet information	Third parties: Name, date of birth and photo (1); Authorities: contextual extended data (4)	Photo, time of last refresh, age eligibility (compared to 14/16/18/21 years) (1; 5)
Analog equivalent exists	YES	YES	YES	NO
Obligation to accept (among verifiers)	For Austrian police authorities; No requirement for (private) third parties (2)	For Austrian police authorities (11); No requirement for (private) third parties	Austrian federal authorities: likely (11), up to acting executive body (12); No requirement for (private) third parties	NO
Legal Embedding	§ 15a FSG	§ 102 para 5 lit b KFG	(§ 4 para 6 E-GovG)	(§ 4 para 6 E-GovG)
Delegation possibility	NO	Registration pools and forwarding (1; 3)	NO	NO
User numbers	654 000 driver's licenses activated (December 2024) (9)	590,000 registrations activated (December 2024) (9)	~ 100,000 activations (August 2024) (10)	~265,000 activations (August 2024) (10)

They furthermore need to present proof of a relevant relation to Austria, such as an employment confirmation or residence registration certificate. For Austrian citizens, registration points also include magistrate offices, district administrative authorities, and in some federal states the municipal office the citizen is registered at. Citizens are asked to bring a photo ID and a passport picture in case no recent photo is registered in the CRR. Moreover, to be qualified to activate ID Austria, applicants need to be at least 14 years of age and comply with the technical and security requirements of the DO app (i.e. a smartphone with Android 10 or newer or respectively iOS 15 or newer and biometric encryption functionality, such as FaceID or TouchID). Alternatively, FIDO or signature card options are available (Austrian Interior Ministry, 2025a; Federal Chancellery, 2024a, n.d.c).

Once an ID Austria 'full functionality' is assigned and a user has downloaded the ATDI app, 'eAusweise', which is a separate application from the DO app, they are guided through an activation process. This includes prompts to accept the terms of service and privacy policy, as well as to secure the app via a biometric lock, as shown in Figure 1 (A-SIT, 2024; Austrian Ministry of Finance, 2024b).

Figure 1 - Activation Dialogue of the Austrian Digital Identity Wallet App

Note: Screenshots from Austrian Ministry of Finance, 2024b

2.2.1.1.2Loading Digital Credentials into the Austrian Digital Identity Wallet

With both an activated ID Austria 'full functionality' and the ATDI application downloaded and set up on the same device, users are able to load their digital credentials onto the device. To do so, they are presented with the option to choose the type of digital credential to activate. Depending on their choice, users are walked through a short introduction on what the specific credential's purpose is and the use-case-specific requirements to add it to the device (see use-case-specific requirements in Table 1). Following the acceptance of the credential-specific terms and conditions and a data privacy policy, users are forwarded to the DO application to authenticate their identity using ID Austria, and the credential is added to their ATDI application. In the case of the digital vehicle registration certificate, all retrievable registration credentials can be loaded

onto the device in one step. Moreover, in the case of temporary sharing of another person's vehicle registration, users can walk through a specialized dialogue to either add someone else's credential to their wallet or share their own via a generated QR code. The process of adding a user's personal digital vehicle registration is shown in Figure 2 (Austrian Ministry of Finance, 2024b; Zellinger & Dittlbacher, 2024; Austrian Federal Computing Center, 2022; Oesterreich.gv.at, 2025).

Figure 2 - Loading of a Digital Vehicle Registration in the Austrian Digital Identity Wallet

Note: Screenshots from Austrian Ministry of Finance, 2024b

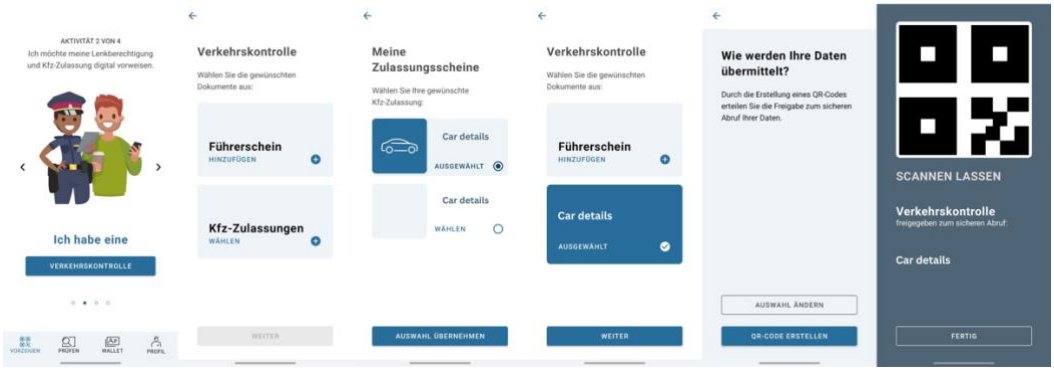
2.2.1.1.3Use Case 1: Presenting Digital Driving Credentials at a Traffic Stop

During a traffic stop, users who choose to present their driving credentials digitally, can trigger a specialized dialogue to display their digital vehicle registration and driver's license in a joint or separate format. Users are walked through a short dialogue, as shown in Figure 3, asking them i.a. which vehicle registration they would like to present. Subsequently, a QR code is generated, which police officers can scan using the MPK ('Mobile Polizei Kommunikation', 'Mobile Police Communiation') app. The scan establishes a Bluetooth connection between the two devices, enabling the transfer of an identifier. This ID is subsequently used by the officer's device to load relevant data directly from relevant databases, such as the driver's license registry, hosted by the Austrian Federal Computing Center (BRZ). To be able to complete this process, every police officer was equipped with a compatible smartphone, and some training measures were taken (Austrian Interior Ministry, 2024).

While the MPK app facilitates traffic stops executed by police officers, incorporating functionalities such as temporarily suspending someone's driver's license, public law enforcement officers on municipal level and road traffic authorities can execute checks using the 'GWK Check App' (GWK is short for 'Gemeindewachkörper' meaning 'Municipal Security Service') (Austrian Federal Computing Center, 2022).

Figure 3 - Austrian Digital Identity Credential Presentation During a Traffic Stop

Note: Screenshots from Austrian Ministry of Finance, 2024b



2.2.1.1.4Use Case 2: Presenting Digital Driving Credentials to a Private Person

ATDI users can also generate a QR code to present a credential to a private third party via a Bluetooth connection between the two devices. Having scanned it, the verifier receives the use-case specific data on their smartphone (see Table 1) to authenticate the person and their credential (Austrian Federal Computing Center, 2022).

Two software options are available for checking the data. Firstly, users can check credentials using the ATDI app directly. Secondly, users can employ the ‘eAusweise Check App’, an application specifically designed only for checking ATDI credentials. No active ID Austria is required to perform credential checks using either, however the applications require access to the device’s Bluetooth connections, as well as the camera, and a software authentication is conducted upon first use (Federal Chancellery, 2024n).

2.2.2 Development and Implementation of the Austrian Digital Identity Wallet

Implemented, developed and maintained throughout multiple Austrian governments and people responsible for its development, the ATDI wallet implementation involved many stakeholders, both in terms of project responsibility and management, and in ministries and public entities involved. The following subsections provide information on who was responsible for ATDI’s development and who promoted it throughout the years. Furthermore, an overview of the embedding of ATDI and equivalent credentials in Austria’s legal structure is provided and contrasted with promotional scenarios for the wallet’s usage.

2.2.2.1 Implementation Partners in Austrian Digital Identity Wallet Development and Diffusion

Throughout the past years, the Austrian digital transformation and eGovernment agenda has seen many ministries, public managers and organizing bodies. While ID Austria was still being developed as a flagship project of the former Austrian Ministry for Digitalization and the Austrian Business Location under the Kurz II government, the minister for the agenda had already been changed twice by the time of ATDI's initial launch in 2022, with final development responsibility ending up at the Ministry of Finance after a government restructuring. There, eGovernment projects were headed by state secretary Florian Tursky, further establishing the multi-level 'Digital Austria' platform and formally launching the ATDI application with the digital driver's license, as well as its expansion to the digital proof of age and the digital vehicle registration. The digital agenda was again handed off in March 2024, this time to Claudia Plakolm, who was already state secretary for youth and civil service, located in the Federal Chancellery. It was from there, that the most recently added credential of digital proof of identity was added, and the digital vehicle registration was further expanded. However, despite the shift, responsibility for the BRZ remained with the Ministry of Finance. With the newly sworn-in government Stocker, digital transformation remained with the Federal Chancellery, accounted for by state secretary Alexander Pröll, who has already announced further steps for development, as previously mentioned (Müllner, 2022; Austrian Federal Computing Center, 2022; Mittelstaedt & Tschiderer, 2024; ORF, 2022)

Beyond the political responsibility, technical development of the ATDI wallet was mostly undertaken by BRZ, which is responsible for the running and maintenance of the ATDI platform. Providing databases (e.g., driver's license register), as well as the technical infrastructure on which the application operates, BRZ developed the ATDI wallet via a container platform built on the Kubernetes-based OpenShift protocol. Authentication is based on the OpenID Connect (OpenID, n.d.) protocol. In line with user-control heuristics, the ATDI platform itself only saves meta-data on which user added which credential to their wallet, with actual credentials being encrypted and stored on users' devices, as well as the various credential-relevant registers (Komendera & Bauer, 2023; Austrian Federal Computing Center, 2022).

For the development of the user-facing application, BRZ partnered up with youniqx Identity AG, a digital spin out subsidiary of the privatized Austrian State Printing House (OeSD). With the company having previously worked on eID solutions in Liechtenstein, the ATDI end-user app was developed as a turnkey solution, and the Austrian State became one of the first adopters. Additionally, A-Trust, the partially private IdP provider

for ID Austria and A-SIT, the Austrian Center for Secure Information Technology, support application development and operation in matters of authentication and encryption (OeSD, n.d.; Youniqx, 2025; Austrian Federal Computing Center, 2022).

Given the different credentials' use cases, more stakeholders come into play, depending on the respective data's context. For the digital driver's license this for example included the Austrian Ministry of the Interior, given their responsibility for Austria's police force, as well as the former Ministry for Climate Protection, the Environment, Mobility, Innovation and Technology, given its ownership of mobility and transport agendas. Lastly, the federal states were practically involved in the implementation of ATDI, as they are the public entities tasked with the processing of driver's license applications (Austrian Federal Computing Center, 2022).

While the technical side of development is mostly handled by BRZ, its partners, and contextually relevant contributors in public administration, diffusion is primarily managed by the Federal Chancellery, typically executed via their platform 'Digital Austria' or the oesterreich.gv.at web portal. Their diffusion activities include i.a. the provision of text-based informational materials (e.g., Federal Chancellery, n.d.b; Digital Austria, 2025a), videos showcasing the tool's utility and activation process (e.g., Austrian Ministry of Finance, 2023c, 2024c), the hosting of detailed FAQ sections, as well as the various terms and conditions users need to agree to (e.g., Federal Chancellery, 2024c, 2024f). Additionally, press releases and -conferences are organized for milestones, such as the launch of a new credential (e.g., Austrian Interior Ministry, 2022) or new user records (e.g., Austrian Ministry of Finance, 2024d). These reports and press conferences were and are frequently picked up by the press, resulting in coverage in all large Austrian mass media channels, such as the Austrian public broadcaster ORF, or major newspapers, such as Der Standard or Die Presse. Moreover, novelties in ATDI are distributed via all social media channels of organizing entities, such as Digital Austria or the Federal Chancellery, as well as the personal accounts of related politicians (e.g., Federal Chancellery et al., 2025).

2.2.2.2 Promoted Equivalence and Legal Realities of Austrian Digital Identity Credentials and Analog ID Documents

While some information on user-control and security is being shared, promotional activities by the government mostly focus on the convenience the application could provide for everyday use cases. ATDI credentials are frequently being showcased as a full replacement to their physical counterparts, supported by statements that with the ATDI wallet, forgetting or searching for a driver's license or vehicle registration can

never happen again (Federal Chancellery & Tursky, 2022; Austrian Ministry of Finance, 2023c, 2024c) or that the expansion of the ATDI application will continuously slim people's physical wallets (Digital Austria, 2025b). Similarly, popular media reported on the direct equivalence of digital credentials and physical identification documents, stating i.a. that going forward, if one forgets one's vehicle license, no fee needs to be paid, as long as one has brought one's smartphone, and that carrying the physical registration will no longer be needed (Zellinger & Dittlbacher, 2024).

Furthermore, use cases of ATDI with third parties beyond executive authorities are continuously being promoted. This concerns especially the digital proof of age, which is for example shown to work as age-proving-mechanism when entering a night club, in the introductory video embedded in many official webpages, and officially intended for establishing minimum age when buying controlled substances (Austrian Ministry of Finance, 2023b, 2023d). Moreover, the digital driver's license was reported to be accepted as identification means supermarkets part of the REWE conglomerate (Heute, 2022).

Given the reports and promotional activities, it would not be surprising, if Austrians perceived digital and physical credentials as equivalent, especially since in the absence of a legal obligation to carry an ID in Austria, alternative identification documents, such as the driver's license are commonly accepted in lieu of a national ID card (H. Leitold [A-SIT], personal communication, March 10, 2025). Indeed, social media activity surrounding ATDI provides some indirect indications that users are unclear about where digital credentials must be accepted (e.g., Aigner, 2024), failed in using it due to lack of recognition on authorities' part (e.g., Da Hofer, 2025) or even doubt that the application can indeed be used in the scenarios it was developed for (e.g., Dermosa). Though such impressions must be viewed with caution due to the self-selecting and likely unrepresentative nature of posters on these platforms, a very prominent example of widespread unclarity about ATDI useability is provided by the Austrian national elections in 2024. On the day of the vote, the prominent Austrian journalist Martin Thür (2024) sparked an online discussion on whether polling stations would accept a digital credential as proof of identity. Responses where mixed. While some referred to a now-unavailable Viennese governmental voting information website stating it was not possible (Mussil, 2024), others referenced newspaper articles informing that it depended on the technical equipment of the polling station (Mittelstaedt et al., 2024), and another group reported their successful or unsuccessful experiences or polling station setups (e.g., MatHias, 2024; Gruber, 2024). The many postings evidence not only the unclarity about ATDI on behalf of users, but also the fuzzy reality of ATDI acceptance and non-acceptance caused by legal gaps and authorities' mixed understanding of the new tool.

As reflected in the previously mentioned reports, the ATDI credentials' practical useability remains restricted in comparison to their physical counterparts despite promotional claims. In some cases, this is due to real-world constraints, such as the application being useable only by people aged 14 or older. Accordingly, while younger citizens can be issued an Austrian ID card, the ATDI proof of identity will not be an option for them (Federal Chancellery, 2024j; Austrian Interior Ministry, 2025b). In a similar fashion, ATDI credentials cannot be used outside of the country for at least another year, while their corresponding physical documents are accepted within the entire European Economic Area (Federal Chancellery, 2024j). Furthermore, the digital driver's license requires ownership of a physical driver's license in cheque card format, requiring Austrian driver's to exchange old paper licenses to exchange the old format for the new one, despite the paper-based version still being valid until 2033 (Federal Chancellery, 2024j; Austrian Ministry for Innovation, Mobility and Infrastructure, 2025b).

Beyond these practical limitations to ATDI useability, the Austrian eGovernment law (E-GovG) (2024) provides the legal foundation for all ATDI credentials. It states that for all federal matters digital identity credentials hold the probative value as government-issued photo-IDs (E-GovG, 2024, §4). For traffic stops and driving scenarios, the license and vehicle registration credentials are even further embedded in the Austrian motor vehicle law, in FSG §15a (2022) and KFG §102e (2024) respectively. Both release subjects carrying a digital credential from the duty to carry the corresponding physical documents when driving on Austrian soil, given all usage criteria are fulfilled (FSG §15a, para. 1, 2022; KFG §102e, para 1, 2024). In the case of the vehicle registration credential, this law also provides for the option of passing the credential to third parties.

However, in spite of these stipulations, gaps to the physical documents remain, which might leave the layman user exposed. If for example the display of a credential is not possible during a traffic stop, regardless of whether the issue is user- or provider-caused, the law compels enforcement officers to treat the case as if the driver was not carrying the credential at all, an infraction carrying a monetary penalty of at least 20€ (Federal Chancellery, 2024k, 2024l; ÖAMTC, n.d.a). Accordingly, while the best-case scenario, without technical issues and featuring competent personnel on the authorities' side, would allow for the complete replacement of the physical driver's license and vehicle registration in a traffic stop, the state assumes no risk in case something goes wrong.

For credentials without additional embedding and in use scenarios, which do not take place while driving, the limit of equivalence on federal law comes into play (E-GovG, 2024, §4). Accordingly, while in theory ATDI credentials hold the same probative power as their physical counterparts, in any identification context taking place under the purview

of state law (e.g., municipal elections) or in relation to private third parties, acceptance of the ATDI wallet is not mandatory (Christof, 2025). Generally, Austria's private sector has been slow to adopt ATDI into their identification use cases. Despite the above-mentioned reports, proving one's age at supermarkets (e.g. REWE's digital terminals) still requires in-person verification of physical documents. Banks and post offices largely do not accept the digital proof of identity and renting a car using one's digital driver's license still appears a long way off (Christof, 2025; H. Leitold [A-SIT], personal communication, March 10, 2025).

2.2.3 Towards a Shared European Union Digital Identity Wallet

The EU-wide recognition of member state issued means of electronic identification has long been recognized as a central pillar in joint European digitalization efforts. Indeed, the lack of both legal and technical interoperability between different states' solutions was already addressed in 2014's Electronic Identification, Authentication and Trust Services (eIDAS) regulation, in which the cross-border usage of national eIDs for online public services was enabled. Emphasizing safety, security and trustworthiness of digital transactions, the legislation currently enables system access to more than 90% of EU citizens and was amended in 2021 to further increase technical interoperability, extend private industry benefits and reflect the circumstances of an evolved digital landscape. Beyond enabling cross-border proof of identity online, eIDAS also paved the way for aspirations towards an EU Digital Identity Wallet, *"allow[ing] everyone in Europe to securely identify themselves when accessing public and private services as well as store and display digital documents like mobile driving licenses and education credentials – all from their mobile phones"* (DG Connect, 2024c). The effort was formally entered into law in 2024's European Digital Identity Regulation (DG Connect, 2024c, 2024d, 2025).

Aiming for a shared platform of technical references, standards, components and solutions, the regulation lays out the goal of universal EUDI wallet access by 2026, targeting European citizens, residents, and businesses. Accordingly, each member state will by then be required to provide at least one wallet operating on the basis of agreed-upon open-source specifications. Beyond convenience, security and data privacy, the European platform emphasizes the principle of data sovereignty, with users being able to control and share locally stored personal data according to their individual preferences. The solution is envisioned to go beyond simple proof of identity, encompassing inter alia the display of driver's licenses, medical prescriptions, education and travel credentials, and is in later stages even meant to enable payment, provide information on financial histories and credit scores, as well as power organizational digital identities. While the use of EUDI wallets will remain opt-in from an end-user perspective, the EUDI act will

render mandatory the acceptance of digital identity credentials on the part of public institutions and other service providers legally obliged to unequivocally identify in the final months of 2026 (DG Connect, 2024c, 2025; EWC, 2025; NOBID Consortium, 2025; Babel et al., 2025).

While the Austrian identity applications do not yet fully conform to the EUDI standards laid out in eIDAS 2.0 legislation, both ATDI and ID Austria were built in alignment with those standards' supranational development and negotiation. Accordingly, only slight outwards facing changes in the user-interface will be required, for example in the field of selective disclosure, while the main applications remain the same. This will enable the country to keep citizen-users, who have already signed up to either service, safeguarding the investment put into the existing systems. Moreover, it is to be noted that the ATDI app is much more geared towards credential display in proximity identification cases than its EUDI counterpart. Indeed, given the EUDI wallet emphasis on user control in data management, the sharing of digital identity credentials in online scenarios, and digital signatures, the Austrian equivalent of EUDI would in fact encompass ID Austria and the corresponding DO application, as well as the ATDI wallet (H. Leitold [A-SIT], personal communication, March 10, 2025; DG Connect, 2024e).

3 Theoretical Background and Development

3.1 Digital Identity, Electronic Identification and Identity Management

Traditionally, transactions of a sensitive nature, from government transactions to banking activities, were and are conducted face-to-face. In these settings, government-issued photo ID documents, including passports, personal ID cards or even driver's licenses, provide trusted and established means to corroborate a claimant's identity with relatively high assurance. As transactions increasingly moved into the digital realm, the question of digitally proving identification in a similarly unambiguous way arose, as proving who one is became more complicated with users petitioning services from the comfort of their homes. This gave raise to technological, policy and academic development on digital identity, and in more recent years digital identity wallets, which can be used in proximity identification cases (Leitold & Posch, 2012; Theuermann et al., 2019). The following subsections first provide an overview of commonly used nomenclature, then diving into different set-ups and contextual requirements for digital identities and their management.

3.1.1 Identity, Identification, Authentication and Verification

Defining identity as *"what makes us unique and identical to others"* (p.2), Sule et al. (2021) set the stage for introducing the basic terms used in this thesis. Accordingly, whether digital or analog, identity answers the question of who (or what) one is in the form of individual information or attributes, encompassing i.a. physical features, biometric information, experiences and relationships. While according to this definition identity could be individually defined, its meaning can be further extended in the form of legal identity, referring to the recognition of identity in law (Manby, 2021; Allende López, 2020; Simone, 2023).

Identification goes a step further, addressing the question of who someone else is or respectively who one is vis-à-vis others, i.e. communicating one's unique identity. This could for example be recorded in a register or confirmed by the issuance of a document, such as a passport or driver's license. Identification therefore refers to the evidence that can be provided to prove one's identity is genuine (Simone, 2023; Idrus et al., 2013; Blue et al., 2018).

Authentication and verification lastly refer to the checking of identification, establishing that a person is who they claim to be. Authentication refers to the process of validating identity via the identification credentials provided, i.e. an individual convincing someone else that they are who they say they are on the basis of identification attributes. Verification on the other hand means the process of ensuring that these credentials are

valid, genuine and accurate. Sometimes used interchangeably in the case of digital identity, verification typically involves the establishment of the link between a person and their digital identity, e.g., by checking their identity document. Identity authentication on the other hand frequently functions as confirmation that the individual accessing a platform is the same as the one previously identified. To summarize all four terms in a sentence and further elucidate their usage, an individual claiming identity can authenticate said identity using a verified identification credential (Idrus et al., 2013; Simone, 2023; Blue et al., 2018; Allende López, 2020).

3.1.2 Digital Identity and Electronic Identification

Driven by the need for authentication in online transactions, the late 20th century gave rise to many solutions being developed for authentication on the internet. While a single definition for the term is still subject of debate, one can build on the notion of identity being presentable as a set of attributes within an identification document. Accordingly, digital identity can be defined as set of attributes ('identifiers'), which allow an individual to be uniquely identifiable and able to authenticate in electronic contexts (Allende López, 2020; Grassi et al., 2017).

Given different digital contexts, multiple digital identities can be held by the same person, animal or thing, representing different subsets of identifiers and attributes (e.g., one person holding a government-issued eID, a social media- and an email account). Together, these identities make up an individual's Digital Persona, which is at times also referred to as digital identity. Crucially, digital identities do not necessarily need to be tied to the real-life identity (e.g., screen names on social media), and different digital identities held by one person do not need to be connected (Allende López, 2020; Grassi et al., 2017; Lyons et al., 2019).

How closely tied real identity and digital identity need to be depends on the sensitivity of processes or data accessed. Accordingly, assurance requirements confirming that a person in the digital realm is who they say they are differ depending on the context of the transaction, further determining the need for security in the corresponding verification and authentication processes (Theuermann et al., 2019). Multiple typology frameworks exist to classify such contextual trust and identity verification requirements. This includes the International Organization for Standardization's (2020) levels of assurance (LoA) framework, associating the quality of LOAs with authentication and verification, as well as the European STORK's (Secure Identity Across Borders Linked) classification in the Authentication Quality Assurance Framework, mapping LOA requirements to contextual repercussions by risk and impact of potential damages (Allende López, 2020; Leitold, 2016; Leithold & Posch, 2012).

To provide secure and verified user identification in cases where a link between an actual identity and the digital user is of the essence, state-issued or -endorsed eID solutions often act as the gateway to facilitate a transaction. As discussed in section for the Austrian case, these government-issued means of identification were mostly conceptualized as digital versions of physical identification documents, such as passports and frequently tied to such documents in terms of hardware (e.g. ID card tokens). As technological developments and harmonization progressed, European eIDs are mostly mobile-phone-based today (Leithold & Posch, 2012; Theuermann et al., 2019)

3.1.2.1 Identity-Management Systems

Reliable user authentication in eIDs is typically enabled by identity-management (IdM) systems. While many forms of IdM have been introduced in the past decades, most models involve four types of entities: A service provider (SP), who offers electronic services (e.g., the Ministry of Finance offering online tax declaration services), a user hoping to access these services, an identity provider (IdP) tasked with authenticating the user and providing their identity data and a controlling party (CP), which enforces regulations (Podgorelec et al., 2022; Zwattendorfer et al., 2014; Allende López, 2020).

Originally, the IdM setup commonly applied was the isolated model, in which the SP and IdP are represented by a single entity. Accordingly, an SP not only provides the specific service but also stores the required identification data for users. This in term means users in isolated IdM systems must register separately for each service used, putting the burden of creating and recalling credentials for each SP on the users (Podgorelec et al., 2022; Zwattendorfer et al., 2014; Allende López, 2020; Babel et al., 2025).

Alleviating this demand on users, SPs outsourced the task of identity provision to separate entities in the central identity model. Accordingly, one IdP can be used for services with multiple SPs, given the SPs all outsourced identity provision to the same entity. While this model increases useability, given that users only need to register once at a central IdP and can use it for all associated SPs, a central IdP also creates one single point of failure, vulnerable to attack. Additionally, involving a single IdP in all authentication processes provides them with insights into when, how often and where a user takes advantage of different SP services, which would allow for potential tracking of their behavior and creates privacy risks. Nonetheless, central IdPs are broadly used, for example in the form of Apple ID or Google Identity (Podgorelec et al., 2022; Allende López, 2020).

Addressing the central identity model's limitation of still requiring an associated IdP to access a given SP's service, the federated model for IdM establishes trust relationships between multiple IdPs, which allow them to delegate authentication to an entity of the

same kind. This means for example that if a user seeks authentication at SP 1 using IdP A, IdP A could forward this request to IdP B, where the user is registered. IdP B could then compile the requested information and provide relevant identity credentials to IdP A, allowing IdP A to proceed with the authentication, as if it had checked the credentials itself. National European IdPs, such as ID Austria, being connected through the eIDAS interoperability framework provide a prominent example for the federated model, enabling cross-border authentication for users (Podgorelec et al., 2022; Allende López, 2020; Babel et al., 2025).

In all three of these IdM models user data is stored with one or more IdPs, authenticating users and providing their identity information to the SP in question. This centralized storing of sensitive information naturally makes IdPs an primary target for attacks, giving rise to a third model called user-centric IdM. In these setups, including for example the Austrian CC, data is stored on physical tokens controlled by the user, such as a smartphone or smartcard. This way, users remain in physical control of their data, allowing for the forwarding of data to SPs directly from the user's domain in each authentication process (e.g., by reading it from a smartcard). However, even in user-centric models some central IdP usually acts as middleware between the SP and the token on which information is stored (Podgorelec et al., 2022).

This requirement of a central IdP is eliminated in more recent developments of Self-Sovereign Identity (SSI), aiming to make users the sole sovereigns of their data. This is typically realized through central, authority-agnostic credentials and peer-to-peer authentication with IdPs belonging to a circle of trust directly registering new users to a distributed ledger. An example for this model was provided by the European Self-Sovereign Identity Framework Lab (eSSIF-Lab, 2024; Podgorelec et al., 2022).

3.2 Digital Identity Wallets

In line with developments towards user control in IdM, the concept of digital identity wallets has increasingly gained attention, both in the technological and the policy domain with the European EUDI wallet included in the eIDAS 2.0 legislation (see 2.2.3). Despite increased interest in recent years (cf. Google Trends, n.d.), definitions for the term are ambivalent, being used in multiple contexts and referring to diverse technical solutions (Podgorelec et al., 2022). However, generally, the term digital wallets is used to describe applications operated through users' edge devices, such as mobile phones, which empower them to manage and store digital objects and credentials. As Babel et al. (2023) put it, *"a digital wallet is very similar to its physical counterpart, which is usually kept directly by its owner and holds various types of attestations, such as an employee badge, a driver's license, or a membership card"* (p. 3).

Some use cases of digital wallets are already widely adopted already, including the digital display of boarding passes or smartphone-based payments via virtual bank cards, the platform mostly provided for by the respective software provider's native wallet application (e.g., Apple, 2024). However, in the field of digital identity credentials, from education qualifications to medical prescriptions and digital driver's licenses, there is high potential for trustworthy, government-driven expansion. While such credentials could be both state-sponsored or integrated into a mobile operating system, such as the examples mentioned above, the European approach leans towards the establishment of proprietary, state-endorsed or -sponsored apps, usable in online and offline certification scenarios, as well as equipping citizens with a certified digital signature (DG Connect, 2024e; Kouliaridis et al., 2023).

3.3 eGovernment Innovation Diffusion and Adoption

Coping with an environment of unprecedented change and speed in innovation, especially in the field of digital transformation, governments around the world are faced with the challenge of adapting quickly. In earlier paradigm shifts of magnitude, ushered in by novel and pervasive ideas, processes or technological breakthroughs, such as the steam engine, the public sector's role focused strongly on promoting newly unlocked opportunities as a change agent (e.g., by increasing awareness, providing funding or offering training and infrastructure) and safeguarding against negative externalities (e.g. by implementing standards or regulations). While these are still at the core of today's policy debates, the age of digital technology and the emergence of AI expanded this scope, with an emphasis on governments as technology adopters and subjects of transformation themselves (Hanna, 2018; Millard, 2023; Misuraca et al., 2020).

From leveraging digital technologies to increase efficiency in administrations' internal operation to harnessing them to establish new forms of relationships and service delivery for stakeholders, discussion on how innovation is implemented is generally addressed in two stages: The development and ideation of new processes and practices, and the diffusion and adoption of already developed concepts and tools, embedding them into existing structures to fully capitalize on their potential (De Vries et al., 2018; Rogers, 1983; Gopalakrishnan & Damanpour, 1997).

In this second phase of diffusion and institutional integration of innovation from a governmental perspective, academic disciplines, including those of public management, public policy and eGovernment, have adopted heterogeneous approaches. These fields diverge not only in how they conceptualize the spread of innovation, but also the types of innovation they frequently cover, their research rationales and the analytical frameworks they often employ (De Vries et al., 2018). While the terms diffusion and adoption of

innovation are often used interchangeably across these disciplines, they offer a great way of illustrating the disparity in perspectives between fields, especially among eGovernment and public policy. While diffusion concerns something "being spread out or transmitted" (Merriam-Webster, n.d.a), adoption is i.a. defined as "the act of beginning to practice or use something" (Merriam-Webster, n.d.b), framing the process from a user's point of view.

Primarily covering the vantage point of entities initiating and managing diffusion, public policy research tends to emphasize governance structures and conceptual innovation, analyzing implementation through a more systemic, network-oriented lens. In contrast, eGovernment research often highlights the perspective of individual users or adopters in the diffusion process, borrowing concepts from business and information system studies, and focusing on factors such as attitudes towards an innovation or antecedents to intentions to use it. Accordingly, while some operationalization of systems-based diffusion concepts is often a part of eGovernment research, the more substantial focus on process, service or product implementation gives way to a more adoption-centric research approach (De Vries et al., 2018; Distel & Ogonek, 2016).

Falling mostly under the domain of the latter category, this thesis explores citizen attitudes, knowledge and beliefs towards a specific product and service innovation (cf. De Vries et al., 2016). Accordingly, the following subsections will provide a brief overview of common approaches to explore eGovernment adoption, diving first into more general concepts for (ICT) technology adoption in the form of technology acceptance models and diffusion of innovations theory (Rogers, 1983). Subsequently, more specific diffusion antecedents for eGovernment, especially citizen trust is discussed. Building on these foundations and newer iterations of Roger's (1983) model, a tailored framework for diffusion of digital identity wallets and innovations with similar service models is introduced, which provides the analytical lens for this project.

3.3.1 Technology Acceptance Models

Applied in a wide variety of domains, from health care and mobility to education and ICT usage, technology acceptance models address the questions of why potential users accept and adopt new technologies or do not, and what influences their decision when doing so (Taherdoost, 2018). Recognizing realities of user resistance towards ICT innovation, and the need for a deeper understanding of the determinants of user acceptance and behavior, Davis et al. (1989) first developed the Technology Acceptance Model (TAM) based on insights from social psychology, including Ajzen and Fischbein's (1980) Theory of Reasoned Action (TRA), and Expectancy-Value Theory (EVT) (Bradley, 2009). To this day, TAM and its succeeding frameworks, which capture adoption decisions even more

comprehensively, often serve as foundation for analyzing eGovernment adoption decisions (Aleisa, 2024; De Vries et al., 2018). The following subsections provide a concise overview of the two underlying frameworks, as well as TAM in more detail.

3.3.1.1 Expectancy-Value Theory and Theory of Reasoned Action

Based on the ideas that individuals' intention to act in a certain way translates to behavior and that this intention is based on their estimated outcome, as well as how this outcome would be perceived by the person, EVT determines the tendency to engage in a certain behavior by measuring perceived likelihood of an outcome taking place and what value is ascribed to it (Bradley, 2009). Building on EVT, TRA also bases its model on behavioral intention (BI) resulting in actual behavior. The theory expands on its predecessor by further formalizing determinants of BI, positing that a person's beliefs and evaluation shape their attitude (A) toward the behavior, and normative beliefs and a person's motivation to comply affect their subjective norm (SN), with A and SN being the two determining factors for BI. While SN accordingly models the external influencing factors of socially normed beliefs and willingness to conform to social expectations, A reflects assessment of an attitude based on the individual's internal beliefs and personal norms (Ajzen and Fischbein, 1980; Taherdoost, 2018; Bradley, 2009).

3.3.1.2 Technology Acceptance Model and Elaborations

Hoping to build a versatile model for ICT technology adoption and user behavior across various application areas and target groups, Davis et al. (1989) dropped the notion of separately discussing A and SN as determinants, given difficulty in practically separating the two during analysis. Asserting like their predecessors that BI indicates action, the team instead introduced two new variables: Perceived Usefulness (PU), shaping both A and BI, and Perceived Ease of Use (PEOU), contributing to PU and A. Considering a person's adoption decision, they accordingly postulate that a potential user's decision is less determinable based on normative or social values, but rather their perception of the tool being helpful to their situation. Moreover, TAM stipulates that both a user's general attitude towards a tool and this belief in its utility are shaped by how difficult it seems to adopt and work with. Upon publication, the model already had theoretical support in multiple disciplines converging around the ideas of PU and PEOU even before publication. Among others this includes diffusion of innovation theory and implementation science, which consider relative advantage and complexity of innovations as key factors for ease and speed of a diffusion process. (Davis et al., 1989; Davis, 1898; Bradley, 2009; Taherdoost, 2018).

Davis et al.'s (1989) TAM was well-received, with many research projects applying the model as theoretical framework, validating its utility in explaining BI and system usage. As digital technologies evolved and became more pervasive, TAM's shortcomings and limitations became more striking, from not accounting for social contexts and facilitating conditions to being limited to voluntary use scenarios and mostly explored using self-reported information by users. To address these gaps, extended models such as TAM2 (Venkatesh & Davis, 2000) and eventually the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003) were introduced. Integrating elements from multiple prior models, UTAUT accounts not only for Performance Expectancy (cf. PU) and Effort Expectancy (cf. PEOU), but also for social influencing factors and facilitating conditions, reflecting support infrastructure or resources, such as helplines. UTAUT additionally added moderators like age, gender, and experience to better capture variance in user behavior. UTAUT2 further refined this by incorporating consumer context-specific variables such as hedonic motivation and habit. These developments reflect a broader trend in technology adoption research to build more comprehensive models that holistically capture the cognitive, social, and contextual factors influencing user decisions by introducing and researching the fact of additional determinant factors (Bradley, 2009; Taherdoost, 2018; Venkatesh et al., 2003; Rana et al., 2012)

3.3.2 Diffusion of Innovations Theory

Defining diffusion as *"the process by which an innovation is communicated through certain channels over time among the members of a social system"*, Rogers' (1983, p. 5) seminal work provided an early theoretical basis for the analysis of how innovation spreads. Building on European sociological discussions of diffusion and drawing heavily from rural sociological research of the early 20th century United States, the scholar's work examines diffusion alongside the four characteristics present in his definition: the innovation or intervention itself, the channels through which it is communicated, the time the process takes, as well as the members of the social system, in which an innovation is to be deployed (Rogers, 1983; Valente & Rogers, 1995).

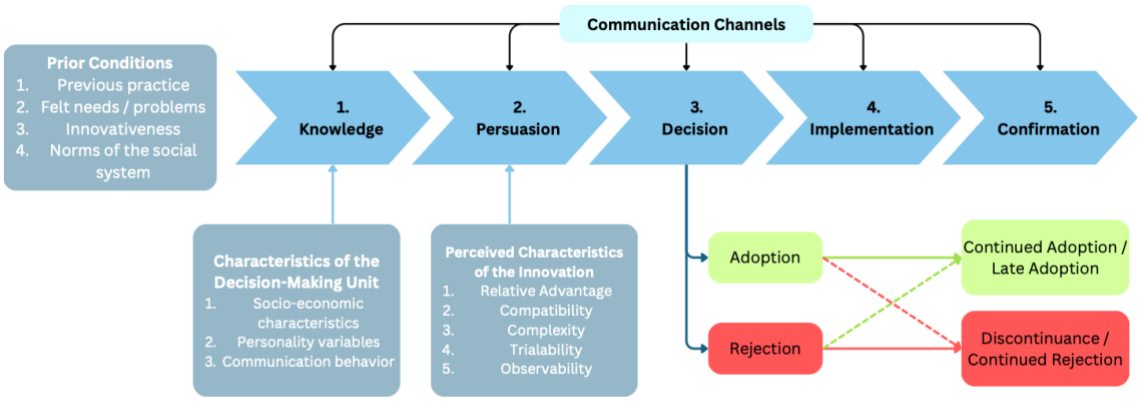
3.3.2.1 Innovation-Decision Process: Individual Adoption Decisions

Characterizing diffusion as a type of communication and social learning process, Rogers (1983) frames innovation as a practice, object or idea perceived as new by the individual or group, where newness can be measured in terms of knowledge, persuasion or even adoption decisions made. Asserting that such newness is inherently linked with uncertainty on an individual level, the author positions the process through which a single person or organization progresses from awareness of an innovation to a stage of adoption

or non-adoption as a distinct decision process. This Innovation Decision process (see Figure 4) consists of five stages, commencing with *Knowledge*, as first exposition of a decision-maker to the new idea, tool or practice. It is followed by *Persuasion,* in which a potential user forms a favorable or unfavorable attitude regarding the novelty, and *Decision*, in which first steps are taken to engage in usage or not to. Following this first adoption or rejection decision, a user applies the innovation during *Implementation*, leading to either *Confirmation*, i.e. continuous use, or discontinuation. Similarly, an individual might decide to reject the innovation initially but reach a positive implementation decision later (Rogers, 1983).

Figure 4 - A Model of Stages in the Innovation-Decision Process

Note: Own illustration, adapted from Rogers, 1983, p. 165



3.3.2.2 From Individual Adoption to Macro-Level Diffusion of Innovations

Rogers' (1983) processual conceptualization on an individual level goes hand in hand with his systemic model of diffusion on the macro-scale, conceiving of aggregated Innovation-Decision Processes not as isolated individual behaviors, but as a population-wide phenomenon based on interconnected decision making. As members of the targeted population navigate uncertainty and progress along the decision process, they are influenced by the adoption of and information provided through peers, opinion leaders and institutional actors, interacting with them through different types of communication channels. These social adoption influences generate momentum, with diffusion typically accelerating once a critical mass of adopters is reached.

This dynamic gives rise to the now pervasive S-curve pattern of innovation diffusion, characterized by an initially slow uptake on the part of Innovators and Early Adopters, followed by an accelerated diffusion through adopters in the Late and Early Majority, and lastly a downturn in new adopters, characterized by Laggards and individuals who do not adopt the innovation at all. These normally distributed categories of adopters are not

merely temporally distinct in their innovation uptake, but socially structured: early adopters often serve as opinion leaders, while late adopters rely on normative pressure and proven outcomes. The aggregated processes, accordingly, are not merely a function of exposure to an innovation, but about relational influence and timing within the social system (Rogers, 1983).

3.3.2.2.1 Innovation Attributes' Influence on Diffusion

Central to Rogers' (1983) theoretical model is the assertion that the rate and extent of diffusion are strongly influenced by specific innovation characteristics. These perceived attributes, irrespective of their objective accuracy, shape innovation-decisions throughout and are defined as follows: *Relative advantage*, somewhat comparable to PU, refers to the degree to which an innovation is perceived as an improvement of the status quo it replaces. This can for example include a feeling that the innovation will improve convenience, enhance social prestige, increase satisfaction or incur higher economic profitability. The second attribute, *Compatibility*, describes the degree to which an in innovation is seen to be consistent with existing values, past experiences or even needs of potential adopters, i.e. how well an innovation fits into the individual's life. Thirdly, perceived *Complexity*, in many ways the counterpart to PEOU, refers to the degree to which an innovation is perceived as difficult to understand, use or implement. While not referring to the innovation's technical sophistication per se, innovations that seem easy to comprehend and adopt will diffuse rapidly, especially among populations with time constraints, or lacking training or background knowledge. As the name suggests, *Trialability*, the fourth characteristic, refers to how easily an innovation can be interacted with on a limited basis, before a full commitment is required. Reducing risk perception by allowing for a trial-run can increase individuals willingness to adopt in the first place and assess the promised utility for themselves. Lastly, *Observability* describes the degree to which an innovation's results or benefits can be observed prior to adoption. Innovations in which demonstrable outcomes are more visible are more likely to be adopted, given that users can more easily confirm the claimed value themselves, for example by observing peers' successful usage or engaging with testimonials (Rogers, 1983).

While each attribute can independently influence adoption rates, there is interaction among them. An innovation perceived as highly advantageous but very complex for example, may still face adopter resistance unless mitigated by training or increased trialability. Similarly, compatibility could moderate complexity perceptions, as familiar concepts and terms feel easier to understand. Moreover, these perceptions are not static, evolving with exposure, social validation, institutional endorsement and naturally, time,

with once-complex-seeming innovations, such as email or smartphones, becoming normalized as diffusion progresses (Rogers, 1983).

3.3.2.2.2Communication Channels and Influence Networks

Based on the communications model, Rogers (1983) posits channels of communication, through which a sender passes messages to a receiver, as a driving factor in diffusion processes. The author here differentiates between mass media channels and interpersonal ones, depending on the form of communication.

Particularly pertinent throughout the *Knowledge* phase of the Innovation-Decision Process, where the primary goal is to quickly generate broad awareness of an innovation, mass media channels include radio, television or news sites. While effective in top-down dissemination from an innovator to many potential adopters within the population, this means of transmitting information is only likely to sway weakly held attitudes about a novel technology, idea or practice (Rogers, 1983).

Interpersonal channels, enabled through face-to-face communication, on the other hand allow for a two-way exchange of information, for example to request further information. While not as effective in reaching many people at once, they hence allow for stronger persuasion and attitude communication, both in favor of or against the novelty to be disseminated, and are more crucial in the phase of *Persuasion*, informing the *Decision* (Rogers, 1983).

Going beyond the channel type alone, who the communicator is matters. Deeply embedded in the structure of socio-cultural networks within the group, communication senders and their relationship and similarity can drastically affect channels' effectiveness. Rogers (1983) describes this similarity or lack thereof as homo- or heterophily respectively, with closer alignment in terms of demographics or values strongly influencing the likeliness of persuasion or dissuasion.

Moreover, the author identifies two types of individuals that are especially important for the successful communication and widespread adoption of an innovation within a social network: *Opinion Leaders* and *Change Agents*. Respected and trusted members of their communities, opinion leaders often occupy central positions within their social network, allowing them to influence other individuals' attitudes at higher levels than others. Ideally slightly ahead in innovation adoption, their role is vital in bridging the gap between early innovations and mainstream acceptance, recognized by their peers as competent to provide a reliable review or opinion on the innovation. Such endorsements provide powerful social validation encouraging adoption by the majorities, given that higher

relational trust and peer credibility is likely to be more persuasive than information provided by authorities or distant experts (Rogers, 1983).

Ideally targeting opinion leaders early-on and creating momentum, change agents act as local innovation disseminators. They strive to influence individuals' decisions towards an innovation in a way that is desirable to the resource system ("change agency") they are affiliated with, usually seeking to secure a positive adoption decision. Normally equipped with greater expertise on the novel idea, practice or process than potential adopters, change agents do not have to be professionals tasked with persuasion, but could for example include a nurse suggesting vaccination. Their direct contact with members of the targeted social system allows them to facilitate information flow in channels that allow for questions to be asked, with their effectiveness strongly depending on an innovation's match with client needs and their ability to bridge social and cognitive gaps. Accordingly, an ideal change agent is highly empathetic, culturally sensitive and client orientated, allowing them to be perceived as insider and to legitimize an innovation within the social fabric (Rogers, 1983).

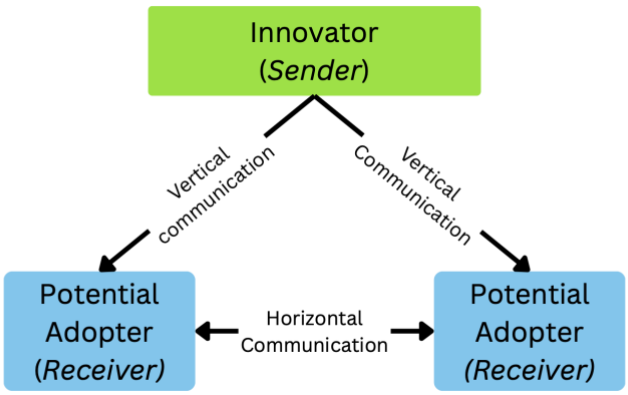
3.3.2.3 Government's Role in the Diffusion of Innovation

Expanding on Rogers' (1983) differentiation between mass media channels and interpersonal ones, implementation research more strongly anchored in communication science differentiates between vertical communication (innovator to receiver) and horizontal communication channels taking place among receivers, i.e., among peers within the social system (e.g., Cavaye, 1995; Bobrowski & Bretschneider, 1994), as depicted in Figure 5. While both are important for diffusion, authors in this field also emphasize the persuasive power of peers' recommendations and opinions on an innovation, as *"adopters tend to learn from each other"* (Cavaye, 1995, p. 94), given not only their relationship, but also their high similarity causing them to have similar demands or face similar issues (Cavaye, 1995).

Exploring how these conceptualizations change with respect to government-sponsored innovation, Moon and Bretschneider (1997), propose an alternative model for the spread of innovation, which positions government as a diffusion catalyst, acting in a twofold role of innovation sponsor and innovation diffuser. In their model, the government first acts as innovator directly or as innovation sponsor during the development cycle. As such, it provides essential funding, technical assistance and infrastructure to develop something new. Secondly, the government holds the role of innovation diffuser, accelerating the spread of novel practices, ideas or technology by disseminating information, providing assistance or actively organizing outreach programs.

Figure 5 - Communication Model for Innovation Diffusion

Source: Adapted from Moon & Bretschneider, 1997, p. 59; Wang & Doong, 2010, p. 417.



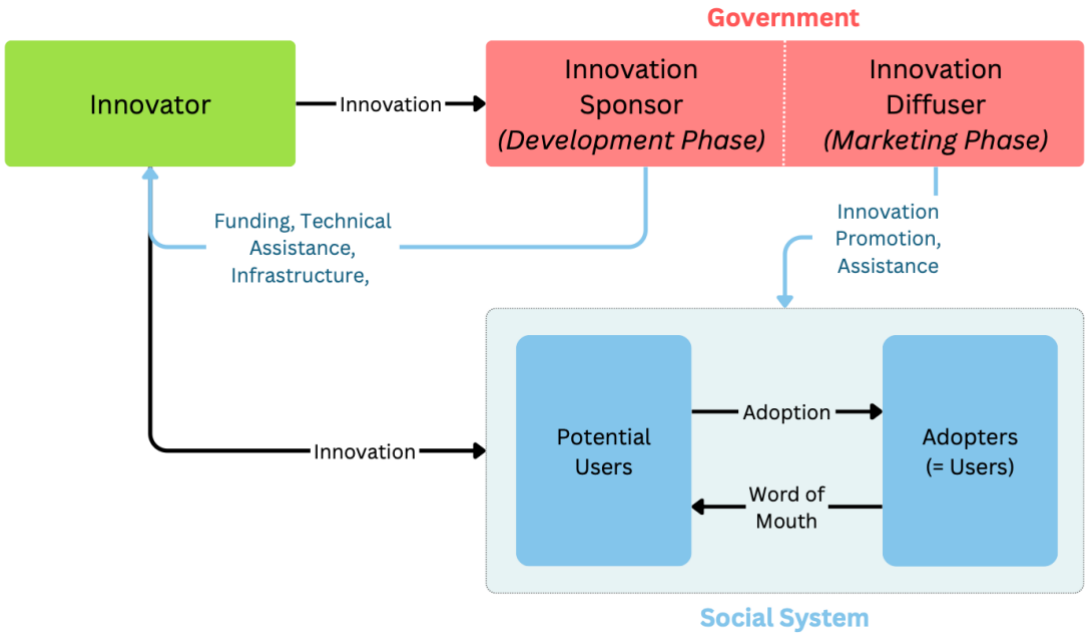
This two-fold model was further expanded by Wang and Doong (2010), associating the two roles to two different stages of the innovation process for their study (see Figure 6). Until the launch of the tax application studied by the team, the government was mostly involved in a financial sponsor capacity, outsourcing work to designers and developers. Afterwards, it promoted tool and offered support to users in what the authors termed marketing phase. After usage, adopters were able to promote the application themselves via word of mouth. A similar structure can be observed in the case of ATDI, where the government mostly assumes the role of innovator directly, outsourcing only some parts of the development, while also acting as chief diffuser. However, unlike applications with one main development effort at the start (cf. Wang & Doong, 2010), ATDI constitutes a continuously expanding platform, with new credentials being added over time. Accordingly, development and diffusion phases do not unfold sequentially across the entire project but rather recur with each new credential introduced. This dynamic positions the government in a continuously dual role, simultaneously diffusing already implemented credentials, which are in the marketing phase, and developing forthcoming use cases for the wallet, as reflected in Figure 6.

Regarding the relative influence of broad, external innovation communication and more interpersonal channels, Mahajan and Peterson (1985) proposed three models. While the team's external influence model assumes that adoption is uniquely determined by information sources that are outside the social system, i.e., diffusion efforts coming from mass media communication channels, its internal influence counterpart proposes that diffusion rates are an outcome of interpersonal channels and communication between earlier adopters and the rest of the potential adoption community. Both aspects are combined in the authors' mixed influence model, including both interpersonal channels' effects and external communication into account (Wang et al., 2007). Testing their models against real world eGovernment adoption scenarios, some evidence was found suggesting

stronger influence of peer word of mouth, favoring internal and mixed models (Wang & Doong, 2010).

Figure 6 - Theoretical Model of Government-Sponsored Innovation

Note: Adapted from Moon & Bretschneider, 1997, p. 60 and Wang & Doong, 2010, p. 418.



Moreover, the traditional definition of word of mouth can be expanded to include the dichotomy of electronic (or virtual) word of mouth (eWOM) through the internet, and the traditional personal word of mouth (pWOM). This reflects the general impact of increased pervasiveness and trust placed in online recommendations and reviews also in eGovernment diffusion (Alzahrani et al., 2017). Some publications empirically provide evidence of eWOM and social media promotion's impact on citizen trust, PU, PEOU and intention to use in general, for example in the diffusion of mobile government services (Mensah, 2020; Mensah & Mwakapesa, 2022; Hebbar & Kiran, 2022).

3.3.3 Trust as an Antecedent to eGovernment Adoption

Trust has long been part of innovation diffusion research, considered to reduce perceived risk and uncertainty (Luhmann, 1968). Following Rotter's (1971) definition of trust as "*expectancy held by an individual or a group that the […] promise […] of another individual or group can be relied on"* (p.444), it is only natural that it has been considered a core component in the relationship between citizens and their governments, for even longer (Tolbert & Mossberger, 2006). Accordingly, citizen trust or perceptions of service- and provider trustworthiness have frequently been cited as influential on citizen's intention to use digital services in general, and eGovernment services in particular (e.g., Carter & Bélanger, 2005; Bélanger & Carter, 2008; Distel, 2020). Here, it is often

differentiated between the trust placed in the party providing the service, in this application area the government, and the mechanism through which it is provided ('control trust'), in eGovernment research frequently proxied by trust in technology or trust in the internet (Distel, 2020; Tan & Theon, 2000; Lai & Lobo Marques, 2023; Alzahrani et al, 2017).

Characterized by *"citizens' normative expectations and belief in government agencies, including multiple levels, such as trust in policies, institutions, and officials"* (Lai & Lobo Marques, 2023, p. 3), trust in government can be evaluated either by directly analyzing trust in the government, with outcomes mostly dependent on the current government's perceived performance, ability and motivation (cf. Grimmelikhuijsen et al.'s, 2013, dimensions of trust: competence, benevolence and integrity), or by measuring trust in the political system. The latter typically focuses on the factors of effectiveness of the system and the impartiality of the political process. While Austria overall ranks among the top OECD-performers in terms satisfaction with government services, considered a facilitator to effective governance and in turn trust, satisfaction with administrative services ranks only a little above average at 66%. Conversely, citizens' trust in public institutions is below average with only about one in four citizens having high or moderately high trust in the government (OECD, 2023). In the more specific context of eGovernment, trust in the government is defined especially in the ability to inspire confidence in the integrity of eGovernment services, the delivery of tools citizens consider useful, as well as the public innovator's competence in delivering such solutions (Lai & Lobo Marquez, 2023).

Trust in technology on the other hand reflects the trust placed by the population in the counterpart within the network, i.e. the service providers facilitating the eGovernment tool. This includes infrastructure dependability, capability and security perceptions, as well as confidence in the diligent handling of privacy risks, such as the loss of personal data ownership (Lai & Lobo Marquez, 2023; Zebaree et al., 2022). While trust in the government has frequently validated as determining factor in adoption or non-adoption, decisions findings on trust in technology's impact have been more ambivalent (e.g. Distel, 2020, Akkaya et al., 2012)

Going beyond the more ubiquitous dual nature of eGovernment trust, some reviewers and researchers (e.g., Alzahrani et al., 2017; Janssen et al., 2017; Kumar et al., 2018; Abdulkareem, 2022), highlight trust's multidimensional nature, and the limitations associated with a mere split in trust in technology and government. Instead, they highlight the subcategories within different players involved in eGovernment diffusion and adoption, as well as the need to consider more intricate dynamics among the two concepts. On the one hand, they argue for the consideration of different stakeholder predispositions

in trust conceptualizations, such as government agency factors (e.g., reputation of agency, past adopter experiences with the agency), in case multiple government entities are involved in the implementation, or individual characteristics, such as a potential adopters experience with the internet or their disposition to trust (Alzahrani et al., 2017). On the other, they suggest an expansion of factors for trust in eGovernment, reflecting the many factors contributing to adoption more holistically. This could for example include perceived prior knowledge, quality perceptions, responsiveness in both the service provider and government more generally or perceived and even relative reliability of eGovernment services (Janssen et al., 2017; Kumar et al., 2018).

3.4 Barriers to eGovernment Diffusion and Adoption

Despite the high number of models, frameworks, theories and publications in the field of eGovernment acceptance, European countries are still challenged with citizens' reluctance to embrace digital public service provision (Distel, 2020). While adoption models, such as the ones mentioned in the previous section mostly investigate factors leading to successful adoption decisions, success factors do not necessarily explain reasons for not using an eGovernment service. Accordingly, to comprehensively grasp innovation diffusion or lack thereof, why citizens do not adopt should be treated as an independent research question, seeing as inhibiting factors are not fully reflected by the inverse of enablers. This gap can be exemplified considering TAM, which, while capturing some rejection factors, presumes awareness of the service offered. Thus, non-usage and rejection require not just exploration independent of their positive counterparts, but also cannot be comprehensively explored by relying on models used to identify antecedents for successful diffusion (Distel & Ogonek, 2016; Cenfetelli & Schwarz, 2011; Distel, 2020; Alzahrani et al., 2017).

While most earlier studies providing insights into ICT rejection focus on diffusion efforts within organizations (e.g., Laumer & Eckhart, 2010), Distel and Ogonek's (2016) literature review provides a clustering of barriers to citizen's eGovernment adoption intentions based on 20 relevant articles, including both organizational and natural-citizen-oriented examples. Firstly, these include technological barriers, such as access characteristics, perceived risks of using technology or a lack of general trust in the internet. Secondly, digital divides and socioeconomic barriers are covered by the authors, including the dual divide conceptualization of access and digital literacy. Moreover, the team included communication barriers, covering all types of communication issues or lack of information access, such as the ones observed in the reported a lack of knowledge about the ID Austria's use cases (see 2.1.2). Fourthly, cultural barriers were addressed, relating to aversions based on norms and traditions present in the potential adopter's

culture, as well as culturally defined trust in government generally. The fifth type of barrier identified were individual ones, concerning personal preferences, such as habits, a lack of time or PU. Lastly, they mention service-related barriers, composed of process complexity issues and the necessity of in-person interactions with a government official.

Their analysis concluded that inhibitors of the technological kind or related to the digital divide and socioeconomic group were mentioned most frequently, with perceived security and privacy risks being especially pronounced. This mirrors the counteracting policy measures implemented by the Austrian government's strategy, including strong training measures, especially for older populations, infrastructure improvements, as well as a strong emphasis on security, safety and personal data sovereignty in eGovernment design heuristics (see 2.1.1) (Distel & Ogonek, 2016).

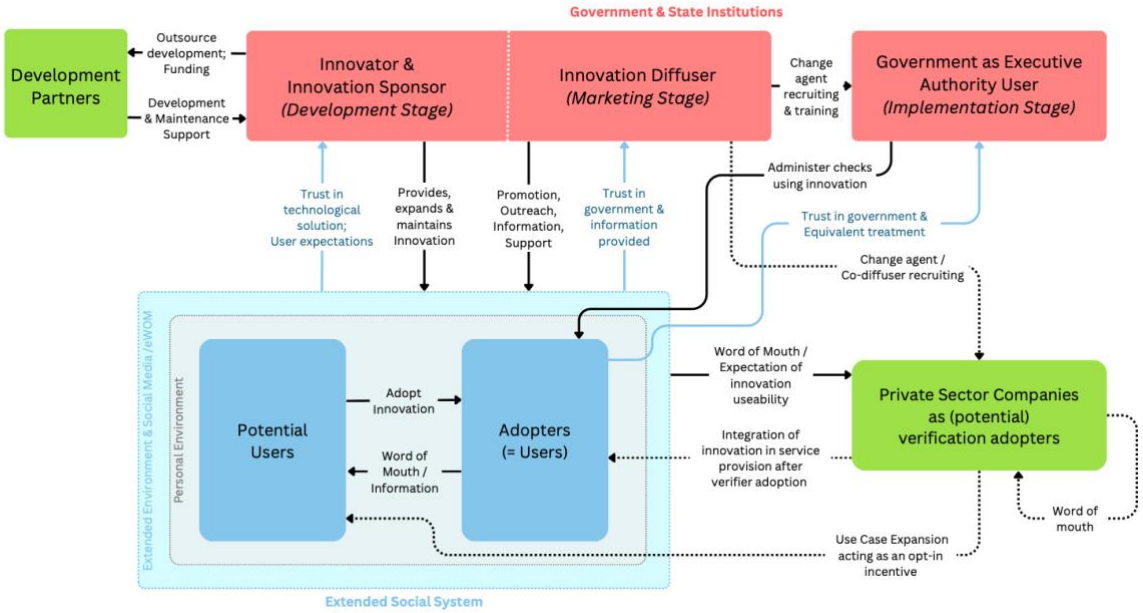
While communication barrier definitions are defined in less unified ways in the articles reviewed by Distel and Ogonek (2016) and beyond, mentions suggest a lack of awareness of the existence of eGovernment services (see for example also Räckers et al., 2013), a lack of knowledge on how to use them, and populations not being aware of the benefits brought about by using them. All three are supported for the Austrian case, based on the ICT usage studies conducted by Peterbauer and Kropfreiter (2023, 2024a, 2024b), and will be explored further in the scope of this thesis.

3.5 Proposed Model for Government-Sponsored Innovation in the Field of Digital Identity Wallets

Drawing from prior research in eGovernment diffusion and adoption, the trust perspective, as well as the specific setup within ATDI wallet implementation, this thesis builds on the model proposed by Moon and Bretschneider (1997), and adapted by Wang and Doong (2010), as seen in Figure 6. Customizing it to the case of ATDI, it expands their conceptualization of governments' dual role, recognizing it is threefold in this setup, with the government also acting as a verification user. Furthermore, the dimension of citizen trust is introduced as an antecedent to successful diffusion activities in each government-to-social-system interaction. In line with the classification of the government as user on the verification side, a second adopter group is introduced in private sector companies, who could also embed ATDI in their operation, becoming verification users and allowing for new use cases for the citizen adopter group. The model is illustrated in Figure 7 and the additions compared to the referenced model are discussed in more detail in the following subsections.

Figure 7 - Expanded Model for Government-Sponsored Innovation in the Field of Digital Identity Wallets

Note: Own graph, expanded from Moon & Bretschneider, 1997, p. 60 and Wang & Doong, 2010, p. 418)



3.5.1 Development Stage

While development of the ATDI wallet is continuous rather than sequential, the innovation's development stage is structured similarly to Wang & Doong (2010). The government acts as innovator, as well as innovation sponsor, outsourcing some of the development to partners, such as youniqx (see 2.2.2.1), while they provide development and maintenance support to the BRZ. In this role, the government provides and maintains the innovation, while also expanding its functionalities by continuously adding new credentials to the platform. In turn, the social system places their trust in the technological solution, for example in terms of data privacy, while also having expectations of the innovator in terms of functionalities, PU and PEOU.

3.5.2 Marketing and Diffusion Stage: Austrian Digital Identity Credential Users

Like the development stage, the marketing and diffusion stage from government to natural citizens closely follows the model put forth by Wang & Doong (2010). The government engages in promotion, outreach campaigns and supporting activities, also providing some legal embedding, as discussed in section 2.2.2.2. These are aimed at the extended social system, which beyond potential adopters' personal environment also includes change agents and early adopters on social media, reflecting the impact of eWOM (see 3.3.2.2.2 and 3.3.2.3) on shaping citizen attitudes towards innovation, such

as negative comments under informational posts (e.g., Dermosa, 2022). As developed in the various adoption models discussed in previous sections, potential innovation adopters could be motivated to adopt (or not adopt) the innovation due to vertical communication from the government or horizontal word of mouth from people in their surroundings, be it in intrapersonal or virtual channels. As discussed, trust in the eGovernment solution is an important component to adoption willingness among the population, often proxied by trust in the government and the technology. While trust in the government, especially in terms of privacy protection and security, is in theory also part of trust in the government as innovator, it is emphasized in the proposed model in the innovation diffusion process, given that potential adopters need to perceive government information as genuine, true and benevolent for it to shape their perception of the innovation as secure and privacy-protecting, among other things.

3.5.3 Diffusion and Implementation Stage: Austrian Digital Identity Verification Users

In the proposed model, the government's role is threefold, extending previous models by adding the government as adopter in its own right. This refers to the role government entities, especially executive authorities, play during implementation, acting as change agents and adopters by implementing ATDI checks within their operation and accepting authentication through the wallet credentials from end-users. This requires for the part of the government in the innovation diffusion role to inform, recruit and train government organizations and employees, such as police officers in the usage of the innovation. Integration of ATDI in as many government identification scenarios as possible might increase PU for citizen users due to use case expansion, while also requiring a certain amount of trust from credential adopters vis-à-vis the government departments conducting the checks. This could include believing that their credential will be treated the same way as a physical document or a perception of relevant government departments to be capable and acting with integrity when performing the checks (e.g., believing that a local police patrol has the equipment and know-how to scan and accept a credential in QR code format).

In a similar vein, private sector companies were added to the model as (potential) verification adopters. To some extent, this group also has a dual role: On the one hand they could be considered their own organizational user group in a second social system. The government provides them with external information on ATDI and adopters could spread the word to potential other adopters within their social system, pushing them to (non-)adoption (cf. Cavaye, 1995). On the other hand, they could act as change agents and co-diffusers towards the citizen user group, further broadening the coverage of the

ATDI wallet by integrating it in their existing identification processes (e.g., a bank now also accepting ATDI proofs of identity increases useability for users by adding an additional use case to its portfolio). Given that within the ATDI context, private sector adoption for identification purposes has not really taken place yet (see 2.2.2.2), potential effects are marked in the model by dotted lines.

Moreover, this model theorizes that citizen users could also act as co-diffusers towards verification users in the private sector with customer expectations to accept ATDI affecting innovation awareness and potentially creating competitive pressure once early movers adopt the innovation. Similar observations have for example been made for sustainability innovation decisions in the private sector (Tran, 2025) and the more closely related field of new digital payment method acceptance among merchants (Kantar Public, 2022).

4 Methodology and Research Design

In light of the research field of digital identity wallets' relative novelty, most academic discussion on the subject focuses on security (e.g., Kouliaridis et al., 2023), privacy and IdM architecture (e.g., Babel et. al, 2025), mostly addressing online use cases rather than identification in proximity scenarios. Similarly, despite being a European early adopter of digital identity credentials for such cases, the Austrian eID landscape beyond ID Austria has barely been explored in an academic context with the author being able to identify only one mention of the ATDI wallet among peer-reviewed sources (Kouliardis et al., 2023). Given the limited existing knowledge about ATDI, and user perceptions and attitudes towards digital identity wallets more generally, an exploratory case study approach was chosen for this thesis, providing initial insights into ATDI wallet perceptions and awareness.

Following a preliminary exploration of the case and related literature, including a background interview and desk research, the thesis primarily applies quantitative survey-based methods. For the empirical research, the scope was reduced to ATDI driving credentials, namely the digital vehicle registration and driver's license. This served the purpose of further focusing the research on the most developed and clear use scenario of driving and traffic stops. It furthermore allows for the mitigation of measurement error risks, given that the digital proof of age and identity credentials do not have as clear cut every-day use cases and are not comparable to the driving credentials in terms of target user base (e.g., digital proof of age going for younger demographics). Moreover, the population studied was reduced to more closely resemble targeted population of ATDI, which includes only Austrian citizens and individuals residing in the country.

Due to the case study approach and limited scope, external generalizability remains highly limited. However, this research strives to provide an early indication on the information status, expectations and attitudes towards ATDI held by the Austrian population. Accordingly, the research question and its two sub-questions are defined as follows:

Are Austrian citizens aware, clear and confident about the country's digital identity wallet service offering and do they believe its driving and vehicle credentials are equivalent to their physical counterparts in usage scenarios?

c. *To what extent are Austrian citizens and residents familiar with, knowledgeable about, and feeling informed regarding the country's digital identity wallet service offering, including where and when it must be accepted?*

d. *Do Austrian citizens and residents think the country's digital identity wallet credentials can be used and will be accepted in the same way as their physical counterparts?*

Separating the main question into two domains, the first sub-question tackles citizens' awareness, perceived information status and actual knowledge about the ATDI wallet. Throughout this thesis, they will be addressed both descriptively across the responses, and in relation to identified subgroups present in the sample. The second sub-question considers perceptions of equivalence and is operationalized via the analysis of self-reported confidence in replacing physical documents, as well as by evaluating what respondents believe to be true about the credentials themselves and their application in use case scenarios.

The following sections provide detailed information on research design and execution, first for the more qualitatively oriented preliminary exploration. Secondly, methods for the cross-sectional, quantitative research are discussed. This includes an elaboration of the 14-16 question online survey design, explaining its operationalization of the research questions, as well as how respondents were approached, and data was collected. The section concludes with a final overview of data analysis methods, including information on composite indicator construction and statistical models applied.

4.1 Preliminary Literature Review and Case Exploration

Given the relatively novelty of digital identity wallet discussion in academia, a semi-structured academic literature review was conducted, covering not only digital identity wallets directly, but multiple related fields, such as eGovernment diffusion and adoption, digital identity and IdM systems. Moreover, the ATDI case was explored in more detail, diving into Austria's history with digital identity platforms and their EU context, the application's use cases, setup and development process, as well as promotional activities conducted. Furthermore, ATDI's embedding in the Austrian legal structure and eGovernment strategy were examined, and traditional- and social media discourse surrounding the ATDI wallet was reviewed.

Basing findings primarily in peer-reviewed sources, multiple repositories were consulted using various associated search terms. With regards to more general academic literature, Scopus, Google Scholar and both, KU Leuven's and the University of Münster's library catalogues were used. For further insights into the Austrian context, the research database of the country's library association, OBSVG, which summarizes all Austrian academic and non-academic publications was also consulted. Going beyond digitally accessible sources, this last search step also enabled the inclusion of physical documents and books

held by the Austrian Parliamentary Library and the libraries of the University of Vienna in the review.

In order to obtain a comprehensive and efficient initial overview of relevant literature across multiple related domains, the research process was started with the identification and analysis of literature review papers, and a follow up of recommended papers from peers and professors in the author's environment. The resulting learnings served as entry points for mapping the respective thematic landscapes and for identifying relevant keywords, conceptual framings, as well as initial papers for further review. Building on this foundation, a more in-depth investigation of identified subtopics was undertaken, employing both forwards and backwards citation chaining, supported by Google Scholar and the Semantic Scholar platform. Additionally, ChatGPT (OpenAI, 2025) was used to systematically generate synonyms and alternative formulations for search terms, enabling more comprehensive research in the above-mentioned databases. Especially when searching for academic investigations into the Austrian context, German and English search terms were employed.

Beyond academic literature, the preliminary desk research consulted policy documents, especially from the European Union, the OECD and Austria, as well as ATDI-related informational and legal texts, and government-issued promotion materials for the wallet. These were primarily sourced directly from the different entities' websites using embedded search bars and following links to more information, as well as the official Austrian online compendium of laws, RIS ('Rechtsinformationssystem').

For news and media coverage, Google News served as primary search tool, expanded by more targeted searches in established Austrian media outlets' catalogues (e.g., 'Der Standard', 'Die Presse', 'ORF'). Conscious of the variety in the Austrian population's media consumption (cf. Raml et al., 2024), these searches were complemented by the occasional review of more sensationalist media, such as 'Heute' and 'OE24'. For ATDI-related press releases, the Austrian Press Agency's APA-OTS ('Austria Presse Agentur – Originaltext-Service') database was consulted, which is the primary Austrian host for publications of this kind.

Social media reception to ATDI was reviewed on a bi-weekly basis throughout the early phases of the research process. On the one hand, this was done via targeted searches on popular Austrian social media platforms, such as Facebook, Instagram, X and Bluesky[3].

[3] X and especially Bluesky are generally not considered among the most frequently used social media platforms in Austria. However, these microblogging sites are known for being very popular among journalists and politicians generally (Robertson, 2023), as well as in Austria specifically, leaving them with a high impact on more traditional reporting. Given that most prominent Austrian X users switched to Bluesky in a concerted effort in November 2024 both were included (Die Presse, 2024).

On the other, a more focused review was done on the responses to official postings about digital credentials (e.g., Federal Chancellery et al., 2022).

The desk research was enriched and complemented by a semi-structured background interview with Herbert Leitold, the director-general of the Austrian Secure Information Technology Center ('A-SIT'). An expert for secure applications, he has long been part of IdM system development and research, having contributed to the implementation of most Austrian eID schemes, including ID Austria, ATDI and the CC, as well as consulted on eIDAS and the EUDI wallet policy (ISEC, 2025). During the conversation, conducted via a Microsoft Teams online meeting on March 10th, 2025, he provided insights into how Austrian eID tools developed historically, as well as how it integrated into the European context and compares to other countries, and elaborated on the Austrian IdM system's technical setup.

4.2 Quantitative Empirical Research

Building on the preliminary research, the core empirical data of this case study was collected via a cross-sectional online survey, capturing a snapshot of the sample's awareness, perceptions, and belief about the ATDI driving credentials at the time of data collection. This method was chosen to enable the collection of structured, comparable data based on Austrian nationals and residents. Operationalizing the research questions and relying on findings from preliminary research, the questionnaire was developed as described in subsection 4.2.1, and then distributed and responded to by 405 participants, as discussed in subsection 4.2.2. The derived data was then cleaned, assessed for representativeness, and finally analyzed as described in subsections 4.2.2.3 and 4.2.3.

4.2.1 Questionnaire Design

Aiming to operationalize the research questions by collecting data to the different factors they are referencing, a closed-item self-completion questionnaire was developed. To allow for full processing of the results, all items were mandatory to be filled, and answers only recorded once the final submit button was clicked. As mostly Austrian citizens and residents were target, the questionnaire was developed in German, including three sections, to introduce users, collect demographic data, and assess factual knowledge and functional beliefs about ATDI driving credentials. The survey encompassed 16 single- or multiple-choice questions, two of which were only conditionally displayed to respondents indicating active usage of the wallet.

Given the risk of respondent fatigue, as well as the lack of prompting options in the self-administration setup, a user-, rather than coding-friendly design was adopted, as

respondent familiarity with digital ID terminology in Austria could not be assumed and convenience for participants was prioritized (cf. Bryman, 2012). Accordingly, instead of research question components corresponding directly to specific inquiries in the survey, more use case-specific knowledge questions were asked to establish potential users' actual information status, functional beliefs and attitudes. They were complemented by personal factual data and some self-reported perceptions, e.g. on feeling infomed about the application. The following subsections provide more detailed information on survey setup and content, its mapping to research question components, as well as piloting and limitations.

4.2.1.1 Questionnaire Organization and Content

Upon clicking on the survey link, participants were welcomed by the first section. Serving as an entry point, this first screen did not include any questions as such. Instead, it provided a short introduction to the ATDI Wallet and thesis topic, including a picture of screenshots, which showcased credential loading and QR-code presentation for the digital vehicle registration. Moreover, the introductory text included guidance on what to expect in the upcoming questionnaire, information on anonymous data processing and privacy, as well as an indication that despite knowledge questions being asked, the survey was hoping to collect their assessment and expectations, rather than quizzing them. It furthermore included information on the thesis background, providing a means to contact the author in case of inquiries, and informed users about their consenting to the anonymous processing of their data by starting the survey.

The second section aimed at collecting demographic data and establishing a first impression of user familiarity with the ATDI wallet. Accordingly, it mostly consisted of basic demographic questions, such as gender, age or the size of their residential community, as well as more contextual personal factual questions, determining whether the respondent held an Austrian driver's license, an Austrian eID, or how familiar they were with the ATDI wallet. It concluded with the first assessment question, asking participants to indicate how informed they feel about the ATDI service offering on a Likert scale.

The final section encompassed seven questions concerning use cases, usability and practical applicability of ATDI, thus making up the core of perception-relevant questions. It first included three binary knowledge and belief questions, regarding the setup cost, time and refreshing requirements of ATDI driving credentials, each answerable with true or false. They were followed by three closed multiple-choice questions asking users to pick what they believed to be possible use cases for the digital driver's license and vehicle registration, as well as inquiring, which of the provided statements users think would hold

true during a traffic stop. All three of these questions included both, options that can be definitively answered and thus be used to assess factual knowledge, and options in which the legal situation for ATDI is unclear or usability depends on the context or counterpart, but are commonly-known use case scenarios for physical driving documents. The survey closes with a Likert question, asking people whether they would be confident to get into a car with only their digital driving credentials. While this question's positioning in the questionnaire might risk respondents being primed, it was deliberately moved to the end in order to assess responses after participants had provided their more detailed thoughts on dependability, as well as to familiarize those who had never heard of the tool throughout the rest of the questionnaire.

Questions and answer options are listed, classified and, where applicable, associated to the questions objectively true answer in Table 2 and Table 3. Additionally, their link to respective research questions is indicated. The original German questions, as well as the full text of the questionnaire, including the first section and descriptions of section two and three can be accessed in Appendix A.

4.2.1.2 Piloting, Limitations and Ethical Considerations

Given limited means, a variety of low-cost piloting was done, ironing out unclear formulations before the questionnaire was sent out. Firstly, people in the author's close environment and the thesis supervisor were consulted and asked for feedback. This also included individuals residing in Austria, who's native tongue is not German, providing input on less understandable terminology and on how language could be further simplified. Moreover, these testers provided feedback on the design, which was mostly realized in the bounds of what is possible using Microsoft Forms, and served as basis for the time estimate of 5-10 minutes, which was provided during outreach.

Similarly, ChatGPT (OpenAI, 2025) was employed to generate responses from multiple personas' perspectives (e.g., an older Austrian, who is not as familiar with technology) and point out unclarities. While this yielded some minor useful improvement suggestions, the overall impact of the large language model's feedback was negligible. This was mainly due to the tool frequently suggesting changes towards overly generalized phrasing for further linguistic simplification, often creating overlap between response options, especially for questions 13, 14 and 15, or suggesting terminology, that is not tied to the Austrian context.

Table 2 - Questionnaire Categorization (Q1-12, Q16)

Note: Own table. (cf. (1) Federal Chancellery, 2024k, 2024l; (2) Federal Chancellery, n.d.b; (3) Federal Chancellery, 2024m)

##	Question	Question Type	Answer Options	Answer Type	True value	Relation to Research
1	Gender	Demographic	Female; Male; Diverse; Other []	SC; Nominal	n/a	Demographic factor & Representativeness
2	Age	Demographic	up to 19; 20-29; 30-39; 40-49; 50-59; 60-69; 70-79; 80-89; 90 or older	SC; Ordinal	n/a	Demographic factor & Representativeness
3	How would you classify the area in which you currently live?	Demographic	Village or rural area (fewer than 5,000 inhabitants); Large village (fewer than 10,000 inhabitants); Small town (fewer than 20,000 inhabitants); Medium-sized city (fewer than 100,000 inhabitants); Large city (fewer than 1 million inhabitants); Metropolis (more than 1 million inhabitants)	SC; Ordinal	n/a	Demographic factor
4	I have an active Austrian driving permit (driver's license).	Personal factual	Yes; No	SC; Binary	n/a	Demographic factor
5	Do you have an active ID Austria, mobile phone signature or Austrian citizen card?	Personal factual	ID Austria; Mobile Phone Signature; Austrian citizen card; I do not have either of them.	SC; Nominal	n/a	Demographic factor
6	How familiar are you with the 'eAusweise' App?	Personal factual; filter question	I have never heard of the 'eAusweise' app.; I have heard of the 'eAusweise' app but have never downloaded it.; I do not actively use the 'eAusweise' app, but I have had it on my device before.; I use the 'eAusweise' app and have activated one or more digital IDs.	SC; Ordinal	n/a	RQ a - Familiarity
7	Which documents have you activated in the 'eAusweise' App?	Personal factual; contingent	Digital driver's license; Digital vehicle registration certificate; Digital proof of age; Digital ID card	MC; Nominal	n/a	RQ a - Familiarity
8	I have previously presented one of these digital credentials.	Personal factual; contingent	Yes; No	SC; Binary	n/a	RQ a - Familiarity
9	I feel well-informed about the 'eAusweise' service offering.	Likert item for attitudes	Strongly agree.; Agree.; Neither agree or disagree.; Disagree.; Strongly disagree.	SC; Ordinal	n/a	RQ a - Perceived Information Status
10	Activating the digital driving license or vehicle registration certificate incurs additional costs beyond the standard issuance fees for the physical documents.	Knowledge and Belief	True; False	SC; Binary	F (1)	RQ a - Factual Knowledge
11	Activating the digital driver's license or vehicle registration certificate requires additional in-person administrative procedures beyond the regular document issuance or the registration of ID Austria with full functionality.	Knowledge and Belief	True; False	SC; Binary	F	RQ a - Factual Knowledge
12	Once I have activated my digital driver's license or vehicle registration certificate in the app, I can access it there until the document's expiration date.	Knowledge and Belief	True; False	SC; Binary	F (3)	RQ a - Factual Knowledge
16	With the digital driver's license or vehicle registration certificate on my phone, I would have no concerns about driving without carrying the paper or card-format version.	Likert item for attitudes	Strongly agree.; Agree.; Neither agree or disagree.; Disagree.; Strongly disagree.	SC; Ordinal	n/a	RQ a - Confidence RQ b - Belief in Equivalence

Table 3 - Questionnaire Categorization (Q13-15)

Note: Own table. (cf. (1) Federal Chancellery, 2024f; (2) Christof, 2025; (3) Mittelstaedt et al., 2024; (4) Federal Chancellery, 2024e; (5) ÖAMTC, n.d.b; (6) Zurich Connect, 2024; (7) ÖAMTC, n.d.c)
(* due to unclear formulation, these survey items were only used limitedly in analysis)

##	Question & Answer Options	Question / Answer Type	True Value	Relation to Research
13	**With an activated digital driving license in the 'eAusweise' app, I can:**	**MC; Knowledge and Belief**	**n/a**	**RQ a - Factual Knowledge** **RQ b - Belief in Equivalence**
13.1	Provide identification for myself in a traffic stop	Binary	UNCLEAR (not guaranteed, likely) (5)	RQ b - Belief in Equivalence
13.2	Prove my driving credentials in a traffic stop	Binary	TRUE (1)	RQ a - Factual Knowledge RQ b - Belief in Equivalence
13.3	Prove my driving credentials to third parties	Binary	TRUE (1)	RQ a - Factual Knowledge RQ b - Belief in Equivalence
13.4	Rent a car in Austria	Binary	UNCLEAR (theoretically possible) (5)	RQ b - Belief in Equivalence RQ b - Belief in Equivalence in Non-Driving Context
13.5	Prove my identity and driver's license, if I am involved in an accident	Binary	UNCLEAR (not guaranteed, likely) (5)*	RQ b - Belief in Equivalence
13.6	Identify myself at a government office or other public institution	Binary	UNCLEAR (context-dependent) (2;5)	RQ b - Belief in Equivalence RQ b - Belief in Equivalence in Non-Driving Context
13.7	Go to the polls and vote	Binary	UNCLEAR (context-dependent) (2; 3)	RQ b - Belief in Equivalence RQ b - Belief in Equivalence in Non-Driving Context
13.8	Cross the border	Binary	FALSE (1)	RQ a - Factual Knowledge (RQ b) - Belief in Useability outside Austria
13.9	Prove my identity in another EU country	Binary	FALSE (1)	RQ a - Factual Knowledge (RQ b) - Belief in Useability outside Austria
13.10	Prove my driving credentials in another EU country	Binary	FALSE (1)	RQ a - Factual Knowledge (RQ b) - Belief in Useability outside Austria
13.11	Prove my identity outside the EU	Binary	FALSE (1)	RQ a - Factual Knowledge (RQ b) - Belief in Useability outside Austria
13.12	Prove my driving credentials outside of the EU	Binary	FALSE (1)	RQ a - Factual Knowledge (RQ b) - Belief in Useability outside Austria
14	**With an activated digital vehicle registration in the 'eAusweise' app, I can:**	**MC; Knowledge and Belief**	**n/a**	**RQ a - Factual Knowledge** **RQ b - Belief in Equivalence**
14.1	Prove my vehicle's registration during a traffic stop.	Binary	TRUE (4)	RQ a - Factual Knowledge RQ b - Belief in Equivalence
14.2	Prove my vehicle's registration, including related annotations on supplementary sheets with additional information, during a traffic stop.	Binary	FALSE (4)	RQ a - Factual Knowledge RQ b - Belief in Equivalence
14.3	Present my vehicle's data during a §57a inspection ("Pickerl").	Binary	UNCLEAR (possible, unlikely) (6)	RQ b - Belief in Equivalence RQ b - Belief in Equivalence in Non-Driving Context
14.4	Prove my vehicle's registration to third parties.	Binary	TRUE (4)	RQ a - Factual Knowledge RQ b - Belief in Equivalence RQ b - Belief in Equivalence in Non-Driving Context

##	Question & Answer Options	Question / Answer Type	True Value	Relation to Research
14.5	Temporarily grant other persons access to the digital registration certificate of my vehicle.	Binary	TRUE (4)	RQ a - Factual Knowledge RQ b - Belief in Equivalence RQ b - Belief in Equivalence in Non-Driving Context
14.6	Permanently grant other persons access to the digital registration certificate of my vehicle.	Binary	PRACTICALLY TRUE (4)*	RQ b - Belief in Equivalence
14.7	Re-register my vehicle.	Binary	UNCLEAR (not likely)	RQ b - Belief in Equivalence
14.8	Sell my vehicle.	Binary	TRUE* (7)	RQ b - Belief in Equivalence
14.9	Request new license plates if the previous ones are lost or stolen.	Binary	FALSE	RQ a - Factual Knowledge RQ b - Belief in Equivalence
14.10	Prove my vehicle's registration in another EU country.	Binary	FALSE (4)	RQ a - Factual Knowledge RQ b - Belief in Equivalence (RQ b) - Belief in Useability outside Austria
14.11	Prove my vehicle's registration outside the EU.	Binary	FALSE (4)	RQ a - Factual Knowledge RQ b - Belief in Equivalence (RQ b) - Belief in Useability outside Austria
15	**15. At a traffic stop in Austria, I believe that the following apply:**	**MC; Knowledge and Belief**	**n/a**	**RQ a - Factual Knowledge** **RQ b - Belief in Equivalence**
15.1	My digital driver's license or vehicle registration certificate must be treated by the police exactly the same as a paper or card-format.	Binary	TRUE (1; 4)	RQ a - Factual Knowledge RQ b - Belief in Equivalence RQ b - Belief in Regulatory Equivalence
15.2	My digital driver's license or vehicle registration format will be treated by the police exactly the same as a paper or card-format document.	Binary	UNCLEAR	RQ b - Belief in Equivalence RQ b - Belief in Authorities' Capability
15.3	My digital driver's license or vehicle registration certificate will be accepted without a physical (paper or card-format) photo ID.	Binary	UNCLEAR	RQ b - Belief in Equivalence RQ b - Belief in Authorities' Capability
15.4	The police immediately recognizes my digital driver's license or vehicle registration certificate in QR-code form.	Binary	UNCLEAR	RQ b - Belief in Equivalence RQ b - Belief in Authorities' Capability
15.5	The police is capable of scanning my digital driver's license or vehicle registration certificate in QR-code form without any problems.	Binary	UNCLEAR	RQ b - Belief in Equivalence RQ b - Belief in Authorities' Capability
15.6	The application will not experience technical problems.	Binary	UNCLEAR	RQ b - Belief in Equivalence RQ b - Belief in Technical Reliability
15.7	I can present my digital driver’s license or registration certificate even without a mobile signal.	Binary	TRUE (1; 4) (limited amount of time)	RQ b - Belief in Equivalence RQ b - Belief in Technical Reliability
15.8	If my phone’s battery is dead or it has a technical issue, the digital driver’s license or registration certificate is still valid or I will be allowed to submit it at a later point.	Binary	FALSE (1, 4)	(RQ b) - Perceived Risk of Punishment in Case of Issues
15.9	If the eAusweise app fails due to a government-related system error or technical issue, I could be penalized as if I were not carrying a driver’s license.	Binary	UNCLEAR (likely, context-dependent) (1, 4)	(RQ b) - Perceived Risk of Punishment in Case of Issues

Despite having conducted some piloting, one double-barrelled response option remained in 13.5, mixing identification and driving qualification for the driver's license credential, the latter of which should be possible, while the other is not guaranteed, assuming that incidence response teams or potential other parties to the accident have the equipment to check ATDI wallet credentials. Moreover, in 14.6, wording should have been cleared up further to reflect ATDI's actual specification of either being able to grant someone else digital access to the registration until it runs out by setting the temporary limit at that time or by sharing the credential due to a shared registration ownership.

Similarly, 14.8 generated some unclarity with respondents. Generally, selling a car while having an activated credential is possible, with the credential being deactivated upon registration to someone else (ÖAMTC, n.d.c). At the same time, selling a car using only the digital credential it is likely impossible. While some people choose to deregister their car before selling it in order to not carry any liability, many people choose to leave it registered in their name, enabling them to park on public ground until the sale is concluded and granting the new owner to directly drive the vehicle upon purchase. Afterwards, the new owner deregisters the car at the same time as they register the car to themselves. The first option of deregistration implies one does not have a registration anymore, but only a deregistration certificate, which can be used for the sale and subsequent reregistration. The second option actively requires a physical copy of the vehicle registration, as deregistering a car is currently possible without (ÖAMTC, 2023). For this reason, the item was only limitedly included in analysis.

Furthermore, asking for perceived useability outside the European Union (13.11, 13.12, 14.10, 14.11) likely exceeds the scope of equivalence, given that the physical Austrian driver's license document would not be accepted in these cases either. Beyond formulation issues, an additional question clearing up respondents' relation to Austria (i.e., residence or citizenship) would have allowed for better controlling on whether the targeted sample was actually reached.

To address ethical considerations, capture of personal identifiers was kept to a minimum, collecting responses anonymously, asking only for gender directly and capturing age and community size in classes. Additionally, participants were informed of data processing in section 1 and asked to consent by progressing in the survey. Here, grouping of community sizes should have been executed differently to align more closely with available population data. This would potentially have allowed for further checks of representativeness.

4.2.2 Data Collection

Data was collected using an online survey was created and administered using Microsoft Forms via the author's institutional Tallinn University of Technology ('TalTech') Microsoft 365 account. As such, the form was hosted on TalTech's secure university-managed infrastructure, ensuring data privacy and access control in line with university standards. It was accessible to anyone via the link. Published on March 24, 2025, the online questionnaire was accessible for a time of 52 days, with the final respondent completing the questionnaire on May 9, 2025. In this time, 405 participants were recruited. The following subsections provide further detail on the sampling and outreach strategy, as well as the final sample composition and representativeness of the overall population.

4.2.2.1 Sampling

As established in section 2.2.1, usage of ATDI driving credentials is open to all Austrian citizens and foreigners eligible for the ATDI wallet app (i.e., with a connection to the country, such as residence), who are old enough to have a driver's license. In line with this population, the survey was aimed at individuals either from Austria, residing in the country, or both, aged 15 or older (Austrian Ministry for Innovation, Mobility and Infrastructure, 2025a). Due to time and means constraints, convenience sampling was chosen as a method, despite the fact that probabilistic or quota sampling would likely have increased representativeness (cf. Bryman, 2012).

4.2.2.1.1 Targeted Sample Size

Despite using non-probabilistic sampling, the targeted sample size was determined using Cochran's (1977) formula for estimating sample size. This was done on the basis of estimations on potential target user bases. These estimations were needed due to a lack of person-related data being available for either of the driving credentials. With regards to driver's licenses this estimation was necessary, given that no statistics are published on how many driver's licenses are currently active in Austria due data base upkeep issues (B. Allex [Statistik Austria], personal communication, November 27, 2024). However, while for vehicle registrations only the number of vehicles, not registration holders, is recorded, preliminary data noted more than 7.43 million registered vehicles in May 2025, and a motorization degree of 56.9% at the end of 2024. This indicates that for this use case the potential target group might include more than half the population (i.e. around 5.2 million) (Fischer & Premm, 2025; Statistik Austria, 2025a, 2025b), making Cochran's formula the appropriate tool due to the large population numbers.

Following methodological recommendations in social science research by Bartlett II et al. (2001), a targeted sample size of 385 responses was calculated based on an alpha-level of 0.05, corresponding to a Z-score (Z) of 1.96 and a 95% confidence level. The targeted margin of error (MoE) was set at 5% and, in the absence of known population proportions, the most conservative estimate (p) of 0.5 was used. This p-value maximizes variance (0.25), yielding the largest sample size requirement under the chosen confidence level (see Equation 1).

Equation 1 - Calculation of Target Sample Size

$$n_0 = \frac{Z^2 * p * (1-p)}{MoE^2} \rightarrow n_0 = \frac{1.96^2 * 0.5 * (1-0.5)}{0.05^2} = 384.16 \sim 385$$

4.2.2.2 Outreach

With the target set, participant mobilization began following the survey's publication on March 24, 2025. The survey link was shared digitally, with the author leveraging their personal network via social media, direct messages to extended friends and family, as well as messages to group chats and email chains. Parallel to this digital outreach, analog methods were employed. This included the distribution of more than 250 flyers with QR-codes linking to the form at public transport hubs and parks across Vienna. Additionally, posters were put up in local coffee shops and bars, and announcements posted on public blackboards at supermarkets and universities. Furthermore, ultimately unsuccessful efforts were made to recruit participants via public entities, declined due to data protection concerns on the organizations' part.

Initial outreach saw a strong response likely driven by the author's close network, but participation slowed down drastically thereafter. Interest picked up again toward the end of the data collection period, aided by warmer spring weather that made in-person recruitment much more effective. The target of 385 respondents was met on on May 6th, 2025. However, to accommodate newly recruited participants, the survey was remained open for an additional three days, ultimately closing with 405 completed responses.

Given the convenience sampling approach chosen, the outreach strategy had its limitations, especially in reaching respondents outside Vienna, which were only targeted via some local organization's mail chains and forwarding by people in the author's extended network. Moreover, younger people were likely to be reached out to more heavily, given both the author's age and corresponding ages of personal connections, as well as the online survey format and QR-code presentation, which discouraged some older targets during in-person recruiting. Additionally, the relatively novel ATDI tool and digital theme caused many individuals approached, especially among older demographics

to decline participation on the basis of not feeling like they could contribute. This skew due to self-selection bias is also noted in the upcoming section, as urban residents, people in their twenties, as well as eID owners are shown to be overrepresented.

4.2.2.3 Sample Distribution and Representativeness

An overview of the 405 respondent sample's make up according to general demographic characteristics (gender, age, community size) and the personal factual identifiers of eID, ATDI and driver's license ownership is provided in Table 4. Where available, real population numbers were drawn for comparison from data sets published by Statistik Austria, the country's national statistical institute. Population data on gender and age furthermore served as the foundation Chi-Square Goodness-of-Fit test, testing sample representativeness according to gender and age groups.

4.2.2.3.1 Distribution and Representativeness According to Gender and Age

In terms of age and gender representation in the sample, a mean absolute deviation from the population of approximately 3.13% and a standard deviation of over- and underrepresentation across age-gender groups of around 4.64% were observed. The sample exhibits a pronounced skew towards young adults aged 20-29, who represent over 33% of all respondents, compared to only 11.72% of the population. Males in this age group are the most overrepresented group across the entire sample, deviating from the real population by 11.16%. This pronunciation is closely followed by females of that group at 10.28% overrepresentation, making this cohort the most disproportionately represented subgroup in the data.

Table 4 - Sample Distribution and Representativeness

Note: Own table based on survey data, (n=405) and population data (Statistik Austria, 2025a, 2025c; Peterbauer & Kropfreiter, 2024b)
* Gender age data operates on n=401, as 4 diverse-gender data points had to be dropped to match published population data

Variable	Characteristic	n	% of n	% of N	% Over/Under Representation
Gender	Diverse	4	0.99	0	0.99
	Female	225	55.56	50.72	4.84
	Male	176	43.46	49.28	-5.82
Gender + Age Group*	Female, ≤19	10	2.49	9.31	-6.82
	Male, ≤19	7	1.75	9.89	-8.14
	Female, 20-29	64	15.96	5.68	10.28
	Male, 20-29	69	17.21	6.04	11.17
	Female, 30-39	34	8.48	6.76	1.72
	Male, 30-39	17	4.24	7.06	-2.82
	Female, 40-49	26	6.48	6.58	-0.1
	Male, 40-49	18	4.49	6.58	-2.09
	Female, 50-59	43	10.72	7.35	3.37
	Male, 50-59	30	7.48	7.2	0.28
	Female, 60-69	40	9.98	6.77	3.21

Variable	Characteristic	n	% of n	% of N	% Over/Under Representation
	Male, 60-69	31	7.73	6.42	1.31
	Female, 70-79	6	1.5	4.55	-3.05
	Male, 70-79	4	1	3.74	-2.74
	Female, 80-89	2	0.5	3.07	-2.57
	Male, 80-89	0	0	2.08	-2.08
	Female, 90-99	0	0	0.62	-0.62
	Male, 90-99	0	0	0.27	-0.27
	Female, ≥100	0	0	0.02	-0.02
	Male, ≥100	0	0	0	0
Community Size	Rural (≤5k)	65	16.05	n/a	n/a
	Village (≤10k)	35	8.64	n/a	n/a
	Small town (≤20k)	36	8.89	n/a	n/a
	Medium city (≤100k)	36	8.89	n/a	n/a
	Large city (≤1M)	34	8.4	n/a	n/a
	Metropolis (≥1M)	199	49.14	n/a	n/a
Driver's License	Has License	365	90.12	n/a	n/a
	No License	40	9.88	n/a	n/a
eID Ownership	Has eID	323	79.75	46.36	33.39
	No eID	82	20.25	53.64	-33.39

By contrast, the youngest age group (≤ 19) is markedly underrepresented. Males 19 or younger comprise only 1.75% of the sample compared to 9.89% of the population, and females in the same group make up 2.49% of the sample versus 9.31% of the population. Given this thesis' research focus however, and 15 being the earliest age to receive any Austrian driver's license, and hence also vehicle registration, this this gap likely reflects natural exclusion of younger Austrians, who are not yet legal holders of such credentials or use cases.

In addition to underrepresentation of the youngest demographic, older adults aged 70 and above are also featuring less in the sample data (3%) than in the population (14.35%). Like the overrepresentation of 20-29-year-olds this deviation is consistent with the outreach strategy applied. With regards to older generations, the topic's digital orientation might have additionally contributed to this gap, with many older people, whom the author asked to fill the survey in person, noting that they do not feel confident contributing to a topic on mobile phone application, due to a lack of knowledge and awareness.

Across the middle-aged brackets (30–69), representation is more balanced, with age group over- and underrepresentation hovering between ±0.1 and ±3.4 percentage points. Gender distribution within these age groups remains roughly proportional, although some variation persists. For example, women aged 50–59 and 60–69 are overrepresented, while their male counterparts are closely aligned with expected proportions.

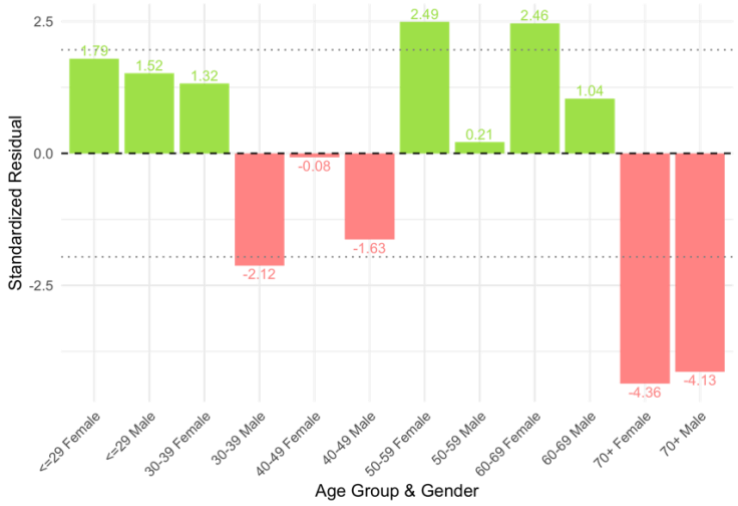
A chi-squared goodness-of-fit with collapsed gender-age brackets (≤29, 30–39, 40–49, 50–59, 60–69, and 70+), comparing the observed distribution of male and female respondents to that of the population yielded $\chi^2{}_{0.05,11} = 63.935$, with a p-value of $p = 1.708 * 10^{-9}$. Accordingly, the test result was highly significant, indicating that the

sample distribution across these age-gender groupings meaningfully diverges from the population proportions and that resulting findings are not significant for the Austrian population as a whole.

The standardized residuals displayed in Figure 8 offer insight into the specific categories contributing most strongly to the overall test result. Residuals greater than ±1.96 indicate statistically significant deviations from expected values at the 5% level, indicated by the dotted grey line.

Figure 8 - Standardized Residuals by Age-Gender Group

Note: Own illustration based on survey data (n=401) and population data (Statistik Austria, 2025a); Residuals beyond ±1.96 indicate statistically significant deviation from expected population counts.



Reinforcing descriptive findings, the most notable significant deviations are the strong underrepresentation of individuals aged 70 and above, both among men and women. Beyond that, statistically significant deviations include the overrepresentation of females aged 50–59 and 60–69 in the sample, and the significant underrepresentation of males aged 30–39. While the other categories fall within the expected range and hence do not differ meaningfully from population expectations, this does not contradict descriptive findings of strong overrepresentation of 20–29-year-olds, given that they were integrated with the strongly underrepresented group of people aged 19 and younger for the Goodness-of-Fit test to ensure sufficient cell counts.

In addition to the binary gender-age representativeness addressed in the above evaluation, more detailed, age-agnostic gender statistics from Statistik Austria (2025c) were used, which included counts for “Diverse”, “Inter”, “Open”, “No entry”, and “Unknown” classifications, as well as traditional gender markers. Consistent with the survey response option, all of them were collapsed into a single “Diverse” group. While the diverse group appears somewhat overrepresented due to its extremely small relative size within the

population, women were shown to be over- and men underrepresented by around 5% across age groups.

4.2.2.3.2 Distribution and Representativeness According to Community Size, Driving Qualification and eID Ownership

In addition to gender and age, the sample distribution was analyzed according to community size and driving credentials. While no comprehensive benchmark data on either exists, some misalignment could be detected, given that almost half of the sample (49.14%) reported living in a "Metropolis" with more than one million inhabitants. Whithin Austria, this classification applies exclusively to Vienna, the country's only city above one million inhabitants (2,028,399 in February 2025), which is home to approximately 22.1% of the total population (Statistik Austria, 2025a). This suggests a marked overrepresentation of Viennese residents. Such a skew is consistent with the thesis' data collection strategy, with most recruiting efforts taking place in the city.

Similarly, for driver's license possession, requested in the questionnaire as a contextual marker, no population level data is available (B. Allex [Statistik Austria], personal communication, November 27, 2024). Of the 405 respondents, 90.12% indicated that they currently hold a valid Austrian driving license, while 9.9% do not. While no data is available on driver's license ownership in Austria, the inferred overrepresentation of Viennese citizens and young adults, both groups which have been reported to have lower car usage in general, and a reduction in driver's license issuances in the case of the city, suggests the risk of overrepresenting people without driving credentials in this study. At the same time the specific question of having an Austrian driver's permit might have overlooked non-Austrian survey participants, who would have been eligible for the ATDI credential (VCÖ, 2021; Allex & Ortner, 2024).

Conversely, ownership of eID among 16-74-year-olds is collected by Statistik Austria (Peterbauer & Kropfreiter, 2024b). The survey data shows a relatively pronounced overrepresentation of individuals owning at least one of the Austrian eID formats (i.e. CC, MPS, ID Austria) compared to the population of 33.39%. This is likely due to inherent self-selection bias present in non-probabilistically sampled, self-administered questionnaires (Bryman, 2012), meaning that people more familiar with the topic or interested in digital public services are probably more likely to take part in a survey about them.

4.2.3 Data Analysis

This section outlines the analytical procedures used to investigate the research questions drawing both on descriptive and inferential methods. To this end, research questions were organized according to factors, some derived directly from individual survey items, some constructed as composite indicators incorporating answers across questions. These variables were examined descriptively on the one hand and applying inferential methods on the other. The following subsections provide information on technical setup, research question operationalization and indicator construction, and analysis methods applied.

4.2.3.1 Technical Setup for Data Processing

Technically, data collected via the online questionnaire was exported from Microsoft Forms and processed using the statistical programming language R (R Core Team, 2025), operated within the RStudio integrated development environment (Posit team, 2025). R was used for all steps of data preparation and analysis, including cleaning, recording, composite indicator construction and the execution of descriptive and inferential statistics. Commonly used packages supported data wrangling, visualization, and statistical testing. These included dplyr (Wickham, Vaughn et al., 2023), tidyr (Wickham et al., 2024), ggplot2 (Wickham, 2016), readr (Wickham, Hester et al., 2024), tibble (Müller & Wickham, 2023), stringr (Wickham, 2016), ComplexUpset (Krassowski, 2020), patchwork (Pedersen, 2024), MASS (Venables & Ripley, 2002) and broom (Robinson et al., 2025). Moreover, ChatGPT (OpenAI, 2025) was consulted for explanations on R function parameters, troubleshooting in case of errors, as well as the generation of visuals. Outputs were always checked, and tweaked where necessary by the author before implementation to ensure correctness and methodological validity in the code.

4.2.3.2 Operationalization of Research Questions: Indicator Construction and Dependent Variables

The two research questions were respectively operationalized in multiple factors, which could then be examined descriptively and evaluated according to demographic and personal factual factors using inferential means. For sub-question a, familiarity and perceived information status were taken directly from the questionnaire, while the factual knowledge status was proxied via correctness of verifiable questions as a composite indicator. Similarly, research question b, evaluating perceptions of equivalence between physical and digital credentials, was operationalized either creating composite indicators or relying on respondent answers directly to create related constructs. These encompassed the sample's self-reported confidence in replacing physical credentials in driving

scenarios, the overall belief in functional equivalence and perceptions of regulatory equivalence in traffic stops, trust in enforcement authorities' capability, perceived technical reliability, as well as perceived risk of punishment. Moreover, belief in the driving credentials' equivalence in non-driving scenarios and in international use cases was explored. Table 5 provides an overview of these dependent variables and indicators, how they are constructed and processed. Familiarity, confidence in replacement and respondents' perceived information status provide relatively straightforward data, relying on a single question item to derive answers. Composite indicator construction on the other hand is less direct due to the chosen questionnaire structure, which favored participants' convenience. For this reason, there are some aspects to be conscious of during result interpretation: Firstly, some composite indicators have overlapping bases in data, such as the more overarching belief in functional equivalence and believed equivalence in non-driving scenarios. Accordingly, while both are provided and discussed, they cannot be considered independently, rather providing a summarized overview and detailed perspective of the same picture. Secondly, indicators rely on different amounts of answer data. This has the potential of skewing perception of relative significance and should be considered when making inferences from data. For example, while belief in regulatory equivalence is proxied by only one multiple-choice answer option in question 15, the factual knowledge indicator assesses correctness of 18 answer options and three additional question items. Conversely, when considering indicators incorporating a high number of answer options, it is important to remain conscious of what answer options were included in the questionnaire. It is for example relatively likely and arguably more at the core of the question of equivalence that individuals, even if they had never heard of ATDI previously, assume that something called digital driver's license can serve as driving qualification in the face of authorities. However, with edge cases, such as being able to request new license plates, respondents are likely less familiar with the scenario, even assuming physical documents. While it is likely that more niche use cases do not impact citizen's perception of equivalence as much, composite indicators in this thesis are constructed on means and weigh them equally. Data Analysis and Variable Evaluation

Following construction, variables were first examined descriptively, providing some insights into the data collected directly. This encompasses i.a. a user-adoption funnel to explore familiarity, and an indication of responses to Likert-scale items, showing general tendencies towards positive or negative personal assessments on the part of respondents. For factual knowledge and beliefs, data on what percentage of participants indicated an answer or responded correctly was provided.

Table 5 - Dependent Variables and Indicators

Note: Own table.
* Indicators also partially serving as independent variables during analysis.

Indicator (dependent variables)	Construction	Basis in Data	Processing	Inferential method	RQ
Familiarity*	Self-reported factual information	Q6	Ordinal, non-equidistant variable on self-reported ATDI awareness	Ordinal Logistic Regression (proportional odds)	RQa
Perceived Information Status	Self-reported assessment	Q9	Ordinal, treated as numeric variable for regression	Linear Regression (ordinary least squares)	RQa
Factual Knowledge	# of correctly answered items, where factually correct answers are available	Q10-Q12, Q13.2- Q13.3, Q13.8- Q13.12, Q14.1-Q14.2, Q14.4-Q14.5, Q14.9-Q14.11, Q15.1, Q15.7-Q15.8	Composite indicator	Linear Regression (ordinary least squares)	RQa
Confidence in Driving without Physical Documents*	Self-reported assessment	Q16	Ordinal, treated as numeric variable for regression	Linear Regression (ordinary least squares)	RQb
Belief in Functional Equivalence	# of items answered positively (indicating equivalence)	Q12, Q13.1-Q13.7, Q13.10, Q14.1-Q14.10	Composite indicator	Ordinal Logistic Regression (proportional odds)	RQb
Belief in Regulatory Equivalence (traffic stop)	Positive answer (indicating normative expectation of equivalence)	Q15.1	Binary response item	Binary Logistic Regression	RQb
Trust in Enforcement Authorities' Capability (traffic stop)	# of items answered positively (indicating capability)	Q15.2-Q15.5	Composite indicator	Ordinal Logistic Regression (proportional odds)	RQb
Perceived Technical Reliability (traffic stop)	# of items answered positively (indicating reliability)	Q15.6, Q15.7	Composite indicator	Ordinal Logistic Regression (proportional odds)	RQb
Perceived Risk of Punishment	# of items answered to suggest low risk perception	Q15.8, !Q15.9	Composite indicator	Ordinal Logistic Regression (proportional odds)	RQb
Belief in Equivalence in Non-Driving Scenarios	# of items answered positively (indicating useability)	Q13.4, Q13.6-Q13.7, Q14.3-Q14.4, Q14.7-Q14.9	Composite indicator	Ordinal Logistic Regression (proportional odds)	RQb
Belief in International Recognition	# of items answered positively (indicating recognition)	Q13.8-Q13.12, Q14.10-Q14.11	Composite indicator	Ordinal Logistic Regression (proportional odds)	RQb

These descriptive analytics were complemented by inferential exploration examining how the demographic and contextual factors (e.g., gender, age group, community size, driver's license ownership and ID Austria ownership) relate to the dependent variables constructed. An overview of these independent variables on the basis of which factors were explored can be found in Table 6. Notable here are familiarity and confidence, both

of which are partially applied as predictor variables despite being subjects of analysis themselves. Accordingly, while familiarity is only analyzed on the basis of gender, age group, community size, driver's license and ID Austria ownership, it is employed as a potential predictor in the analysis of all other dependent variables. Similarly, confidence is applied as a potential predictor for all belief items.

Table 6 - Independent Variables

Note: Own table.
* Only used for some tests, indicators also partially serving as dependent variables during analysis.

Independent variables	Basis in Data	Data type
Gender	Q1_Gender	Nominal
Age	Q2_Age	Ordinal
Community Size	Q3_Rurality	Ordinal
Driver's license	Q4_Driver	Binary
ID Austria	Q5_eID	Binary
Familiarity*	Q6 - Familiarity_ATDI	Ordinal
Confidence in Driving without Physical Documents*	Q16 - Confidence	Ordinal Likert-scale variable, treated as numeric

Given the different types of dependent variables, multiple regression models suited to the respective data types were employed. Likert-scale items, as well as the factual knowledge score, were treated as numeric variables in regression models, assuming approximate interval-scale properties consistent with common practice in applied research. Given this categorization, they were analyzed using an ordinary least squares linear regression model (Lewis-Beck et al., 2004; Bryman, 2012). For the evaluation of the factor of familiarity, lacking equidistance between ordered ordinal categories, as well as all belief composite indicators, a proportional odds model, estimated via of maximum likelihood estimation, was employed. For composite indicators, this method was chosen due to their discrete and bounded nature, as well as the content differences creating a scoring logic that cannot be considered equidistant. Standard errors and confidence intervals derived from the Hessian matrix. Similarly, for the binary outcome variable of belief in regulatory equivalence, a binary logistic regression model was used. As in the ordinal regression approach, maximum likelihood formed the basis for estimation, confidence intervals and standard errors being derived from the Hessian matrix (Lewis-Beck et al., 2004).

To enable interpretation of coefficients relative to the overall population mean as opposed to each other, effect coding was applied to categorical predictors across analyses, avoiding comparisons with potentially small n subgroups (Alkharusi, 2012). Model output was processed in R and p-values were approximated manually, using the standard normal distribution. Given coefficient reporting for k-1 levels of each factor, estimates for the omitted levels were manually calculated. Visualizations were provided in the form

of grouped dot and whisker plots for coefficients, providing a quick overview of tendencies and significant results within 95% confidence.

5 Results

This chapter discusses results derived about the sample population. Analysis results are presented alongside the variables used to operationalize the research questions, first establishing a general picture to what extent the population is aware and using the wallet and then moving on to how informed respondents are and feel. Addressing the second research question, participant assessments of confidence in replacing physical driving credentials, as well as multiple dimensions of belief in equivalence are shared.

5.1 Awareness, Familiarity and Usage of Austrian Digital Identity Wallet Application

Awareness of and familiarity with the ATDI wallet were assessed on the basis of self-reported data, describing whether respondents had heard of the application, had downloaded it before or were active users. Among active users, further data provides insights on whether they had ever presented their wallet, and which of the ATDI credentials they had activated. Following an elaboration on these statistics in the two upcoming subsections, the implications of different demographic and personal factors on familiarity levels is discussed in 5.1.3.

5.1.1 Austrian Digital Identity Wallet Diffusion and Adoption Along the User Journey

Figure 9 provides an overview of user responses by familiarity level, while Figure 10, illustrates the user adoption funnel, showing the extent to which segments of the total sample have progressed in adopting ATDI credentials. The data reflects sample user familiarity with the wallet and does not focus specifically on its driving-related functionalities, offering insight into overall eligibility, awareness and usage behavior as a percentage of total respondents. While 79.8% of respondents reported owning some form of eID, 72.1% had activated their ID Austria, making them technically eligible to activate and use ATDI credentials. This number matches up relatively well with the amount of respondents, who had at least heard of the ATDI application, a fact that can likely be explained due to the information provided on it in the DO app, which is necessary for ID Austria usage. While knowledge about the application appears relatively well-established reaching almost three thirds of respondents, only 39.9% of the sample had made a positive adoption decision previously at one moment and downloaded the application. Among them, only around half (21.2%) indicate having previously activated a credential and implemented the wallet, with an even smaller percentage claiming to have ever presented a credential in real life, confirming their decision. Notably, validation

checks revealed minor inconsistency among responses regarding eID ownership, such as active users claiming to have no ID Austria.

Figure 9 - Awareness and Familiarity with the Austrian Digital Identity Wallet

Note: Own illustration based on survey data, (n=405).

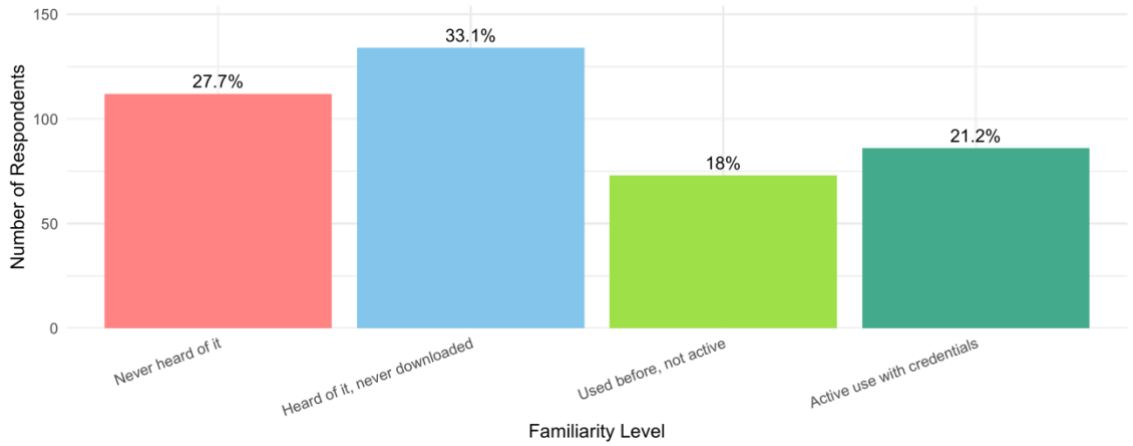
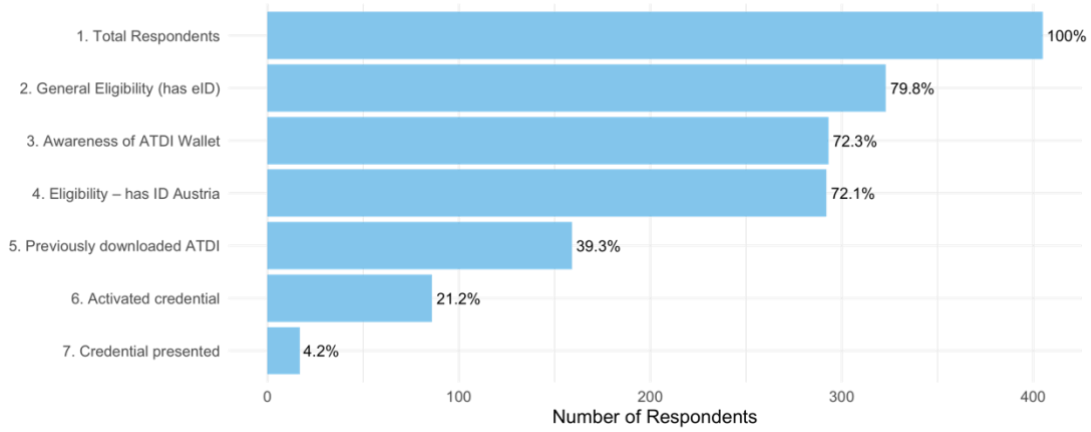


Figure 10 - Awareness and Familiarity: User Adoption Funnel

Note: Own illustration based on survey data, (n=405).



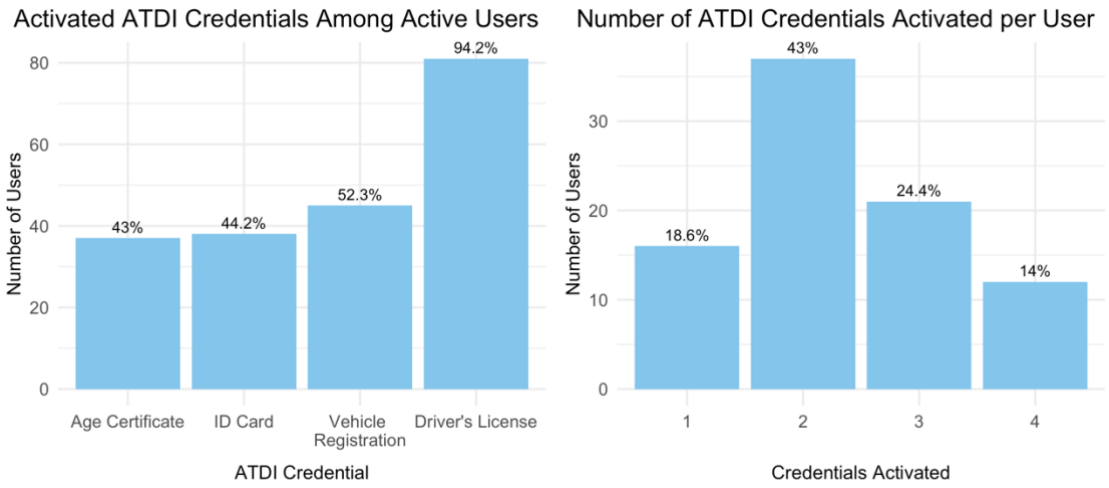
5.1.2 Active User Behavior

Among the 86 active users in the sample, both driving credentials were the most popular, with the digital driver's license far surpassing other document types in terms of activations (94.2% of active users). Most users had two loaded credentials, the combined setup of the digital driver's license and vehicle registration being the most common combination. This setup was followed by users, who had activated either only the driver's license or all available credentials. Less than 3.5% of active users had not downloaded at least one of the two driving credentials (cf. Annex C). The popularity of both driving credentials could be explained due to the very clear and promoted use scenario in traffic stops. Moreover, the digital driver's license being the first ATDI credential and available

since 2022, as opposed to newer credentials, might have contributed to the higher adoption numbers. Further details on credential activation are displayed in Figure 11, as well as in Annex C.

Figure 11 - Overview of Activated Austrian Digital Identity Credentials

Note: Own illustration based on survey data, (n=86).



5.1.3 Predictors of Austrian Digital Identity Wallet Familiarity

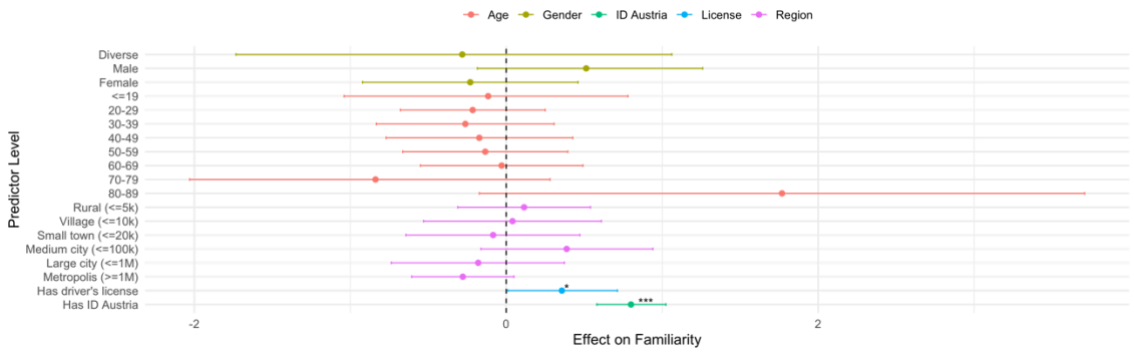
Evaluating how sociodemographic and contextual variables relate to familiarity with the ATDI wallet, an ordinal logistic regression model was employed comparing grand mean familiarity with the means of subgroups. Results are visualized in Figure 12, with detailed data provided in Appendix D.

Model estimation revealed that the possession of ID Austria was the strongest predictor for higher familiarity, with respondents significantly more likely to report higher familiarity levels than their peers. This can be easily explained due to ID Austria being a prerequisite for ATDI adoption, as well as the direct link and promotion for the wallet in the DO application. A second statistically significant positive effect was observed for driver's license holders, suggesting that those with a driver's license reported higher levels of familiarity relative to the population mean. Though significant, the effect size found was modest.

No statistically significant effects were observed for gender, age or community size, though some trends were visible. For instance, the coefficient for male respondents was positive, indicating slightly higher average familiarity than the grand mean, while female respondents scored slightly below.

Figure 12 - Awareness and Familiarity: Ordinal Regression Coefficients

Note: Own illustration based on survey data, (n=405); Visualized confidence intervals at 95%.
(*** p < 0.001; ** p < 0.01; * p < 0.05)



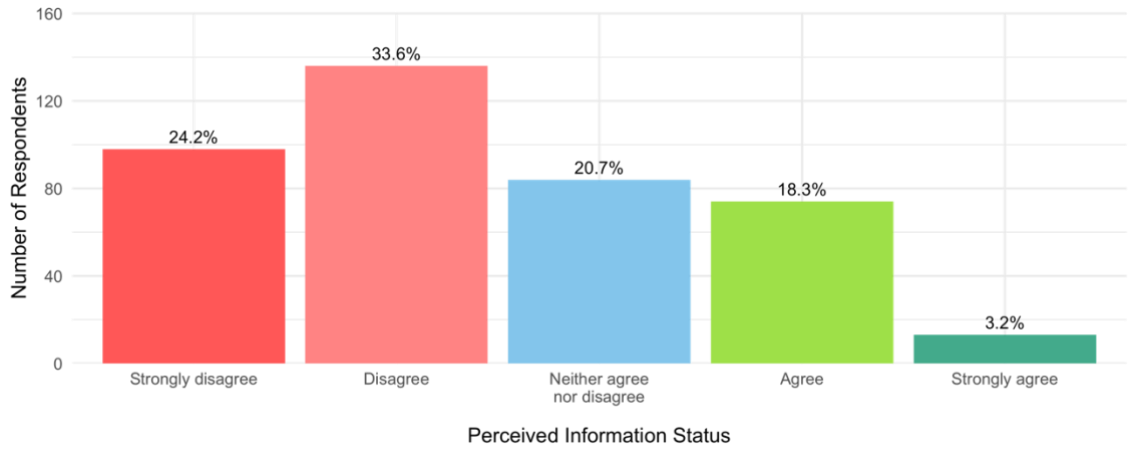
5.2 Information Status

Clarity about ATDI and the population's awareness status were assessed through two complementary measures: perceived informedness, which was self-reported on a Likert scale, and factual knowledge indicating how accurate responses to objective knowledge items in the questionnaire were. Findings on the two dimensions are reported in the upcoming subsections, providing descriptive outputs and further analysis alongside the predictors of gender, age, ID Austria and driver's license ownership, as well as reported familiarity levels with the ATDI wallet.

5.2.1 Perceived Information Status

Figure 13 - Perception of Information Status About the Austrian Digital Identity Service Offering

Note: Own illustration based on survey data, (n=405).



On a balanced five-point Likert scale from *"Strongly agree"* to *"Strongly disagree"*, survey participants ranked their feeling of being well-informed about the ATDI service

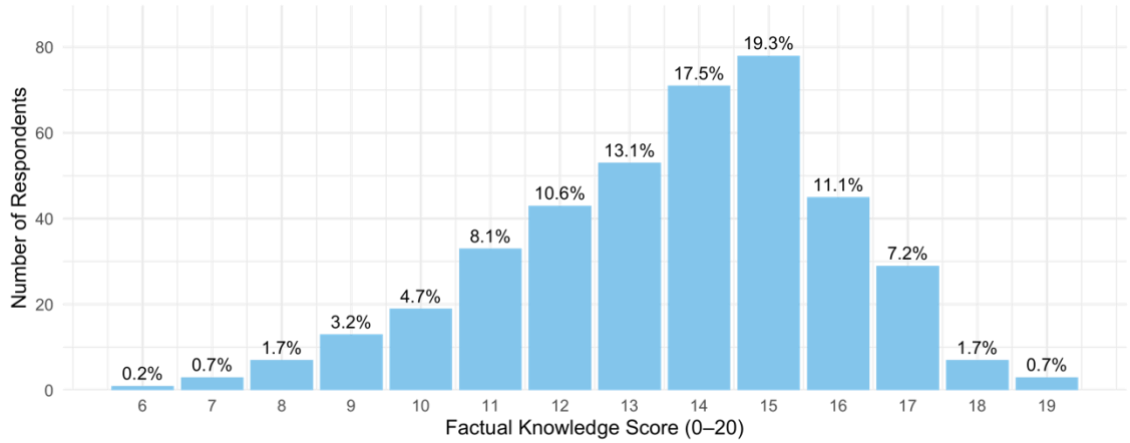
offering predominantly on the lower end. As depicted in Figure 13, a combined 57.8% of respondents either disagreed or strongly disagreed with the statement presented to them in question 9, suggesting that the majority of the sample do not feel adequately informed about the wallet. Neutral responses made up 20.7%, while less than a quarter expressed agreement, only 3.2% of which agreeing strongly. Accordingly, the amount of positively responding participants is lower than the amount of respondents actively using the application (see 5.1.1), pointing to a notable information gap.

5.2.2 Factual Knowledge Level

Factual knowledge levels among the sample population were assessed on the basis of 20 answers to verifiably true or false answer options, as indicated Table 2 and Table 3. Respondents' overall performance is visualized in Figure 14, showing the distribution of individual factual knowledge scores. Skewing towards the higher end of the scale, correct responses peak around 15 out of 20, suggesting a moderate-to-high knowledge level among the sample, with relatively few achieving either low or near-perfect sores.

Figure 14 - Factual Knowledge: Score Distribution

Note: Own illustration based on survey data, (n=405).



A more granular view is provided in Figure 15, which presents the percentage of correct answers by item. While some items were answered correctly by the vast majority of respondents, others revealed significant gaps in external perception of ATDI and legal and functional realities: On the one hand, items related to the very basic functionality of the ATDI wallet showed very high accuracy. This included for example 13.2, being able to provide driving credentials at a traffic stop using ATDI), at 94.3% and 14.1, being able to prove vehicle registration at a traffic stop using ATDI, at 94.1%. On the other, respondents were rightfully sceptical about international useability, especially outside Europe, with the corresponding questions 13.11, 13.12 and 14.11 showing accuracy of

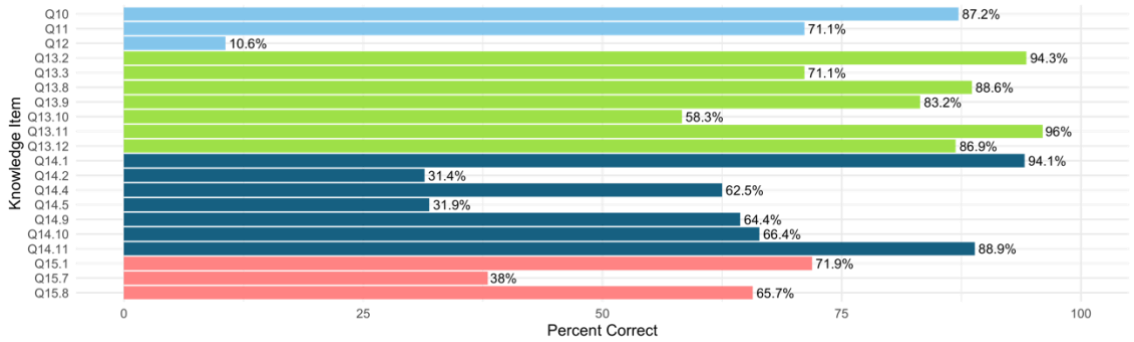
96%, 86.9% and 88.9 respectively. Other well-understood items included the absence of additional activation cost (Q10 at 87.2%).

Conversely, question 12 stands out as the item with the lowest accuracy at 10.6%. While participants assumed that once loaded, a credential will remain there until its expiration date, safety measures do require occasional reloading of qualifications. Items 14.2 and 14.5 were also answered correctly by less than a third of respondents. While the former showcases that people expect supplementary sheet data to be included in the digital credential despite it not being the case, the latter shows shows limited awareness that a digitial vehicle registration can be passed on temporarily. This might be due to the relative novelty of this functionality, having only been activated in January of this year, after much lamentation that the functionality was missing (e.g. Neuwirth, 2024).

Overall, the results indicate that while core aspects of the application and useability restrictions to domestic applications appear relatively well-understood among respondents, participants were less accurate about niche applications, such as requesting new license plates (14.9) or new application areas of the digital credential, such as 14.5.

Figure 15 - Factual Knowledge: Response Accuracy Across Survey Items

Note: Own illustration based on survey data, (n=405).



5.2.2.1 Predictors of Information Status

To assess how gender, age, community size and contextual variables including familiarity with ATDI relate to feelings of informedness, as well as factual knowledge, a linearized regression model was applied using a numerized version of responses (1 = *"Strongly disagree"*, 5 = *"Strongly Agree"*), as well as bounded proportional version of factual accuracy scores as the dependent variables. An overview of results is displayed in Figure 16, with detailed data presented in Appendices E and F.

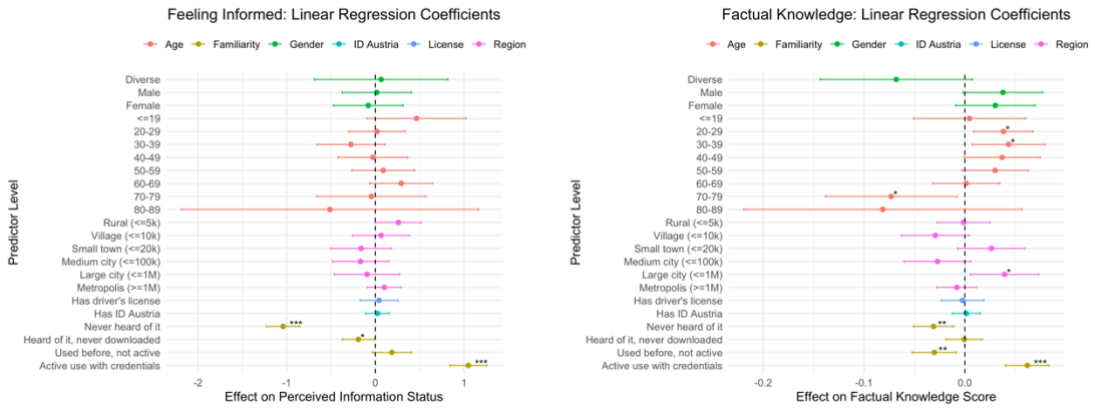
As illustrated in Figure 16, the clearest and most consistent predictor across both outcomes was familiarity with ATDI. Active users in the sample population scored

significantly higher on perceived and factual information status than the grand mean ($p < 0.001$). Conversely and rather intuitively, those who had never heard of the application scored significantly lower in both instances ($p < 0.01$ for factual knowledge, $p < 0.001$ for perception). Additionally, those who had heard of the application, but never downloaded it scored significantly below the mean in terms of feeling informed ($p < 0.05$). Somewhat surprisingly, individuals, who had previously downloaded the app, but were not active users at the time of response, reported significantly lower factual accuracy scores ($p < 0.01$) than the sample mean. This discrepancy might be point to the reasons that dissuaded them from engaging with the wallet further.

While regarding the feeling of informedness, ATDI familiarity was the only significant predictor of divergence from the grand mean, factual accuracy scores furthermore deviated significantly towards the positive for people between 20 and 39 years old ($p < 0.05$ for both age groups), while 70-79 year olds scored significantly lower ($p < 0.05$). While this would be in line with the general second-level digital divide observed in Austria (cf. Peterbauer & Kropfreiter, 2024c; Schmölz et al., 2023), inferences about sample groups of 10 people should be made only with caution. Lastly, respondents of large cities with community sizes of above 100,000 up to 1 million inhabitants also reached significantly higher accuracy scores than the population mean ($p < 0.05$).

Figure 16 - Information Status: Linear Regression Coefficients

Note: Own illustration based on survey data, (n=405); Visualized confidence intervals at 95%. (*** p < 0.001; ** p < 0.01; * p < 0.05)



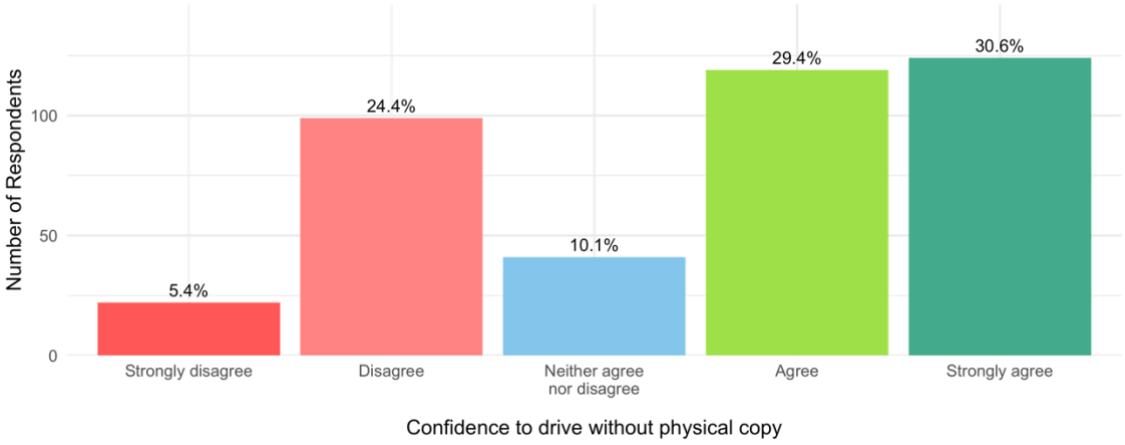
5.3 Confidence to Drive without Analog Driving Credentials

Indicating their willingness to get into the car without a physical copy of their driving credentials in paper or cheque-card format, respondents skewed clearly positive on the five-point Likert scale, as shown in Figure 17. Painting a rather contrasting view to feeling informed about the wallet, 30.6% of the sample indicated strong confidence with another 29.4% agreeing to the statement. Conversely, 24.4% of participants disagreed and another

5.4% strongly disagreed, while 10.1% remained neutral. This suggests that while the majority of respondents report they would be comfortable relying on the digital format alone, a notable minority still harbors doubts, potentially due to previous experiences, concerns about technological reliability, enforcement authorities' capabilities or unfamiliarity with the new system.

Figure 17 - Confidence to Drive Without Analog Driving Credentials

Note: Own illustration based on survey data, (n=405).



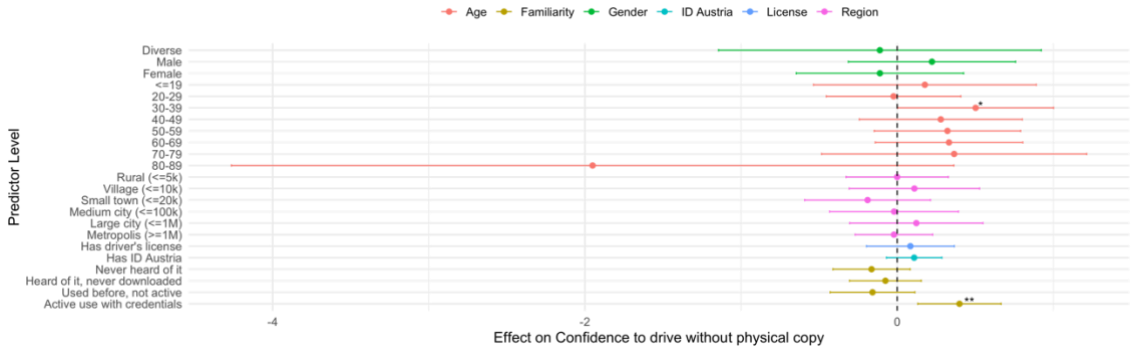
5.3.1 Predictors of Confidence to Drive Without Analog Driving Credentials

To assess which factors predict respondents' confidence in driving without carrying a physical version of their driving credentials, a linear regression model was estimated using self-reported Likert-scale ratings as the outcome variable. Figure 18 displays model results, while a full coefficient table is available in Appendix G.

As was the case with information status outcome variables, active users among the sample reported higher confidence levels than the sample population mean ($p < 0.01$), reinforcing the importance of hands-on experience in shaping confident adoption. Additionally, a small but statistically significant effect was observed for the 40-49 age group ($p < 0.05$), who reported higher confidence relative to the overall average. No other age groups, nor any of the remaining predictors, including gender, region size, ID Austria or driver's license ownership showed significant associations with confidence to drive without physical credentials.

Figure 18 - Confidence to Drive Without Analog Driving Credential Documents: Linear Regression Coefficients

Note: Own illustration based on survey data, (n=405); Visualized confidence intervals at 95%.
(*** p < 0.001; ** p < 0.01; * p < 0.05)



5.4 Belief in Equivalence Between Physical and Digital Driving Credentials

Going to the core of research question b, belief in equivalence between physical and digital driving credentials was analyzed alongside multiple dimensions. For the general purpose of this thesis, equivalence was defined rather broadly, referring to the idea that anything that could be done with or is a characteristic of an analog driving credential is also a given for its digital counterpart. Accordingly, equivalence would also encompass question items such as Q12, indicating that once loaded, a credential will remain active until the corresponding document's expiration date, given that a physical driver's license would also not disappear before expiring. For reference on which items were responded to affirmatively (i.e., ticked or responded *"True"* to), a summarized graph with positive response percentages in Q10-Q15 is provided in Appendix H.

As mentioned, equivalency beliefs are addressed multi-dimensionally. First, belief in functional equivalence is discussed, providing a broad overview of the sample population's expectations towards equivalent usability within all mentioned examples that would certainly be possible with the physical license or registration. Following this cross-section, more specific areas of equivalence are explored. These include the belief in regulatory equivalence during traffic stops, trust in enforcement authorities' capability with regards to ATDI, the perceived technical reliability, and risk of punishment, as well as equivalence beliefs in non-driving scenarios, such as voting, and belief in international recognition of ATDI, exploring expectations of useability beyond the country's borders.

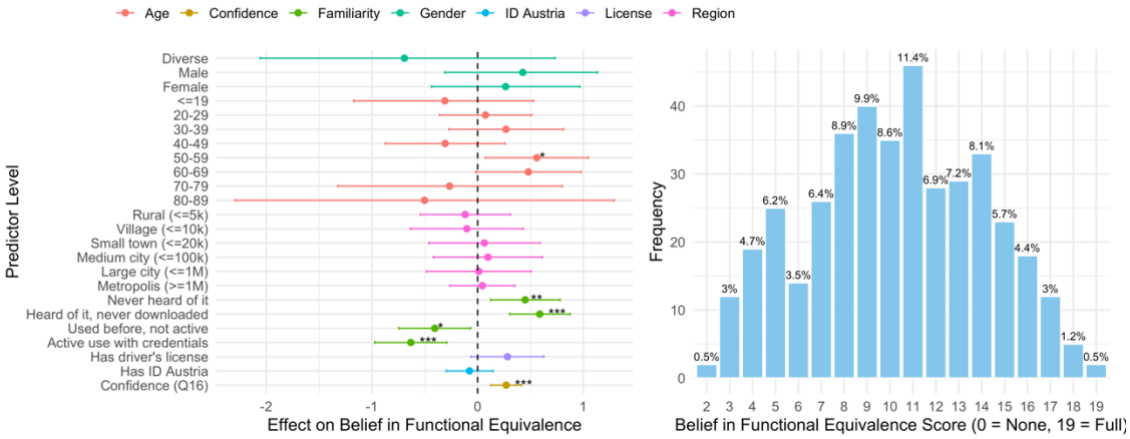
5.4.1 Belief in Functional Equivalence

The composite indicator of belief in functional equivalence summarizes data across 19 response items, which refer to use scenarios that would be possible with ATDI's physical

counterpart. As depicted in Figure 19, overall functional belief scores were widely distributed across the sample, with central tendency, suggesting moderate average belief in functional parity between the two formats.

Figure 19 - Belief in Functional Equivalence

Note: Own illustration based on survey data, (n=405).
Visualized confidence intervals at 95%; (*** p < 0.001; ** p < 0.01; * p < 0.05).



Once again, self-reported familiarity proved a strong and significant predictor of belief in functional equivalence. Interestingly, however, belief was highest compared to the overall mean among respondents, who had never used the ATDI wallet themselves. Respondents who had only heard of the application, but never downloaded it showed significantly above average belief ($p < 0.001$), followed closely by those who had never heard of it ($p < 0.01$). In contrast, those with active usage experience reported below-average belief in equivalence ($p < 0.001$), as did those who had used the app in the past but were no longer active ($p < 0.05$). This pattern suggests that direct exposure to the system may lead to a more critical evaluation of capabilities, as opposed to non-users holding more normative assumptions. Furthermore, those who reported higher confidence in driving without a physical credential also showed significantly higher belief in functional equivalence ($p < 0.001$), as was likely to be intuitively assumed, supporting the link between the two. Lastly, 50-59-year-olds also incurred higher belief score than the sample population grand mean. More detailed data is included in Appendix I.

5.4.2 Belief in Regulatory Equivalence During Traffic Stops

Assessed only alongside one response item, that during a traffic stop ATDI credentials *must* accepted, a strong majority of 71.9% affirmed belief in regulatory equivalence, as shown in Figure 20, while just over a quarter rejected the notion of mandatory acceptance. The regression results show that certain age groups are the only significant predictor of deviation from the population mean in regulatory equivalence beliefs. This concerns

participants aged 20-29, who skew significantly higher in their beliefs, as well as respondents younger than 20, tending to the opposite assumption. However, given that only 17 members in the sample population (~ 4%) belong to the latter age group, interpretation should be handled cautiously. Exact data on the ordinal regression performed can be found in Appendix J.

Figure 20 - Belief in Regulatory Equivalence During Traffic Stops

Note: Own illustration based on survey data, (n=405).
Visualized confidence intervals at 95%; (*** p < 0.001; ** p < 0.01; * p < 0.05).

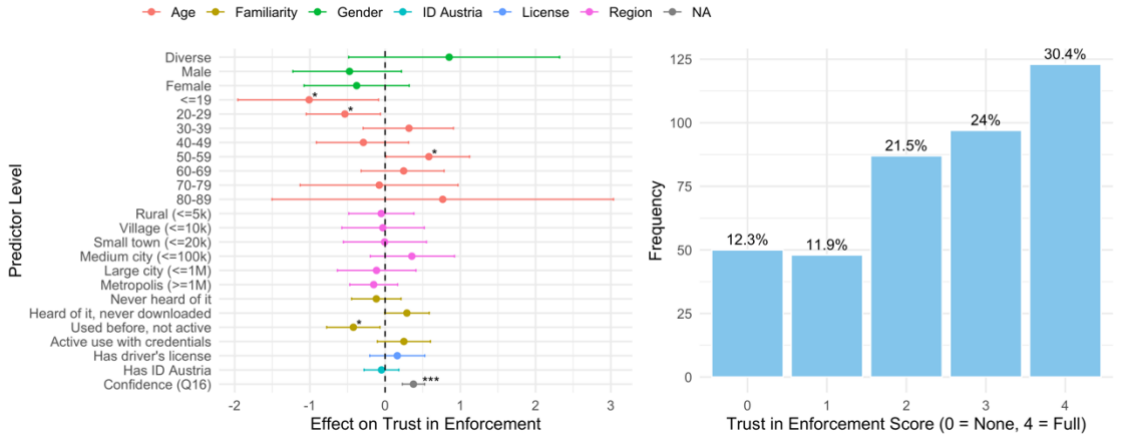
5.4.3 Trust in Enforcement Authorities' Capability

The indicator for trust in enforcement officer's capabilities only covers the scenario of a traffic stop and captures respondents' beliefs about whether government authorities, in this case likely police officers, will accept ATDI credentials and know how to proceed when faced with them. Figure 21 shows that participant scores in this field are right-skewed, with a majority of respondents expressing moderate to high trust in enforcement capability. Among the included items, respondents' belief is highest in officers accepting digital driving credentials without physical ID (72.1%) and while only around half of the sample population think an officer would immediately recognize the QR-code based document (50.2%) (cf. Appendix H).

Regression results reveal the most significantly relevant predictor for positive beliefs about authority capabilities to be high confidence in being able to drive with ATDI credentials only ($p < 0.001$). In contrast, users who had previously downloaded it, but were inactive, as well as younger age groups (≤19 and 20-29) seem to have less faith in police officers' knowledge and treatment of ATDI ($p < 0.05$). 50-59-year-olds on the other hand seem to instead have higher trust than the population mean ($p < 0.05$). Detailed results from the ordinal regression can be found in Appendix K.

Figure 21 - Trust in Enforcement Authorities' Capability

Note: Own illustration based on survey data, (n=405).
Visualized confidence intervals at 95%; (*** p < 0.001; ** p < 0.01; * p < 0.05).

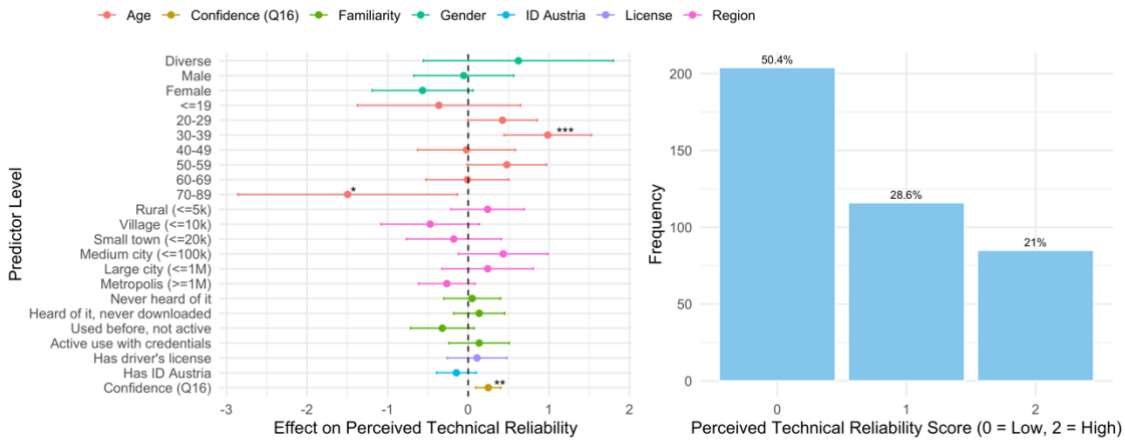


5.4.4 Perceived Technical Reliability

Though not the focal point of this thesis, perceived technical reliability also plays into the belief of functional equivalence and was evaluated on the basis of two response items. Accordingly, for this indicator the more direct response of Q15.6, stating that the application will not experience technical problems (ticked by 33% of respondents) was combined with Q15.7 stating that no internet connection was required for the presentation of credentials (ticked by 38.5% of respondents). Accordingly, just over half the sample expressed low reliability confidence, only 21% agreeing with both statements.

Figure 22 - Perceived Technical Reliability

Note: Own illustration based on survey data, (n=405).
Visualized confidence intervals at 95%; (*** p < 0.001; ** p < 0.01; * p < 0.05).



The regression analysis in Figure 22 reveals respondents in the age group of 30-39 to be the one most significantly diverging from the population mean, exhibiting higher trust in technical functionalities ($p < 0.001$). Similarly, participants aged 70-89, whose groups

were combined for this examination, appear to perceive technical reliability based to be lower based on the two response items ($p < 0.01$). The self-reported confidence item from Q16 once again proved a significant predictor, skewing towards higher reliability perceptions.

5.4.5 Perceived Risk of Punishment

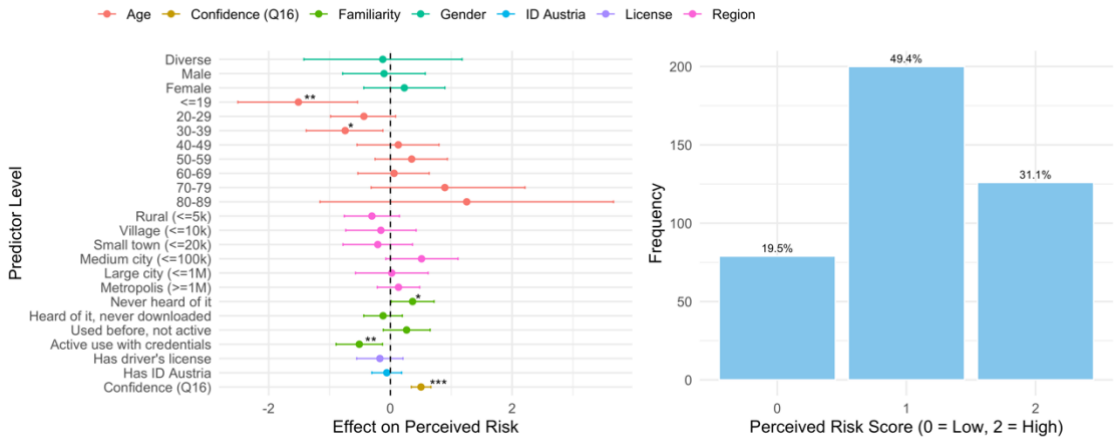
The composite measure of perceived risk of punishment combines data about whether the sample believes they will be held accountable, if the application is down to a system error (reverse-coded), and on whether respondents believe it will be a problem, if their ATDI cannot be displayed (either by it still being valid or by being able to submit the credential at a later point, as is possible with some Austrian train tickets). Nearly half of the sample believed at least one of these scenarios would not pose a risk to them, with more than a third believing an issue with their device will not cause a larger issue and only 23% believing, that they could be punished, in case the system was failing (cf. Appendix H).

The regression model shows that younger individuals in the sample, particularly those aged 30-39 ($p < 0.05$) and 19 or younger ($p < 0.01$), estimate the risk to be lower than the grand mean. Once again, familiarity with ATDI played a significant role, with respondents, who had never heard of the application, estimating the risk to be higher ($p < 0.05$) and those being active users significantly believing the risk of punishment to be relatively low ($p < 0.01$).

Confidence to drive without physical driving qualifications also proved a strong, significant predictor of risk perception ($p < 0.001$). However, interestingly those who feel confident perceived the risk to be higher than the grand mean. Detailed data on the regression results are provided in Appendix M.

Figure 23 - Perceived Risk of Punishment

Note: Own illustration based on survey data, (n=405).
Visualized confidence intervals at 95%; (*** p < 0.001; ** p < 0.01; * p < 0.05).



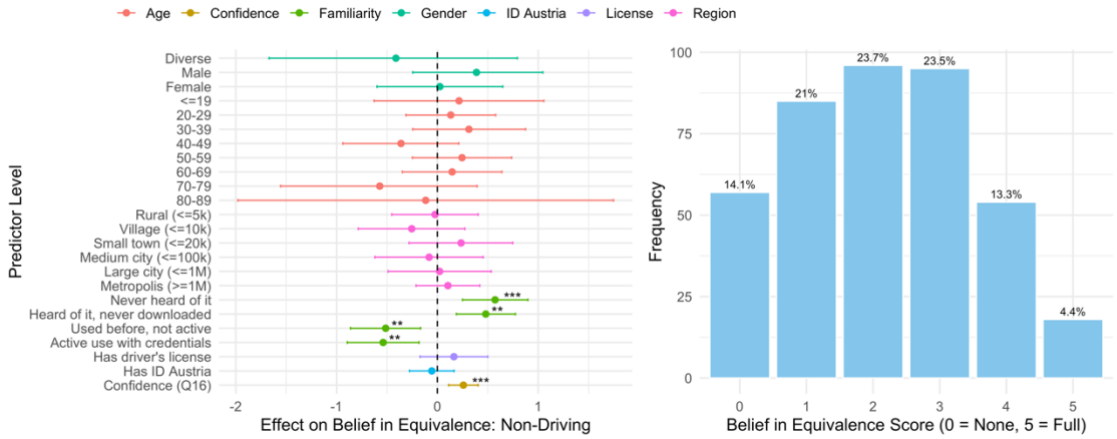
5.4.6 Belief in Equivalence in Non-Driving Scenarios

Diving more into expectations of useability beyond the scope of a traffic stop, beliefs about ATDI equivalence in non-driving scenarios was discussed. Given that the Austrian physical driver's license frequently fulfils the same purpose as official IDs domestically, this indicator encompassed items such as respondents' expectations on whether they could use ATDI credentials as ID, for example at government offices, or as driving credential vis-à-vis third parties and companies, for example when renting a car. Five response items were used for the construction. Score distribution shows that most respondents clustered around 1-3 ticked responses out of 5, suggesting limited belief in the non-driving use cases mentioned in the survey.

As was the case with many other predictors, familiarity with the ATDI app and willingness to drive without the wallet alone were identified as strong predictors for believing in useability beyond active driving scenarios, such as traffic stops. As depicted in Figure 24, users who had never heard about ($p < 0.001$) or never downloaded the app ($p < 0.01$), believed more use cases could be completed using the Austrian digital credentials. Active and prior users on the other hand, expected significantly fewer cases to be achievable using ATDI credentials than the grand mean. Again, high confidence to drive without credentials was a marker for respondents believing more strongly in wallet usability, even beyond driving contexts. Detailed results can be accessed in Appendix N.

Figure 24 - Belief in Equivalence in Non-Driving Scenarios

Note: Own illustration based on survey data, (n=405).
Visualized confidence intervals at 95%; (*** p < 0.001; ** p < 0.01; * p < 0.05).



5.4.7 Belief in International Recognition of the Austrian Digital Identity Wallet

Partially going even beyond what is possible with a physical Austrian driver's license or vehicle registration, the indicator for belief in international recognition of ATDI's driving credentials combines variables asking the sample population, whether the digital

identification means hold value beyond domestic borders, both within the EU and in third countries. The distribution displayed in Figure 25 shows that over half of the respondent group rightfully do not belief in any non-domestic usability, while only a very small portion (2%) believes in unlimited usability as identification and driving credentials beyond the country's borders.

As in many other indicators, familiarity with the ATDI wallet and confidence proved the only significant predictors for deviation from the grand mean. Similar to usage in non-driving applications, individuals, who had never heard of the service ($p < 0.01$) or had not downloaded the application before ($p < 0.05$), were more optimistic about being able to use credentials outside of Austria. Conversely, active users showcased awareness of their wallet not being recognized internationally ($p < 0.001$). Again, higher confidence levels to driving with digital credentials only proved a significant predictor to higher levels of belief in international usability ($p < 0.01$). Detailed data on regression results is available in Appendix O.

Figure 25 - Belief in International Recognition of Austrian Digital Identity

Note: Own illustration based on survey data, (n=405).
Visualized confidence intervals at 95%; (*** p < 0.001; ** p < 0.01; * p < 0.05).

6 Discussion

While not directly representative of the national population, the sample responses gathered in the context of this thesis offer initial exploratory insights into potential areas for further investigation, both from academic and practical standpoints. This chapter contextualizes the findings presented in the previous, outlines key limitations of this study and highlights potential gaps and related avenues for future research and practical consideration.

6.1 Discussion of the Results

With nearly three thirds of respondents indicating that they had at least heard of the ATDI wallet, general awareness of the service offering appears widespread. A similarly large share of survey participants also reported being eligible for the application, actively using ID Austria. Given the relative ease of trialability for this respondent group, as well as the innovation's compatibility with the existing Austrian digital public service landscape, it appears somewhat counterintuitive, that only a significantly smaller portion of participants (~ 39%) was persuaded to make an initial adoption decision in downloading the wallet application.

Following Rogers' (1983) Innovation-Decision process (see 3.3.2.1), this drop-off may be due to the relatively low perceived information status regarding ATDI, with more than half of the respondents disagreeing with the statement of being well-informed about the service. Interestingly, however, despite these self-assessments, the sample exhibited moderate to high factual accuracy throughout the survey, including in response to two response items addressing the absence of entry costs and the lack of additional in-person government interactions during onboarding. Although factual knowledge was somewhat lower among non-users, the sample population's relatively high accuracy suggests success in information provision and supporting activities on the part of the government in its diffuser role. However, the contrasting results in self-reported knowledge assessment, if reflective of the overall population, indicate a potential need for further promotional activities to enhance salience and bring the ATDI wallet more prominently to the forefront of public awareness.

Furthermore, a substantial number of respondents who had downloaded the application previously, indicating an at least partial positive adoption decision, were not active users of the wallet at the time of the survey. This could either point to them not having fully implemented the application, for example due to technical hurdles, such as not having the right version of ID Austria, or to them being dissuaded from their decision upon use due to a bad experience using the app. While the former theory is reflected in the sample

reporting low trust in technical reliability of ATDI, the latter is supported by previous users reporting significantly lower trust in enforcement authorities' capability to correctly interact with and use digital credentials than their peers. This, along with the very small number of active users in the sample, who had actually presented a credential previously (< 5%), suggests a need for further strengthening of trust in the government as executive authority user, particularly among newly adopting groups, seeing as across the sample reported belief in equivalent treatment by authorities was relatively high.

Moreover, the discontinuation of adoption could be caused by user expectations towards the innovation not being met, potentially reducing their perception of usefulness. This notion is supported by the fact that sample populations, who had not used or even heard of the application previously, reported significantly higher belief in its functional equivalence overall, and in non-driving use cases and international usability especially. Should this finding be mirrored in the Austrian population, it offers two lenses through which potential response strategies could be informed:

On the one hand, the mismatch between presumed useability and actual scope of assured use cases among potential users may pose a risk of dissuasion during the Innovation-Decision process. This risk of a rude awakening on the adopters' part is further amplified by respondents' limited awareness of legal consequences in case of technical issues. Only 23% correctly identified the legal reality users could be penalized for non-presentation of a credential, even in the event of a system-sided failure and more than a third of the sample believed that if their edge device lost power, their digital credential would remain valid or could be submitted retroactively. To mitigate potential negative experiences and subsequent disillusionment, which could potentially further diffuse in the social system, as evidenced by parts of the social media discourse surrounding ATDI (see 2.2.2), the government, in its role as innovation diffuser could focus on clear messaging, precisely outlining accepted ATDI use cases in their promotional efforts.

On the other hand, the mismatch of expectations and the status quo could be considered an opportunity for growth, challenging the government in both its capacities as innovator and diffusor to extend the wallet's application areas. Accordingly, user expectations could be catered to either by developing new credentials, which cover additional usage scenarios or by recruiting partners to become co-diffusers and adopt the wallet in their verification processes. An example for the latter would be the ATDI's integration into the EUDI wallet, unlocking some international useability by the end of the upcoming year. Moreover, high customer expectations of acceptance, for example at mandatory vehicle inspections, could also push private sector companies to adopt digital credential verification.

Related to respondents' high factual accuracy, the sample's overall beliefs about functional equivalence remained in the mid-range, suggesting a somewhat optimistic, yet realistic assessment of ATDI's functionalities. Especially with regards to core usage scenarios and more extreme edge cases, the application's scope appeared clear across the sample. Intuitively, active users evidenced higher awareness of the current legal and practical status in Austria, accordingly assessing equivalence more cautiously than the overall sample population. Despite exhibiting awareness that equivalence was limited, participants appeared confident to rely on the digital service alone while driving with more than half of the sample providing affirmative responses. This willingness to rely on the service implies trust in both the technical solution and its practical implementation, and by extension the government as an innovator and verifier.

Familiarity with the ATDI application and confidence in replacing the wallet proved to be the strongest predictors of other variables studied. Indeed, high replacement confidence significantly predicted higher scores in all belief indicators besides the belief in regulatory equivalence. Interestingly, people more confident in the application, also scored higher when assessing the risk of penalty. This indicates that while the sample population might be willing to rely on the app credential's alone, it does not necessarily belief that doing so would be without consequences in the event of technical failure or non-acceptance. This somewhat relativizes the aforementioned risk of disillusionment, as it suggests that optimistic users, while confident in the app's capabilities, are not blindly trusting its legal standing and remain aware of potential confidences.

Across the various models, personal factual identifiers, including gender, age, community size, possession of a driver's license and ownership of ID Austria proved to be relatively neutral to perceptions and beliefs related to ATDI, exhibiting only limited predictive power. Gender showed no significant effects in any model, and while certain age groups occasionally deviated from the sample mean, these effects lacked consistency across outcomes and did not necessarily mirror frequently discussed trends, such as the country's second-level digital divide. Community size only emerged as a weak predictor in an isolated case, and holding an ID Austria or a driver's license was singularly associated with increased familiarity with the ATDI application, but did not systematically influence beliefs regarding functionality, equivalence or risk. This findings suggest that sample attitudes towards the digital identity wallet are less dependent on structural or eligibility-related characteristics and more strongly shaped by informational and psychological factors.

6.2 Limitations

Constituting an early foray into citizen's perceptions of digital identity wallets, the present study is naturally constrained in its external validity due to the case-study approach adopted and the non-representative nature of the population sample. In light of these factors, and given the exploratory design rather than confirmatory hypothesis testing, findings should be interpreted as indicative trends to be validated in further research, rather than definitive conclusions.

The sample overrepresents younger respondents and women as a result of the non-probabilistic sampling method employed, making the study susceptible to sampling biases. These include a likely self-selection bias owed to the survey's digital topic and online distribution, which may have skewed the sample towards tech-savvy individuals, who feel more comfortable completing digital surveys and contributing their opinion on smartphone-based tools. Furthermore, the intensified outreach efforts in Austria's capital city likely introduced some exclusion bias against residents of less populated areas. Consequently, while the study offers valuable early insights in a nascent field of research, the findings cannot be confidently extrapolated to the broader population, particularly given the modest sample size. Moreover, the specificity of the Austrian context, including cultural factors, such as the country's institutional trust landscape, the country's digital infrastructure, as well as its legal framework limit generalizability across national borders.

Internal validity is similarly constrained. On the one hand, this is due to the self-administered survey design, which though most practical given the means at hand, limited respondents' ability to seek clarification in a field where technical terminology and distinctions might not be widely understood. For instance, several in-person study recruitees expressed confusion over the differences between Austria's various eID schemes, and some even questioned whether the ATDI application existed *after* completing the questionnaire. These instances highlight the potential for misclassification biases, whereby respondents may have inaccurately reported their eligibility status or misunderstood a scenario presented to them. Furthermore, they showcase the risk of respondent fatigue and satisficing biases, due to the the relative length and technical nature of the questionnaire, increasing the likelihood of superficial and heuristic responses, rather than careful consideration of each response item presented. Additionally, some respondents reported experiencing the questionnaire as a form of test in an area they knew little to nothing about, potentially introducing response distortions associated with cognitive pressure or social desirability.

Beyond that, the present thesis' internal validity is impacted by measurement limitations. Given the study's broad scope and exploratory setup, certain complex constructs, such as belief in functional equivalence had to be operationalized through a limited number of response items, necessarily simplifying multidimensional concepts, even within a relatively narrow application area. As the academic field matures, future research may benefit from more targeted studies of specific aspects explored in this thesis, as well as from incorporating qualitative exploration into their research design to better capture these constructs' multidimensionality.

7 Conclusion

This thesis set out to provide an exploratory account of adoption patterns, informational baselines and user perceptions surrounding Austria's digital identity wallet, one of Europe's earlier implementations of a digital identity solution for proximity use cases. Drawing on 405 responses to a cross-sectional online survey, the study operationalized two primary research questions examining sample population's familiarity, knowledge and perceived information status, as well as beliefs about equivalence between digital and physical driving documents, proxied by multiple composite indicators. These included belief in functional and regulatory equivalence, trust in enforcement officers' capability, perceived technical reliability and risk of punishment, as well as equivalence in non-driving scenarios and international use cases to a limited degree. The research employed both descriptive and inferential analysis on the basis of ordinal, binary and linear regression models to examine relationships between the analyzed dimensions and individual context factors, including demographic data, eligibility criteria, familiarity and stated confidence to rely on the ATDI application alone while driving. Collected using non-probabilistic sampling, the respondent pool was shown not to be representative of the general population, overrepresenting younger individuals and women.

The analysis revealed a complex landscape of awareness, adoption and perception regarding the ATDI wallet. While general awareness appears relatively widespread, with nearly three quarters of respondents having heard of the ATDI wallet, actual adoption remains limited with only around 21% of the sample having activated credentials and fewer than 5% having ever presented them in real-world scenarios. This substantial drop-off between awareness and implementation, as well as between downloading the app and actively using it suggests significant hurdles in the Innovation-Decision process that merit further investigation.

Furthermore, a striking disconnect between perceived and actual knowledge emerged from the data. Despite more than half of the respondents reporting they did not feel well-informed about the service, the sample demonstrated moderate to high factual accuracy when answering objective questions about the wallet's functionality. In case these responses are reflective of the population at large, this finding indicates that while the government's information provision efforts have been technically successful and use cases are somewhat intuitive, this does not translate to respondents' self-perceived information status.

Familiarity with the ATDI application proved to be the strongest predictor across nearly all measured variables in the sample population, surpassing traditional demographic factors in explanatory power. Active users consistently demonstrated more accurate

knowledge, assessing the wallet's capabilities more realistically, compared to non-users who mostly held more optimistic assumptions about its functionality. This pattern suggests that direct exposure to the system leads to more critical evaluation of capabilities, contrasting with the more normative assumptions held by non-users.

The study revealed nuanced perceptions of equivalence between digital and physical credentials among survey participants. While respondents showed overall confidence in using digital credentials while driving, with 60% expressing agreement, their beliefs about functional equivalence were more tempered, particularly among those with actual experience using the application. User experience appears to moderate expectations downward, with those who had never used or even heard of the application reporting significantly higher beliefs in its functional equivalence and useability in international and non-driving scenarios. Meanwhile, active users demonstrated more realistic awareness of current limitations, suggesting that implementation challenges may contribute to user disillusionment.

Trust in enforcement authorities' capability to properly handle digital credentials in a traffic stop showed variation across user groups, with previous users who had discontinued use reporting significantly lower trust than the sample mean. This finding points to implementation challenges beyond the technology itself, highlighting the importance of ensuring consistent and competent handling of digital credentials by verification entities.

Somewhat surprisingly, traditional demographic factors showed limited predictive power for attitudes toward the digital wallet in the sample population. Gender, age, community size, and even possession of prerequisite qualifiers had minimal systematic influence on beliefs regarding functionality, equivalence, or risk. This suggests that attitudes toward digital identity wallets might be less dependent on structural characteristics and more strongly shaped by informational and experiential factors.

These findings contribute to the emerging academic field of digital identity wallet research by providing empirical evidence from one of Europe's most established proximity-use digital identity systems. From a theoretical perspective, the results appear to support Rogers' (1983) diffusion of innovations theory, particularly regarding the importance of trialability and observability in adoption decisions and the strong predictive power of familiarity aligns with technology acceptance models emphasizing the role of perceived usefulness and ease of use, while the moderation of expectations through experience highlights the dynamic nature of innovation perceptions throughout the adoption process.

For practitioners, the sample responses offer several insights to be evaluated further, that could support understanding of user attitudes during diffusion activities. The information-confidence gap suggests that technical information dissemination alone may be insufficient, pointing to a need for more accessible, confidence-building communication strategies. The finding that previous users in the sample reported lower trust in enforcement authorities' capability suggests that citizen perceptions of verification entity competence could potentially influence continued use of digital credentials. Moreover, the mismatch between non-user expectations within the sample and actual capabilities points to a need for more precise messaging about use cases and limitations to prevent disappointment and subsequent discontinuation, as well as highlighting the necessity for continued use case expansion.

While not representative of the Austrian population, findings point to several specific areas warranting further investigation, including the observed disconnect between perceived and actual knowledge and the drop-off points in the adoption journey. The limited influence of demographic factors compared to experiential ones furthermore suggests that future research might benefit from also examining more process-oriented variables in addition to more traditional structural predictors in digital identity adoption contexts.

As the EU-wide digital identity wallet prepares for rollout, Austria's experience offers valuable lessons about the multi-faceted nature of digital transformation in government services. Limited in their generalizability, the findings suggest that technical implementation alone may be insufficient for widespread adoption, as evidenced by the gap between awareness and active use, the information-confidence disconnect, and the moderation of expectations through user experience. While Austria has achieved technical functionality and broad awareness of its digital identity system, the patterns observed in this study indicate that sustained adoption may depend on factors beyond technological capability.

References

Abdulkareem, A. K., & Ramli, R. M. (2022). Does trust in e-government influence the performance of e-government? An integration of information system success model and public value theory. *Transforming Government: People, Process and Policy, 16*(1), 1-17. https://doi.org/10.1108/TG-01-2021-0001

Aichholzer, G., & Strauß, S. (2010). The Austrian Case: multi-card concept and the relationship between citizen ID and social security cards. *Identity in the Information Society, 3*, 65-85. https://doi.org/10.1007/s12394-010-0048-9

Aigner, F. [@florianaigner.at]. (2024, November 22). *Mit der staatlichen eAusweise-App kann man am Handy die Identität nachweisen. Superpraktisch! Habe das bei meiner Bank probiert. Wurde angesehen*. [Bluesky Posting]. Bsky.app. http://web.archive.org/web/20250526183901/https://bsky.app/profile/florianaigner.at/post/3lbjurbtxz22f

Ajzen, I., & Fischbein, M. (1980). *Understanding attitudes and predicting social behavior*. Prentice Hall.

Akkaya, C., Wolf, P., & Krcmar, H. (2012). The Surprisingly Low Effect of National Culture on E-Government Adoption: A Cross-Cultural Comparison. *AMCIS 2012 Proceedings, 1*, 1-8. http://aisel.aisnet.org/amcis2012/proceedings/EGovernment/

Aleisa, N. (2024). Key factors influencing the e-government adoption: a systemic literature review. *Journal of Innovative Digital Transformation, 1*(1), 14-31. https://doi.org/10.1108/JIDT-09-2023-0016

Alkharusi, H. (2012). Categorical Variables in Regression Analysis: A Comparison of Dummy and Effect Coding. *International Journal of Education, 4*(2), 202-210. https://doi.org/10.5296/ije.v4i2.1962

Allende López, M. (2020). *Self-Sovereign Identity: The Future of Identity: Self-Sovereignty, Digital Wallets and Blockchain.* Inter-American Development Bank. https://doi.org/10.18235/0002635

Allex, B., & Ortner, S. (2024, August). *Führerscheine und -Lenkberechtigungen: Jahresergebnisse 2023.* Statistik Austria. https://www.statistik.at/fileadmin/user_upload/SB_4-4_Fuehrerscheine_2023.pdf

Alzahrani, L., Al-Karaghouli, W., & Weerakkody, V. (2017). Analysing the critical factors influencing trust in e-government adoption from citizen's perspective: A systematic review and a conceptual framework. *International Business Review, 26*, 164-175. https://doi.org/10.1016/j.ibusrev.2016.06.004

Amon, D. (2024). *Bring your own Identity – Social Login und E-Government Systeme: Datenschutz und technische Funktionsweise.* (urn:nbn:at:at-fhcw:1-110333) [Master Thesis, Fachhochschule Campus Wien]. FH Campus Wien Publication Database.

Apple (2024). *Apple Wallet*. Apple Inc. https://apps.apple.com/at/app/apple-wallet/id1160481993?l=en-GB

A-SIT [A-SIT Zentrum für sichere Informationstechnologie - Austria]. (2024, April 26). *Die App „eAusweise“: Leitfaden und datenschutzrechtliche Aspekte.* Onlinesicherheit.at. http://web.archive.org/web/20250602205727/https://www.onlinesicherheit.gv.at/Services/News/eAusweise-App-Ueberblick.html

Austrian Federal Computing Center [Bundesrechenzentrum]. (2022, October 19). *Das technische System hinter dem digitalen Führerschein.* BRZ. http://web.archive.org/web/20250507170239/https://www.brz.gv.at/presse/technische-system-digitaler-fuehrerschein.html

Austrian Federal Computing Center [Bundesrechenzentrum]. (2023, September 12). *Die Technik hinter dem digitalen Altersnachweis.* BRZ. http://web.archive.org/web/20250507174018/https://www.brz.gv.at/presse/20230912-technik-digitaler-altersnachweis.html

Austrian Interior Ministry [Bundesministerium für Inneres]. (2022, October 19). *Karner und Tursky präsentieren den digitalen Führerschein – der erste digitale Ausweis Österreichs!*. BMI. http://web.archive.org/web/20250526140730/https://www.bmi.gv.at/news.aspx?id=624834668644256663373 3D

Austrian Interior Ministry [Bundesministerium für Inneres].(2024, February 15). *Moderne Polizeiausstattung gewährleistet Kontrolle des digitalen Zulassungsscheins.* BMI. http://web.archive.org/web/20250602080732/https://www.bmi.gv.at/news.aspx?id=426B536B567A6F674434773D

Austrian Interior Ministry [Bundesministerium für Inneres]. (2025a, April 9). *Registrierungsbehörden.* Oesterreich.gv.at. http://web.archive.org/web/20250427183146/https://www.oesterreich.gv.at/id-austria/registrierungsbehoerden.html

Austrian Interior Ministry [Bundesministerium für Inneres] (2025b, May 12). *Personalausweis – Minderjährige unter 18 Jahren.* Oesterreich.gv.at. http://web.archive.org/web/20250319145205/https://www.oesterreich.gv.at/themen/persoenliche_dokumente_und_bestaetigungen/personalausweis/Seite.030300.html

Austrian Ministry for Innovation, Mobility and Infrastructure [Bundesministerium für Innovation, Mobilität und Infrastruktur]. (2025a, April 7). *Mindestalter für die Erteilung der Lenkberechtigung.* Oesterreich.gv.at. http://web.archive.org/web/20250527203140/https://www.oesterreich.gv.at/themen/persoenliche_dokumente_und_bestaetigungen/fuehrerschein/1/1/Seite.040160.html

Austrian Ministry for Innovation, Mobility and Infrastructure [Bundesministerium für Innovation, Mobilität und Infrastruktur]. (2025b, April 8). *Scheckkartenführerschein – Allgemeine Informationen.* Oesterreich.gv.at. http://web.archive.org/web/20250526200335/https://www.oesterreich.gv.at/themen/persoenliche_dokumente_und_bestaetigungen/fuehrerschein/6/Seite.040101.html

Austrian Ministry of Education [Bundesministerium für Bildung]. (n.d.). *FAQ-Bereich der edu.digicard.* Bundesministerium Bildung. http://web.archive.org/web/20250507183710/https://www.bmb.gv.at/Themen/schule/zrp/dibi/itinf/itdienstleistungen/educard/faq.html

Austrian Ministry of Finance [Bundesministerium für Finanzen]. (2023a). *Nationaler strategischer Fahrplan für die Digitale Dekade Österreich.* Bundesministerium für Finanzen. http://web.archive.org/web/20240519071921/https://www.digitalaustria.gv.at/dam/jcr:7cddce48-17be-4c53-afdd-2ddb6207bd9a/BMF%20Nationaler%20Fahrplan%202023-final-28112023-fast%20barrierefrei.pdf

Austrian Ministry of Finance [Bundesministerium für Finanzen]. (2023b, September 11). *Tursky: Mit dem digitalen Altersnachweis sind bereits drei Ausweise in Österreich digitalisiert*. Oesterreich.gv.at. http://web.archive.org/web/20250507190617/https://www.bmf.gv.at/presse/pressemeldungen/2023/september/Altersnachweis.html

Austrian Ministry of Finance [Bundesministerium für Finanzen]. (2023c, October 27). *Digitaler Führererschein* [Video]. Youtube. Retrieved May 7, 2025, from https://www.youtube.com/watch?v=MCIc-VYyRLE

Austrian Ministry of Finance [Bundesministerium für Finanzen]. (2023d, September 11). *Aktivierung & Nutzung Altersnachweis* [Video]. Youtube. Retrieved May 7, 2025, from https://www.youtube.com/watch?v=pBYs4J8ToeI

Austrian Ministry of Finance [Bundesministerium für Finanzen]. (2024a, March 2). *Tursky: Österreich startklar für EU-Wallet dank ID-Austria.* Bundesministerium Finanzen. http://web.archive.org/web/20250602210112/https://www.bmf.gv.at/presse/pressemeldungen/2024/maerz/eu-wallet.html

Austrian Ministry of Finance [Bundesministerium für Finanzen]. (2024b). *eAusweise* (Version 4.1.19). Bundesministerium Finanzen. https://apps.apple.com/at/app/eausweise/id1641458335?l=en-GB

Austrian Ministry of Finance [Bundesministerium für Finanzen]. (2024c, February 14). *Digitaler Zulassungsschein* [Video]. Youtube. Retrieved May 7, 2025, from https://www.youtube.com/watch?v=m3ukaxY-oF4

Austrian Ministry of Finance [Bundesministerium für Finanzen]. (2024d, February 16). *Rekord: 86.034 digitale Zulassungsscheine in 24 Stunden!*. Bundesministerium Finanzen. http://web.archive.org/web/20250526141000/https://www.bmf.gv.at/presse/pressemeldungen/2024/februar/digitaler-zulassungsschein-rekord.html

Babel, M., Willburger, L., Lautenschlager, J., Völter, F., Guggenberger, T., Körner, M. F., Sedlmeir, J., Strücker, J., & Urbach, N. (2025). Self-sovereign identity and digital wallets. *Electron Markets, 35*(28), 1-14. https://doi.org/10.1007/s12525-025-00772-0

Bartlett II, J. E., Kotrlik, J. W., & Higgins, C. C. (2001). Organizational Research: Determining Appropriate Sample Size in Survey Research. *Information Technology, Learning, and Performance Journal, 19*(1).

Beck, W. (2021). Aktuelle E-Government-Regelungen in Deutschland, Österreich und der Schweiz: unter besonderer Berücksichtigung von eID. In J. Stember, W. Eixelsberger, A. Spichiger, FR. Habbel, & M. Wundara (Eds.), *Aktuelle Entwicklungen zum E-Government.* (pp. 3-28). https://doi.org/10.1007/978-3-658-33586-1_1

Bélanger, F., & Carter, L. (2008). Trust and risk in e-government adoption. *Journal of Strategic Information, 17*, 165-176. https://doi.org/10.1016/j.jsis.2007.12.002

Blue, J., Condell, J., Lunney, T. (2018). A Review of Identity, Identification and Authentication. *International Journal for Information Security Research (IJISIR), 8*(2), 794-804. http://dx.doi.org/10.20533/ijisr.2042.4639.2018.0091

Bobrowski, P., & Bretschneider, S. (1994, July). Internal and external interorganizational relationships and their impact on the adoption of new technology: An exploratory study. *Technological Forecasting and Social Change, 46*(3), 197-211. https://doi.org/10.1016/0040-1625(94)90001-9

Bradley, J. (2009). The Technology Acceptance Model and Other User Acceptance Theories. In Y. K. Dwivedi, B. Lai, M. D. Williams, S. L. Schneberger, & M. Wade (Eds.), *Handbook of Research on Contemporary Theoretical Models in Information Systems.* (pp. 277-294). https://doi.org/10.4018/978-1-60566-659-4.ch015

Bryman, A. (2012). *Social Research Methods*. 4th edition, Oxford University Press.

Carter, L., & Bélanger, F. (2005, January). The utilization of e-government services: citizen trust, innovation and acceptance factors. *Information Systems Journal, 15*(1), 1-60. https://doi.org/10.1111/j.1365-2575.2005.00183.x

Cavaye, A. L. M. (1995). The sponsor-adopter gap – differences between promoters and potential users of information systems that link organizations. *International Journal of Information Management, 15*(2), 85-96. https://doi.org/10.1016/0268-4012(95)00007-T

Cenfetelli, R. T., & Schwarz, A. (2011). Identifying and Testing the Inhibitors of Technology Usage Intentions. *Information Systems Research, 22*(4), 808-823. https://doi.org/10.1287/isre.1100.0295

OpenAI (2025). ChatGPT (Version GPT-4o) [Large Language Model]. https://chatopenai.com

Christof, F. (2025, February 11). *Wo müssen eAusweise am Handy akzeptiert werden - und wo nicht?* futurezone. http://web.archive.org/web/20250430042510/https://futurezone.at/digital-life/wo-muss-der-eausweis-am-handy-akzeptiert-werden-app-digitaler-identitaetsnachweis-polizei-behoerde/403009102

Cochran, W. G. (1977). *Sampling Techniques*. 3rd Edition, John Wiley & Sons.

Da Hofer [@da-hofer53.bsky.social]. (2025, January 2). *Hallo @lpdwien.bsky.social, hat es sich bei Euch schon herumgesprochen, dass es, wie von Frau Plankolm großspurig angepriesen wurde, die eAusweise.* [Bluesky Posting]. Bsky.app. http://web.archive.org/web/20250526183820/https://bsky.app/profile/da-hofer53.bsky.social/post/3leryxbrmns2l

Davis, F. D., (1989, September). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *MIS Quarterly, 13*(3), 319-340. https://doi.org/10.2307/249008

Davis, F. D., Bagozzi, R. P., Warshaw, P. R. (1989, August). User Acceptance of Computer Technology: A Comparison of Two Theoretical Models. *Management Science, 35*(8), 982-1003. https://doi.org/10.1287/mnsc.35.8.982

Dermosa [@pietmoser]. (2022, October 19). *Aha… Sie hoitn mir jetz a handy ins Gsicht? Geh blosns ma do eini.* [X Posting]. X. Retrieved May 7, 2025, from https://x.com/pietmoser/status/1582747138668171264

Der Standard. (2023, March 31). *Digitaler Schülerinnenausweis Edu-Digicard vorgestellt.* DerStandard.at. Retrieved May 7, 2025, from https://www.derstandard.de/story/2000145091664/digitaler-schuelerinnenausweis-edu-digicard-vorgestellt

Der Standard. (2024, June 18). *Österreich bringt den digitalen Personalausweis zwei Jahre vor der Frist.* DerStandard.at. Retrieved May 7, 2025, from https://www.derstandard.at/story/3000000224818/oesterreich-bringt-den-digitalen-personalausweis-zwei-jahre-vor-der-frist

Der Standard. (2025, April 4). *ID Austria soll überarbeitet werden.* DerStandard.at. Retrieved May 7, 2025, from https://www.derstandard.at/story/3000000264345/id-austria-soll-ueberarbeitet-werden

De Vries, H., Bekkers, V., & Tummers, L. (2016) Innovation in the Public Sector: A Systematic Review and Future Research Agenda. *Public Administration, 94*(1), 146-166. https://doi.org/10.1111/padm.12209

De Vries, H., Tummers, L., & Bekkers, V. (2018, September). The Diffusion and Adoption of Public Sector Innovations: A Meta-Synthesis of the Literature. *Perspectives on Public Management and Governance, 1*(3), 159-176. https://doi.org/10.1093/ppmgov/gvy001

[DG Connect] European Commission Directorate-General for Communications Networks, Content and Technology. (2024a). *eGovernment Benchmark 2024 Executive Summary: Advancing Pillars in Digital Public Service Delivery.* European Commission. https://ec.europa.eu/newsroom/dae/redirection/document/106737

[DG Connect] European Commission Directorate-General for Communications Networks, Content and Technology. (2024b, June 2). *Digital Decade Country Report 2024: Austria.* European Commission. https://ec.europa.eu/newsroom/dae/redirection/document/106691

[DG Connect] European Commission Directorate-General for Communications Networks, Content and Technology. (2024c, July 30). *European Digital Identity Wallet.* European Commission. https://digital-strategy.ec.europa.eu/en/factpages/european-digital-identity-wallet

[DG Connect] European Commission Directorate-General for Communications Networks, Content and Technology. (2024d, October 28). *Electronic Identification.* European Commission. https://digital-strategy.ec.europa.eu/en/policies/electronic-identification

[DG Connect] European Commission Directorate-General for Communications Networks, Content and Technology. (2024e, April 4). *Q&A Digital Identity*. European Commission. https://digital-strategy.ec.europa.eu/en/faqs/qa-digital-identity

[DG Connect] European Commission Directorate-General for Communications Networks, Content and Technology. (2025, February 21). *European Digital Identity (EUDI) Regulation).* European Commission. https://digital-strategy.ec.europa.eu/en/policies/eudi-regulation

Die Presse. (2024, November 17). *„eXit“: Armin Wolf, Florian Klenk und Corinna Milborn steigen aus X aus.* Die Presse. http://web.archive.org/web/20250527152409/https://www.diepresse.com/19080196/exit-armin-wolf-florian-klenk-und-corinna-milborn-steigen-aus-x-aus

Digital Austria. (2023). *E-Government Strategy 2023.* Digital Austria. http://web.archive.org/web/20250505130434/https://www.digitalaustria.gv.at/dam/jcr:e93f9913-c1d1-4968-b6c6-ea9aed5c3498/E-GovernmentStrategieOesterreich-EN-final17072023.pdf

Digital Austria. (2025a). *Die App “eAusweise“ macht Ihr Smartphone zum Ausweis.* Digital Austria. http://web.archive.org/web/20250526134031/https://www.digitalaustria.gv.at/Services/eServices/eAusweise.html

Digital Austria. (2025b). *Der digitale Identitätsnachweis und Meine ID Austria Daten.* Digital Austria. http://web.archive.org/web/20250526190030/https://www.digitalaustria.gv.at/Services/eServices/Identitaetsnachweis.html

Distel, B. (2020). Assessing citizens' non-adoption of public e-services in Germany. *Information Polity, 25*(3), 339-360. https://doi.org/10.3233/IP-190214

Distel, B., & Ogonek, N. (2016). To adopt or not to adopt: A literature revierw on barriers to citizens' adoption of e-government services. *Twenty-Fourth European Conference on Information Systems (ECIS) 2016 Research Papers* (155). https://aisel.aisnet.org/ecis2016_rp/155

Djahangiri, N., Weinauer, M., & Haßl, G. (2019). *IKT-Einsatz in Haushalten: Einsatz von Informations- und Kommunikationstechnologien in Haushalten 2018.* Statistik Austria. https://www.statistik.at/fileadmin/publications/IKT-Einsatz_in_Haushalten_2018.pdf

[E-GovG] Bundesgesetz über Regelungen zur Erleichterung des elektronischen Verkehrs mit öffentlichen Stellen (E-Government-Gesetz – E-GovG). (2024). RIS. https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=20003230

eSSIF-Lab. (2024). *eSSIF-Lab Framework*. NGI ESSIF-LAB. http://web.archive.org/web/20250525153847/https://essif-lab.github.io/framework/docs/essifLab-fw/

[EWC] EU Digital Wallet Consortium. (2025). *About Us.* EWC. http://web.archive.org/web/20250602210929/https://eudiwalletconsortium.org/about-us/

Federal Chancellery. (2024a, May 1). *FAQ: Allgemeines zu ID Austria.* Oesterreich.gv.at. https://web.archive.org/web/20250503202206/https://www.oesterreich.gv.at/id-austria/betrieb.html

Federal Chancellery. (2024b, November 25). *Start des regulären Betriebs der ID Austria.* Oesterreich.gv.at. https://web.archive.org/web/20250505203633/https://www.oesterreich.gv.at/id-austria/haeufige-fragen/allgemeines-zu-id-austria.html#IDA-mit-SK

Federal Chancellery. (2024c, June 17). *Nutzungsbedingungen: App eAusweise.* Oesterreich.gv.at. http://web.archive.org/web/20250507161311/https://www.oesterreich.gv.at/app-eAusweise/nutzungsbedingungen.html

Federal Chancellery. (2024d, February 14). *Jetzt neu: Der digitale Zulassungsschein.* Oesterreich.gv.at. http://web.archive.org/web/20250507180331/https:/www.oesterreich.gv.at/nachrichten/allgemein/digitaler-zulassungsschein.html

Federal Chancellery. (2024e, December 16). *eAusweise: Digitale Zulassungsscheindaten.* Oesterreich.gv.at. http://web.archive.org/web/20250505193251/https://www.oesterreich.gv.at/eausweise/haeufige-fragen/haeufige-fragen-eausweise-digitale-zulassungsscheindaten.html

Federal Chancellery. (2024f, December 16). *eAusweise: Digitaler Führerschein*. Oesterreich.gv.at. http://web.archive.org/web/20250505192337/https://www.oesterreich.gv.at/eausweise/haeufige-fragen/haeufige-fragen-eausweise-digitaler-fuehrerschein.html

Federal Chancellery. (2024g, December 16). *eAusweise: Digitaler Identitätsnachweis*. Oesterreich.gv.at. http://web.archive.org/web/20250505195417/https://www.oesterreich.gv.at/eausweise/haeufige-fragen/haeufige-fragen-eausweise-digitaler-identitaetsnachweis.html

Federal Chancellery. (2024h, December 16). *eAusweise: Digitaler Altersnachweis*. Oesterreich.gv.at. http://web.archive.org/web/20250505194239/https://www.oesterreich.gv.at/eausweise/haeufige-fragen/haeufige-fragen-eausweise-digitaler-altersnachweis.html

Federal Chancellery. (2024i, June 17). *Nutzungsbedingungen Digitaler Identitätsnachweis*. Oesterreich.gv.at. http://web.archive.org/web/20250507202529/https://www.oesterreich.gv.at/app-eAusweise/nutzungsbedingungen-nachweis-id.html

Federal Chancellery. (2024j, December 16). *eAusweise: Allgemeine Fragen.* Oesterreich.gv.at. http://web.archive.org/save/https://www.oesterreich.gv.at/eausweise/haeufige-fragen/haeufige-fragen-eausweise-allgemein.html

Federal Chancellery. (2024k, December 16). *Nutzungsbedingungen: Digitaler Zulassungsschein.* Oesterreich.gv.at. http://web.archive.org/web/20250526211053/https://www.oesterreich.gv.at/app-eAusweise/nutzungsbedingungen-zulassung.html

Federal Chancellery. (2024l, May 1). *Nutzungsbedingungen: Digitaler Führerschein.* Oesterreich.gv.at. http://web.archive.org/web/20250526211419/https://www.oesterreich.gv.at/app-eAusweise/nutzungsbedingungen-digitaler-fuehrerschein.html

Federal Chancellery. (2024m, December 16). *eAusweise: Aktivierung*. Oesterreich.gv.at. http://web.archive.org/web/20250528191452/https://www.oesterreich.gv.at/eausweise/haeufige-fragen/haeufige-fragen-eausweise-registrierung.html

Federal Chancellery. (2024n, December 16). *eAusweis Check: Anwendung und Nutzung.* Oesterreich.gv.at. http://web.archive.org/web/20250602081410/https://www.oesterreich.gv.at/eausweise/haeufige-fragen/haeufige-fragen-eausweis-check-anwendung.html

Federal Chancellery. (2025, May 21). *Staatssekretär Pröll: Digitaler Studierendenausweis soll das Leben der Studentinnen und Studenten erleichtern*. Bundeskanzleramt. http://web.archive.org/web/20250525195359/https://www.bundeskanzleramt.gv.at/bundeskanzleramt/nachrichten-der-bundesregierung/2025/05/staatssekretaer-proell-digitaler-studierendenausweis-soll-das-leben-der-studentinnen-und-studenten-erleichtern.html

Federal Chancellery. (n.d.a) *Vorteile der ID Austria für Service Provider.* Oesterreich.gv.at. http://web.archive.org/web/20250507200617/https://www.oesterreich.gv.at/id-austria/Vorteile-der-ID-Austria-für-Service-Provider.html#FAQ_Zahlen

Federal Chancellery. (n.d.b). *My smartphone my ID: eAusweise*. Oesterreich.gv.at. http://web.archive.org/web/20250428032442/https://www.oesterreich.gv.at/en/eausweise.html

Federal Chancellery. (n.d.c). *ID Austria: Same mobile signature – new modern twist.* Oesterreich.gv.at. http://web.archive.org/web/20250508124155/https://www.oesterreich.gv.at/en/id-austria.html

Federal Chancellery [Bundeskanzleramt Österreich], & Tursky, F. (2022, December 28). *Der digitale Führerschein ist der erste eAusweis in Österreich. Das heißt, er existiert elektronisch und funktioniert am Handy.* [Facebook Posting; Video attached]. Facebook. https://www.facebook.com/Bundeskanzleramt.gv.at/videos/digitaler-führerschein/894802311961097/

Federal Chancellery [@bundeskanzleramt.gv.at], Pröll, Alexander [@alexanderproell], & Digital Austria [@digitalaustria.gv.at]. (2025, May 22). *Der digitale Studierendenausweis kommt!🫶 Im Laufe des Sommersemesters 2026 wird erstmals ein digitaler Studierendenausweis an öffentlichen Universitäten und Hochschulen in* [Instagram Posting; Video attached]. Instagram. https://www.instagram.com/bundeskanzleramt.gv.at/reel/DJ8nMxaoLaA/

Fischer, G., & Premm, S. (2025, February 25). *5.23 Mio. Pkw in Österreich zugelassen* [Pressemitteilung 13 546-039/25]. Statistik Austria. https://www.statistik.at/fileadmin/announcement/2025/02/20250225KfzBestand2024.pdf

[FSG §15a] Führerscheingesetz §15a. (2022, October 18). RIS. https://www.ris.bka.gv.at/NormDokument.wxe?Abfrage=Bundesnormen&Gesetzesnummer=10012723&FassungVom=2025-02-01&Artikel=&Paragraf=15a&Anlage=&Uebergangsrecht=

Google Trends. (n.d.). *„digital identity wallet“.* Retrieved June 25, 2025, from https://trends.google.com/trends/explore?date=all&q=%22digital%20identity%20wallet%22&hl=en

Gopalakrishnan, S., & Damanpour, F. (1997). A review of innovation research in economics, sociology and technology management. *Omega, 25*(1), 15–28. https://doi.org/10.1016/S0305-0483(96)00043-6

Grassi, P. A., Fenton, J. L., & Garcia, M. E. (2017). *Digital Identity Guidelines [including updates as of 12-01-2017], Special Publication (NIST SP).* National Institute of Standards and Technology. https://doi.org/10.6028/NIST.SP.800-63-3

Grimmelikhuijsen, S., Porumbescu, G., Hong, B., & Im, T. (2013, July), The Effect of Transparency on Trust in Government: A Cross-National Comparative Experiment. *Public Administration Review, 73*(4), 549-663. https://doi.org/10.1111/puar.12047

Gruber, S. [@gruber_severin]. (2024, September 29). *Bei uns (Gemeindewahlbehörde Roitham am Traunfall) schon. Bürgermeister hat die App.* [X Posting]. X. https://x.com/gruber_severin/status/1840304820076367887

Hanna, N. (2018). A role for the state in the digital age. *Journal of Innovation and Entrepreneurship, 7*(5). https://doi.org/10.1186/s13731-018-0086-3

Hebbar, S., & Kiran, K. B. (2022). Do Social Media and e-WOM influence M-Government Services?: A Citizen Perspective from India. *International Journal of Electronic Government Research, 18*(1), 1-27. http://dx.doi.org/10.4018/IJEGR.294891

Hemesath, S., & Gerrits, L. (2023). Der elektronische / digitale Personalausweis im internationalen Vergleich (E-ID). In T. Klenk, F. Nullmeier, & G. Wewer (Eds.), *Handbuch Digitalisierung in Staat und Verwaltung.* (pp. 1-16). SpringerVS. https://doi.org/10.1007/978-3-658-23669-4_50-2

Heute. (2022, December 9). *Das ist der erste digitale Führererschein Österreichs*. Heute. http://web.archive.org/web/20250526180106/https://www.heute.at/s/das-ist-der-erste-digitale-fuehrerschein-oesterreichs-100243204

Idrus, S. Z. S., Cherrier, E., Rosenberger, C., & Schwartzmann, J. J. (2014). A Review on Authentication Methods. *Australian Journal of Basic and Applied Sciences, 7*(5), 95-107. https://hal.science/hal-00912435v1

Initiative D21, & Technische Universität München. (2024). *eGovernment Monitor 2024: Nutzung und Akzeptanz digitaler Verwaltungsleistungen aus Sicht der Bürger*innen. Die deutschen Bundesländer, Österreich und die Schweiz im Vergleich.* Initiative D21. https://initiatived21.de/uploads/03_Studien-Publikationen/eGovernment-MONITOR/2024/egovernment_monitor_24.pdf

International Organization for Standardization. (2020). *Information technology – Security techniques – Entity authentication assurance framework [ISO/IEC 29115:2013]*. ISO. Retrieved May 7, 2025, from https://www.iso.org/standard/45138.html

[ISEC] Institute of Information Security. (2025). *Herbert Leitold*. TU Graz. http://web.archive.org/web/20250527155007/https://www.isec.tugraz.at/person/herbert-leitold/

Janssen, M., Rana, N. P., Slade, E. L., & Dwivedi, Y. K. (2017). Trustworthiness of digital government services: deriving a comprehensive theory through interpretive structural modelling. *Public Management Review, 20*(5), 647–671. https://doi.org/10.1080/14719037.2017.1305689

Kantar Public. (2022, March). *Study on New Digital Payment Methods.* European Central Bank. https://www.ecb.europa.eu/euro/digital_euro/timeline/profuse/shared/pdf/ecb.dedocs220330_report.en.pdf#:~:text=•%20The%20overarching%20key%20driver,element%20that%20currently%20hinders%20some

[KFG §102e] Kraftfahrgesetz 1967 §102e. (2024, October 29). RIS. https://www.ris.bka.gv.at/NormDokument.wxe?Abfrage=Bundesnormen&Gesetzesnummer=10011384&FassungVom=2024-10-29&Artikel=&Paragraf=102e&Anlage=&Uebergangsrecht=

Komendera, A., & Bauer, R. (2023, October 4). *Die BRZ Ausweisplattform auf OpenShift* [Public Presentation]. Red Hat. http://web.archive.org/web/20250526132900/https://www.redhat.com/tracks/_pfcdn/assets/10330/contents/549742/cd195d1a-c0b0-4194-8210-f5d767c4c280.pdf

Kouliaridis, V., Karopoulos, G., & Kambourakis, G. (2023). Assessing the Security and Privacy of Android Official ID Wallet Apps. *Information, 14*(8), 1-14. https://doi.org/10.3390/info14080457

Krassowski, M. (2020). *krassowski/complex-upset* (Version 1.3.5). Zenodo. http://doi.org/10.5281/zenodo.3700590

Kumar, R., Sachan, A., Mukherjee, A., & Kumar, R. (2018). Factors influencing e-government adoption in India: a qualitative approach. *Digital Policy, Regulation and Governance, 20*(5), 413-433. https://doi.org/10.1108/DPRG-02-2018-0007

Lai, C., & Lobo Marques, A. J. (2023). Aspects that constitute citizens' trust in e-government: A review and framework development. *Multidisciplinary Reviews, 7*(2). https://doi.org/10.31893/multirev.2024023

Laumer, S., & Eckhart, A. (2010). Why do People Reject Technologies? – Towards an Understanding of Resistance to IT-induced Organizational Change. *ICIS 2010 Proceedings*, 151. https://aisel.aisnet.org/icis2010_submissions/151

Leitold, H. (2016, August 1). *Federated identity management, sTORK, eIDAS* [Lecture slides]. TU Graz (COINS summer school on authentication). https://pure.tugraz.at/ws/portalfiles/portal/26511298/20160802_Summerschool_Leitold.pdf

Leitold, H. & Konrad, D. (2018). Erfahrungen aus eIDAS Zertifizierung: Fernsignaturen vs. Smartcards: andere Technologie damit auch anderer Zugang der Sicherheitsbewertung. *Datenschutz und Datensicherheit, 42*, 429-433. https://doi.org/10.1007/s11623-018-0973-6

Leitold, H. & Posch, R. (2012). STORK – Technical Approach and Privacy. In J. Bus, M. Crompton, M. Hildebrandt & G. Metakides (Eds.), *Digital Enlightenment Yearbook 2012.* (pp. 289-306). IOS Press. https://doi.org/10.3233/978-1-61499-057-4-289

Lewis-Beck, M. S., Bryman, A., & Liao, T. F. (Eds.) (2004). *The SAGE encyclopedia of social science research methods.* (Vols. 1-3). SAGE Publications, Inc. https://doi.org/10.4135/9781412950589

Luhmann, N. (1968). *Vertrauen. Ein Mechanismus zur Reduktion sozialer Komplexität: Soziologische Gegenwartsfragen.* Ferdinand-Enke-Verlag.

Lyons, T., Courcelas, L., & Timsit, K. (2019, May). *Blockchain and Digital Identity*. The European Unioin Blockchain Observatory and Forum. https://blockchain-observatory.ec.europa.eu/document/download/c9090f4f-a20a-4725-b3f9-335b7d6a1281_en?filename=report_identity_v0.9.4.pdf

Mahajan, V., & Peterson, R. A. (1985). *Models for Innovation Diffusion.* SAGE Publications, Inc. https://doi.org/10.4135/9781412985093

Manby, B. (2021). The Sustainable Development Goals and 'legal identity for all': 'First, do no harm'. *World Development, 139*, 1-12. https://doi.org/10.1016/j.worlddev.2020.105343

MatHias [@MatHias8719]. (2024, September 29). *Musste schon feststellen dass es nicht geht. War heut 2mal wählen* [X Posting]. X. Retrieved June 8, 2025, from https://x.com/MatHias8719/status/1840283570805334029

Mein Bezirk. (2024, December 23). *Digitaler Zulassungsschein auf mehreren Handys möglich.* Mein Bezirk. http://web.archive.org/web/20250507195523/https://www.meinbezirk.at/c-motor/digitaler-zulassungsschein-auf-mehreren-handys-moeglich_a7079113

Mensah, I. K. (2020). Perceived Usefulness and Ease of Use of Mobile Government Services: The Moderating Impact of Electronic Word of Month[4]. *International Journal of Technology Diffusion, 11*(1), 1-16. https://doi.org/10.4018/IJTD.2020010101

Mensah, I. K., & Mwakapesa, D. S. (2022). The Influence of Electronic Word of Mouth (eWOM) Communications on Citizens' Adoption of Mobile Government Services. *International Journal of Electronic Government Research, 18*(1), 1-21. https://doi.org/10.4018/IJEGR.298025

[4] The published article title includes this typographical error, in the paper 'Word of Mouth' is used.

Merriam-Webster. (n.d.a). Diffusion. In *Merriam-Webster.com Dictionary*. http://web.archive.org/web/20250519164534/https://www.merriam-webster.com/dictionary/diffusion

Merriam-Webster. (n.d.b). Adoption. In *Merriam-Webster.com Dictionary*. http://web.archive.org/web/20250519165453/https://www.merriam-webster.com/dictionary/adoption

Millard, J. (2023). *Impact of digital transformation on public governance: New forms of policy-making and the provision of innovative, people-centric and inclusive public services* [JRC133975]. Publications Office of the European Union. https://dx.doi.org/10.2760/204686

Misuraca, G., Barcevičius, E., Codagnone, C., (Eds.). (2020). *Exploring Digital Government Transformation in the EU: Understanding public sector innovation in a data-driven society* [EUR 30333 EN]. Publications Office of the European Union. https://dx.doi.org/10.2760/480377

Mittelstaedt, K., Rachbauer, S., & Maximilian Werner. (2024, September 29). *Mit Hund oder ohne Ausweis abstimmen? Funfacts für Vorzeigewähler.* DerStandard.at. Retrieved June 8, 2025. https://www.derstandard.at/story/3000000236515/mit-hund-oder-ohne-ausweis-abstimmen-funfacts-fuer-vorzeigewaehler

Mittelstaedt, K., & Tschiderer, M. (2024, March 8). *Tursky geht als Staatssekretär und übergibt an Plakom.* DerStandard.at. Retrieved June 8, 2025, from https://www.derstandard.at/story/3000000210738/tursky-will-als-staatssekret228r-zur252cktreten

Moon, M. J., & Bretschneider, S. (1997, January). Can state government actions affect innovation and its diffusion?: An extended communication model and empirical test. *Technological Forecasting and Social Change, 54*(1), 57-77. https://doi.org/10.1016/S0040-1625(96)00121-7

Müller, K., Wickham, H. (2023). *tibble: Simple Data Frames* (R package version 3.2.1). R-Project. https://doi.org/10.32614/CRAN.package.tibble

Müllner, T. (2022). *Wie entwickelt sich die digitale Transformation der öffentlichen Verwaltung in Österreich am Beispiel des Bundesdienstes sowie der Stadt Wien und was sind ihre voraussichtlichen Auswirkungen auf die Bediensteten sowie auf das Gemeinwohl bis 2030?.* (urn:nbn:at:at-fhcw:1-74793) [Master Thesis, FH Campus Wien]. FH Campus Wien Publication Database. https://pub.fh-campuswien.ac.at/urn/urn:nbn:at:at-fhcw:1-74793

Mussil, J. [@jmussil]. (2024, September 29). *Nein.* [X Posting; Picture attached]. X. Retrieved May 8, 2025, from https://x.com/jmussil/status/1840281053757386942

Neuwirth, E. [@neuwirthe]. (2024, February 15). *Habe gerade den digitalin Zulassungsschein in der eAusweise App aktiviert. Das Auto ist auf mich registriert, es fährt aber meistens* [X Posting]. X. Retrieved May 30, 2025, from https://x.com/neuwirthe/status/1758252304044630509?lang=ar

[NOBID] Nordic-Baltic eID Project Consortium. (2025). *About NOBID.* NOBID Consortium. NOBID Consortium. http://web.archive.org/web/20250602212217/https://www.nobidconsortium.com/about/

ÖAMTC. (2023, October 3). *Privater Autoverkauf: Worauf muss ich achten?.* ÖAMTC. http://web.archive.org/web/20250531182018/https://www.oeamtc.at/news/privater-autoverkauf-worauf-muss-ich-achten-62941011

ÖAMTC. (n.d.a). *Jährlich fast 500 Unfallbeteiligte ohne Lenkberechtigung ertappt.* ÖAMTC. https://www.oeamtc.at/thema/fuehrerschein/jaehrlich-fast-500-unfallbeteiligte-ohne-lenkberechtigung-ertappt-61309241

ÖAMTC. (n.d.b). *Der digitaler Führerschein in Österreich.* ÖAMTC. http://web.archive.org/web/20250528200622/https://www.oeamtc.at/thema/fuehrerschein/der-digitale-fuehrerschein-in-oesterreich-55111443

ÖAMTC. (n.d.c.). *Der digitale Zulassungsschein in Österreich.* ÖAMTC. http://web.archive.org/web/20250601225900/https://www.oeamtc.at/thema/autokauf/der-digitale-zulassungsschein-in-oesterreich-67303687

OECD. (2023). *Government at a glance 2023: Country Notes.* OECD. https://www.oecd.org/content/dam/oecd/en/publications/reports/2023/06/government-at-a-glance-2023-country-notes_a95d10b5/austria_73941cb0/384afb87-en.pdf

OeSD. (2024, October 3). *Digitale Ausweisplattform „eAusweise" gewinnt eAward, 2024.* Österreichische Staatsdruckerei. http://web.archive.org/web/20250601225655/https://www.staatsdruckerei.at/allgemein/digitale-ausweisplattform-eausweise-gewinnt-eaward-2024/

OeSD. (n.d.). *Die digitale Ausweisplattform.* Österreichische Staatsdruckerei. Retrieved May 7, 2025, from https://www.staatsdruckerei.at/id-produkte/digitale-identitaeten/eausweise/#:~:text=Die%20App%20„eAusweise"%20ist%20die,der%20Österreichischen%20Staatsdruckerei%20(OeSD).

Oesterreich.gv.at. (2024, February 14). *Jetzt neu: Der digitale Zulassungsschein.* Oesterreich.gv.at. https://www.oesterreich.gv.at/dam/jcr:01fa0233-7864-4019-8010-a1f0adb5af26/2024-02-news-teaser-zulassungsschein@2x.png

Oesterreich.gv.at. (2025, January 21). *Weitergabe digitaler Zulassungsdaten.* Oesterreich.gv.at. http://web.archive.org/web/20250602001502/https://www.oesterreich.gv.at/nachrichten/allgemein/digitaler-zulassungsschein-2.html

OpenID. (n.d.). *What is OpenID Connect.* OpenID. http://web.archive.org/save/https://openid.net/developers/how-connect-works/

ORF. (2022, May 24). *Bündelung der Digitalagenden im Finanzministerium geplant.* News.ORF.at. http://web.archive.org/web/20250526103220/https://orf.at/stories/3267628/

Pedersen, T. (2024). *patchwork: The Composer of Plots* (R package version 1.3.0). CRAN. https://doi.org/10.32614/CRAN.package.patchwork

Peterbauer, J. & Kropfreiter, V. (2023, December 12). *IKT-Einsatz_in_Haushalten_2023_n* [Data set]. Statistik Austria. https://www.statistik.at/fileadmin/pages/284/IKT-Einsatz_in_Haushalten_2023_n.ods

Peterbauer, J., & Kropfreiter, V. (2024a). *IKT-Einsatz in Haushalten 2023: Einsatz von Informations- und Kommunikationstechnologien in Haushalten.* Statistik Austria. https://www.statistik.at/fileadmin/user_upload/IKTH_2023.pdf

Peterbauer, J., & Kropfreiter, V. (2024b, October 24). *IKT-Einsatz_in_Haushalten_2024-2* (2) [Data set]. Statistik Austria. https://www.statistik.at/fileadmin/pages/284/IKT-Einsatz_in_Haushalten_2024.ods

Peterbauer, J., & Kropfreiter, V. (2024c, September 25). *Jede zweite Person ab 75 Jahren nimmt am digitalen Leben Teil* [Pressemitteilung 13 427-193/24]. Statistik Austria. https://www.statistik.at/fileadmin/announcement/2024/09/20240925InternetnutzungAelterer.pdf

Podgorelec, B., Alber, L., & Zefferer, T. (2022). What is a (digital) identity wallet?: A systematic literature review. *2022 IEEE 46th Annual Computers, Software and Applications Conference (COMPSAC)*, 809-818. https://doi.org/10.1109/COMPSAC54236.2022.00131

Polzer, T. & Meyer, R. E. (2023). Österreich: Digitalisierungsstrategie der Bundesebene. In T. Klenk, F. Nullmeier, & G. Wewer (Eds.), *Handbuch Digitalisierung in Staat und Verwaltung.* (pp. 1-16). SpringerVS. https://doi.org/10.1007/978-3-658-23669-4_97-1

Posit team. (2025). *RStudio: Integrated Development Environment for R* (Version 2025.5.0.496). Posit Software, PBC, Boston, MA. http://www.posit.co/

R Core Team (2025, April 11). *R: A Language and Environment for Statistical Computing* (Version 4.5.0). R Foundation for Statistical Computing, Vienna, Austria. https://www.R-project.org/.

Räckers, M., Hofmann, S., & Becker, J. (2013). The Influence of Social Context and Targeted Communication on e-Government Service Adoption. In M.A. Wimmer, M. Janssen, & H.J. Scholl (Eds.), *Electronic Government. EGOV 2013. Lecture Notes in Computer Science 8074* (pp. 298–309). Springer. https://doi.org/10.1007/978-3-642-40358-3_25

Raml, R., Buljubasic, D., Birke, J., Tröster, L. (2024). *Mediendiskursstudie Wien 2024: Mediennutzung und Informationsverhalten.* Stadt Wien. https://www.wien.gv.at/spezial/mediendiskursstudie/files/mediennutzungsbroschuere_2024.pdf

Rana, N. P., Williams, M. D., Dwivedi, Y. K. (2012). E-Government Adoption Research: A Meta-Analysis of Findings. *ECIS 2012 Proceedings, 3*, 1. http://aisel.aisnet.org/ecis2012/3?utm_source=aisel.aisnet.org%2Fecis2012%2F3&utm_medium=PDF&utm_campaign=PDFCoverPages

Robertson, C. T. (2023, October 25). *Here's what our research says about news audiences on Twitter, the platform now known as X.* Reuters Institute – University of Oxford. http://web.archive.org/web/20250527151606/https://reutersinstitute.politics.ox.ac.uk/news/heres-what-our-research-says-about-news-audiences-twitter-platform-now-known-x

Robinson D, Hayes A, Couch S (2025). *broom: Convert Statistical Objects into Tidy Tibbles* (R package version 1.0.8). CRAN. https://doi.org/10.32614/CRAN.package.broom

Rogers, E. M. (1983). *Diffusion of Innovations* (3rd edition). The Free Press.

Rotter, J. B. (1971). Generalized expectancies for interpersonal trust. *American Psychologist, 26*(5), 443-452. https://doi.org/10.1037/h0031464

Ru, S. (2017, December 27). *First WeChat ID card issued in China.* China Daily. http://web.archive.org/web/20250602151809/https://www.chinadaily.com.cn/a/201712/27/WS5a435749a31008cf16da3caa_2.html

Schmölz, A., Geppert, C., Schwarz, S., Svecnik, E., Koch, J., Bieg, T., & Freund, L. (2023, December). Assessing the Second-Level Digital Divide in Austria: A Representative Study on Demographic Differences in Digital Competences. *Digital Education Review, 44*, 61-75. https://doi.org/10.1344/der.2023.44.61-75

Sidoti, O., Dawson, W., Gelles-Watnick, R., Faverio, M., Atske, S., Radde, K., & Park, E. (2024, November 13). *Mobile Fact Sheet.* Pew Research Center. http://web.archive.org/web/20250602212659/https://www.pewresearch.org/internet/fact-sheet/mobile/

Simone, T. (2023). *The Digital Wallet paradigm for identity.* [Master Thesis, Politecnico Milano]. POLITesi – Archivo digitale delle tesi di laurea e di dottorato. https://hdl.handle.net/10589/202975

Statistik Austria. (2025a, February 11). *Bev_nach_Alter_Geschlecht_Staatsangeh_Bundesl_Zeitreihe-3* (2) [Data set]. Statistik Austria. https://www.statistik.at/fileadmin/pages/406/Bev_nach_Alter_Geschlecht_Staatsangeh_Bundesl_Zeitreihe.ods

Statistik Austria. (2025b, March 31). *BestandFahrzeugeMaerz2025VorlaeufigeDaten* (1) [Data set]. Statistik Austria. https://www.statistik.at/fileadmin/pages/75/BestandFahrzeugeMaerz2025VorlaeufigeDaten.ods

Statistik Austria. (2025c, February 11). *Bev_Quartalsbeginn_detailliertes_Geschlecht* [Data set]. Statistik Austria.

https://www.statistik.at/fileadmin/pages/406/Bev_Quartalsbeginn_detailliertes_Geschlecht.ods

Sule, M. J., Zennaro, M., & Thomas, G. (2021, November). Cybersecurity through the lens of Digital Identity and Data Protection: Issues and Trends. *Technology in Society, 67*, 1-9. https://doi.org/10.1016/j.techsoc.2021.101734

Taherdoost, H. (2018). A review of technology acceptance and adoption models and theories. *Procedia Manufacturing, 22*, 960-967. https://doi.org/10.1016/j.promfg.2018.03.137

Tan, Y. H., & Thoen, W. (2000). Toward a Generic Model of Trust for Electronic Commerce. *International Journal of Electronic Commerce, 5*(2), 61-74. https://doi.org/10.1080/10864415.2000.11044201

Teodorescu, C. A., Durnoi, A., & Vargas, V. (2023, July). The Rise of the Mobile Internet: Tracing the Evolution of Portable Devices. *Proceedings of the International Conference on Business Excellence, 17*(1), 1645-1654. https://doi.org/10.2478/picbe-2023-0147

Theuermann, K., Zefferer, T., Lenz, T., & Tauber, A. (2019). Flexible und benutzerfreundliche Authentifizierungsverfahren zur Umsetzung transaktionaler E-Government-Services auf mobilen Geräten. In J. Stember, W. Eixelsberger, A. Spichiger, A. Neuroni, F. Habbel & M. Wundara (Eds.), *Handbuch E-Government.* (pp. 405-434). Springer. https://doi.org/10.1007/978-3-658-21402-9_36

Thür, M. [@MartinThuer]. (2024, September 29). *Frage mich gerade, ob ein e-Ausweis am Handy auch als Identitätslokal im Wahllokal gilt. Any idea?* [X Posting]. Retrieved May 7, 2025, from https://x.com/MartinThuer/status/1840279733881217151

Tolbert, C. J., & Mossberger, K. (2006, May). The Effects of E-Government on Trust and Confidence in Government. *Public Administration Review, 66*(3), 302-478. https://doi.org/10.1111/j.1540-6210.2006.00594.x

Tran, T. A. P. (2025). The role of customer expectations and competitive pressure in shaping firm innovation decisions towards sustainability: Mediating effects of innovation perception. *Cogent Business and Management, 12*(1), 1-19. https://doi.org/10.1080/23311975.2025.2462272

Valente, T. W., & Rogers, E. M. (1995, March). The Origins and Development of the Diffusion of Innovations Paradigm as an Example of Scientific Growth. *Science Communication 16*(3), 242-273. https://doi.org/10.1177/1075547095016003002

Venables, W. N. & Ripley, B. D. (2002) *Modern Applied Statistics with S. Fourth Edition*. Springer.

Venkatesh, V., & Davis, F. D. (2000, February). A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies. *Management Science, 46*(2), 186-204. https://www.jstor.org/stable/2634758

Venkatesh, V., Morris, M. G., Davis, G. B., Davis, F. D. (2003, September). User Acceptance of Information Technology: Toward a Unified View. *MIS Quarterly, 27*(3), 425-478. https://doi.org/10.2307/30036540

VCÖ. (2021, May 7). *Autofreies Mobilitätsangebot in Stadt und Land ausbauen und verbessern.* VCÖ – Mobilität mit Zukunft. http://web.archive.org/web/20250517115154/https://vcoe.at/presse/presseaussendungen/detail/vcoe-jeder-4-in-oesterreich-lenkt-nie-oder-nur-selten-ein-auto-in-wien-sogar-jeder-zweite

Wang, H. C., Doong, H. S., & Lin, F. C. (2007). Determinants of E-Government Service Adoption: An Innovation Diffusion Perspective. *2007 International Conference on Wireless Communications, Networking and Mobile Computing*, 3485-3461. IEEE. https://doi.org/10.1109/WICOM.2007.855

Wang, H. C., & Doong, H. S. (2010). Does government effort or citizen word-of-mouth determine e-Government service diffusion? *Behaviour & Information Technology, 29*(4), 415-422. https://doi.org/10.1080/01449291003639897

Wickham, H. (2016). *ggplot2: Elegant Graphics for Data Analysis*. Springer-Verlag. https://ggplot2.tidyverse.org

Wickham, H. (2023). *stringr: Simple, Consistent Wrappers for Common String Operations* (R package version 1.5.1). R-Project. https://doi.org/10.32614/CRAN.package.stringr

Wickham, H., François, R., Henry, L., Müller, K., & Vaughan, D. (2023). *dplyr: A Grammar of Data Manipulation* (R package version 1.1.4). R-Project. https://doi.org/10.32614/CRAN.package.dplyr

Wickham, H., Vaughan, D., & Girlich, M. (2024). *tidyr: Tidy Messy Data* (R package version 1.3.1. R-Project. https://doi.org/10.32614/CRAN.package.tidyr

Wickham, H., Hester, J., & Bryan, J. (2024). *readr: Read Rectangular Text Data* (R package version 2.1.5). R-project. https://doi.org/10.32614/CRAN.package.readr

Youniqx. (2025). *Youniqx history: Paving the way*. Youniqx. http://web.archive.org/web/20250526080041/https://youniqx.com/about-youniqx/history/?product=history

Zebaree, M., Agoyi, M., & Aquel, M. (2022). Sustainable Adoption of E-Government from the UTAUT Perspective. *Sustainability, 14*. https://doi.org/10.3390/su14095370

Zefferer, T., Teufl, P., & Leitold, H. (2011). Mobile qualifizierte Signaturen in Europa. *Datenschutz und Datensicherheit, 35*, 768-773. https://doi.org/10.1007/s11623-011-0183-y

Zeiler, B. (2023). *Die Bürgerkarte als Authentifizierungstool für E-Government Anwendungen.* (urn:nbn:at:at-ubl:1-69887) [Magister Thesis, Johannes Kepler Universität Linz]. Repository of the University Library Linz.

Zellinger, P., & Dittlbacher, G. L. (2024, February 15). *Den Zulassungsschein gibt es nun auch digital am Smartphone*. DerStandard.at. Retrieved May 7, 2025, from https://www.derstandard.at/story/3000000207564/den-zulassungsschein-gibt-es-nun-auch-digital-am-smartphone

Zurich Connect. (2024, March 19). *Digitale Zulassungsschein: Alles, was man Wissen muss.* Zurich Connect. http://web.archive.org/web/20250528201101/https://www.zurich-connect.at/blog/articles/2024/digitaler-zulassungsschein

Zwattendorfer, B., Zefferer, T., & Stranacher, K. (2014). An Overview of Cloud Identity Management-Models. *10th International Conference on Web Information Systems and Technologies (WEBIST)*, 82-92. https://doi.org/10.5220/0004946400820092

Appendix

A Questionnaire: German Original Questions and English Translations

Table 7(A) - Questionnaire: Sheet 1 Translation

Note: Own translation.

Sheet 1 - Introduction	
Sheet 1 - Introduction	**Welcome Screen [english]**
Herzlich willkommen! Vielen Dank, dass Sie an meiner Masterarbeitsumfrage teilnehmen! Das Ausfüllen dieses Onlinefragebogens dauert nur 5-10 Minuten. **Thema der Umfrage** Die Befragung betrifft die österreichische 'eAusweise' App, eine Handy-Applikation mit der Sie unter anderem Ihre österreichische Lenkberechtigung und KFZ-Zulassung als QR-Code gegenüber Autoritäten des öffentlichen Sektors oder Dritten vorweisen können. **Aufbau und wichtige Hinweise** Die Umfrage öffnet mit 7 bzw. 9 demografischen Fragen zu Ihrer Person und Ihrer Vertrautheit mit der App, die als Basis für die Auswertung dienen, und ist gefolgt von 8 thematischen Single- oder Multiple Choice Fragen zu Ihren Einschätzungen, Annahmen und Vermutungen über die 'eAusweise' App. - Alle erhobenen Daten werden ausschließlich für wissenschaftliche Zwecke im Rahmen meiner Masterarbeit verwendet. - Die Auswertung erfolgt in aggregierter Form, sodass keine Rückschlüsse auf einzelne Teilnehmer*innen möglich sind. - Fragen zu Aktivierung, Verwendungszwecken und Anwendungen betreffen Ihre Einschätzungen, Annahmen und Vermutungen zu den Möglichkeiten mit der App. - Für die Beantwortung ist es daher nicht wichtig, ob Sie die richtige Antwort kennen oder mit der 'eAusweise App' vertraut sind. *Durch das Fortfahren mit der Umfrage bestätigen Sie, dass Sie diese Informationen gelesen haben und mit der anonymen Verarbeitung Ihrer Antworten einverstanden sind.* Vielen Dank für Ihre Teilnahme und Unterstützung! **Kontakt** Diese Befragung wird im Rahmen einer Erasmus Mundus Masterarbeit im Bereich Public Sector Innovation and eGovernance durchgeführt, betreut durch Forschende der Universität Münster (DE), Katholieke Universiteit Leuven (BE) und Tallinn University of Technology (EE). Für Fragen oder Anmerkungen zur Studie oder den Ergebnissen können Sie mich gerne jederzeit unter johanna.sturm@student.kuleuven.be kontaktieren.	Welcome! Thank you for participating in my Master thesis survey! Completing this online questionnaire will take only 5–10 minutes. **Survey Topic** The survey concerns the Austrian “eAusweise” app, a mobile application that allows you to present, among other things, your Austrian driving license and vehicle registration as a QR code to public authorities or third parties. **Structure and Important Notes** The survey begins with 7 or 9 demographic questions about you and your familiarity with the app, which serve as a basis for the analysis. These are followed by 8 thematic single- or multiple-choice questions regarding your assessments, assumptions, and perceptions of the “eAusweise” app. - All collected data will be used exclusively for academic purposes within the framework of my Master’s thesis. - The analysis will be conducted in aggregated form, so no conclusions can be drawn about individual participants. - Questions about activation, purposes of use, and application features refer to your assessments, assumptions, and perceptions of what is possible with the app. - It is therefore not important, whether you know the correct answers or are familiar with the “eAusweise” app in order to participate. *By proceeding with this survey, you confirm that you have read this information and agree to the anonymous processing of your responses.* Thank you for your participation and support! **Contact** This survey is conducted as part of an Erasmus Mundus Master thesis in the field of Public Sector Innovation and eGovernance, supervised by researchers from the University of Münster (DE), KU Leuven (BE), and Tallinn University of Technology (EE). If you have any questions or comments about the study or its results, feel free to get in touch with me at johanna.sturm@student.kuleuven.be.

Figure 26(A) - Questionnaire: Sheet 1 Image

Note: This image was included in sheet 1 of the questionnaire to provide respondents with an early impression of ATDI, in case they were not familiar. (Oesterreich.gv.at., 2024)

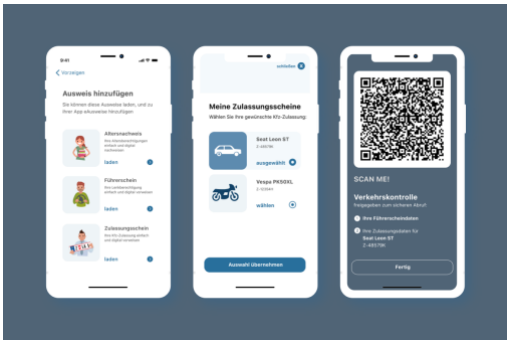


Table 8(A) - Questionnaire: Sheet 2 Description Translation

Note: Own translation.

Sheet 2 - Demographics and Individual Factual Data	
Introduction Section 2 [german]	**Introduction Section 2 [english]**
Demografische Angaben Diese kurzen Angaben zu Ihrer Person und Vertrautheit mit der eAusweise App helfen, die Ergebnisse besser einzuordnen. Alle Informationen werden selbstverständlich anonym behandelt und nicht an Dritte weitergegeben.	**Demographic Data** These brief questions about you and your familiarity with the "eAusweise" app help to better contextualize the results. All information will, of course, be treated anonymously and will not be shared with third parties.

Table 9(A) - Questionnaire: Sheet 2 Question Translation

Note: Own translation.

Question [german]	**Question [english]**	**Answer Options [german]**	**Answer options [english]**
1. Geschlecht	1. Gender	Weiblich; Männlich; Divers; Andere []	Female; Male; Diverse; Other []
2. Alter	2. Age	bis 19; 20-29; 30-39; 40-49; 50-59; 60-69; 70-79; 80-89; 90 oder älter	up to 19; 20-29; 30-39; 40-49; 50-59; 60-69; 70-79; 80-89; 90 or older
3. Wie würden Sie das Gebiet, in dem Sie derzeit leben klassifizieren?	3. How would you classify the area in which you currently live?	Dorf oder ländliches Gebiet (unter 5000 Einwohner*innen); Ortschaft (unter 10 000 Einwohner*innen); Kleinstadt (unter 20 000 Einwohner*innen); Mittlere Stadt (unter 100 000 Einwohner*innen); Große Stadt (unter 1 Million Einwohner*innen); Großstadt (mehr als 1 Million Einwohner*innen)	Village or rural area (fewer than 5,000 inhabitants); Large village (fewer than 10,000 inhabitants); Small town (fewer than 20,000 inhabitants); Medium-sized city (fewer than 100,000 inhabitants); Large city (fewer than 1 million inhabitants); Metropolis (more than 1 million inhabitants)
4. Ich habe eine aktive österreichische Lenkberechtigung (Führerschein).	4. I have an active Austrian driving permit (driver's license).	Yes; No	Yes; No

Question [german]	Question [english]	Answer Options [german]	Answer options [english]
5. Haben Sie eine aktive ID Austria, Handy-Signatur oder die österreichische Bürgerkarte? (Mehrfachauswahl möglich)	5. Do you have an active ID Austria, mobile phone signature or Austrian citizen card? (Multiple selections possible)	ID Austria; Handy-Signatur; Österreichische Bürgerkarte; Ich habe keine der drei.	ID Austria; Mobile Phone Signature; Austrian citizen card; I do not have either of them.
6. Wie vertraut sind Sie mit der 'eAusweise' App?	6. How familiar are you with the 'eAusweise' App?	Von der 'eAusweise' App habe ich noch nie gehört.; Ich habe die ‚eAusweise‘ App nie heruntergeladen, aber schon davon gehört.; Ich verwende die ‚eAusweise‘ App nicht aktiv, habe sie aber schon einmal heruntergeladen oder in der Vergangenheit auf meinem Gerät gehabt.; Ich verwende die ‚eAusweise‘ App und habe einen oder mehrere Ausweise aktiviert.	I have never heard of the 'eAusweise' app.; I have heard of the 'eAusweise' app but have never downloaded it.; I do not actively use the 'eAusweise' app, but I have had it on my device before.; I use the 'eAusweise' app and have activated one or more digital IDs.
(7.) Welche Nachweise haben Sie in der 'eAusweise' App aktiviert? (Mehrfachauswahl möglich)	(7.) Which documents have you activated in the 'eAusweise' App? (Multiple selections possible)	Digitaler Führerschein; Digitaler Zulassungsschein; Digitaler Altersnachweis; Digitaler Personalausweis	Digital driver's license; Digital vehicle registration certificate; Digital proof of age; Digital ID card
(8.) Ich habe einen der aktivierten Ausweise schon einmal vorgewiesen.	(8.) I have previously presented one of these digital credentials.	Ja; Nein	Yes; No
9. Ich fühle mich gut über das eAusweise Angebot informiert.	9. I feel well-informed about the 'eAusweise' service offering.	Stimme voll und ganz zu.; Stimme zu.; Weder noch.; Stimme nicht zu.; Stimme überhaupt nicht zu.	Strongly agree.; Agree.; Neither agree or disagree.; Disagree.; Strongly disagree.

Table 10(A) - Questionnaire: Sheet 3 Description Translation

Note: Own translation.

Sheet 3 - Use cases, Usability and Applicability of the 'eAusweise' App	
Introduction Section 3 [german]	**Introduction Section 3 [english]**
Anwendungszwecke, Nutzbarkeit und Verwendbarkeit der 'eAusweise' App	**Use cases, usability, and applicability of the eAusweise app**
Die folgenden Fragen betreffen Ihre Einschätzungen, Vermutungen und Annahmen zu den Möglichkeiten mit der 'eAusweise' App. Für die Beantwortung ist es daher nicht wichtig, ob Sie die richtige Antwort kennen oder mit der 'eAusweise' App vertraut sind.	The following questions concern your perceptions, assumptions, and expectations regarding the possibilities offered by the ‘eAusweise’ app. Therefore, it is not important whether you know the correct answer or are familiar with the app.

Table 11(A) - Questionnaire: Sheet 3.1 Question Translation

Note: Own translation.

Question [german]	Question [english]	Answer Options [german]	Answer options [english]
10. Die Aktivierung des digitalen Führer- oder Zulassungsscheins verursacht zusätzliche Kosten über die reguläre Ausstellungsgebühr für die physischen Dokumente hinaus.	10. Activating the digital driving license or vehicle registration certificate incurs additional costs beyond the standard issuance fees for the physical documents.	Richtig; Falsch	True; False
11. Die Aktivierung des digitalen Führer- oder Zulassungsscheins benötigt zusätzliche persönliche Amtsgänge über die reguläre Dokumentausstellung oder Anmeldung der ID Austria mit Vollfunktion hinaus.	11. Activating the digital driver's license or vehicle registration certificate requires additional in-person administrative procedures beyond the regular document issuance or the registration of ID Austria with full functionality.	Richtig; Falsch	True; False
12. Wenn ich meinen digitalen Führer- oder Zulassungsschein in die App geladen habe, kann ich ihn bis zum Ablaufdatum des Dokuments dort abrufen.	12. Once I have activated my digital driver's license or vehicle registration certificate in the app, I can access it there until the document's expiration date.	Richtig; Falsch	True; False
16. Mit dem digitalen Führer- oder Zulassungsschein auf dem Handy, würde ich ohne Bedenken ohne meinem Führer- oder Zulassungsschein im Papier- oder Scheckkartenformat ins Auto steigen.	16. With the digital driver's license or vehicle registration certificate on my phone, I would have no concerns about driving without carrying the paper or card-format version.	Stimme voll und ganz zu. Stimme zu. Weder noch. Stimme nicht zu. Stimme überhaupt nicht zu.	Strongly agree. Agree. Neither agree or disagree. Disagree. Strongly disagree.

Table 12(A) - Questionnaire: Sheet 3.2 Question Translation

Note: Own translation.

Questions and Answers [german]	Questions and Answers [english]
13. Mit einem aktivierten digitalen Führerschein in der 'eAusweise' App kann ich: (Mehrfachauswahl möglich)	13. With an activated digital driving license in the 'eAusweise' app, I can: (Multiple selections possible)
13.a Mich in einer Verkehrskontrolle ausweisen.	13.a Provide identification for myself in a traffic stop
13.b In einer Verkehrskontrolle meine Lenkberechtigung nachweisen.	13.b Prove my driving credentials in a traffic stop
13.c Meine Lenkberechtigung gegenüber dritten Personen nachweisen	13.c Prove my driving credentials to third parties
13.d In Österreich ein Auto mieten.	13.d Rent a car in Austria
13.e Wenn ich in einen Unfall verwickelt bin, meine Identität und Lenkberechtigung nachweisen.	13.e Prove my identity and driver's license, if I am involved in an accident
13.f Mich an einem Amt oder anderen öffentlichen Stellen ausweisen.	13.f Identify myself at a government office or other public institution
13.g Wählen gehen.;	13.g Go to the polls and vote;
13.h Die Grenze überqueren.;	13.h Cross the border;
13.i Mich im EU-Ausland ausweisen.;	13.i Prove my identity in another EU country;
13.j Im EU-Ausland meine Lenkberechtigung nachweisen.;	13.j Prove my driving credentials in another EU country;
13.k Mich außerhalb der EU ausweisen.;	13.k Prove my identity outside the EU;
13.l Außerhalb der EU meine Lenkberechtigung nachweisen.	13.l Prove my driving credentials outside of the EU

Questions and Answers [german]	**Questions and Answers [english]**
14. Mit einem aktivierten digitalen Zulassungsschein in der 'eAusweise' App kann ich: (Mehrfachauswahl möglich)	14. With an activated digital vehicle registration in the ‘eAusweise’ app, I can: (Multiple selections possible)
14.a Die Zulassung meines Fahrzeugs in einer Verkehrskontrolle nachweisen.	14.a Prove my vehicle's registration during a traffic stop.
14.b Die Zulassung meines Fahrzeugs, sowie angehörige Vermerke auf Beiblättern mit Zusatzinformationen in einer Verkehrskontrolle nachweisen.	14.b Prove my vehicle's registration, including related annotations on supplementary sheets with additional information, during a traffic stop.
14.c Die Daten meines Fahrzeugs bei einer §57a-Begutachtung ("Pickerl") vorweisen.	14.c Present my vehicle's data during a §57a inspection ("Pickerl").
14.d Die Zulassung meines Fahrzeugs gegenüber dritten Personen nachweisen.	14.d Prove my vehicle's registration to third parties.
14.e Anderen Personen Zugang zum digitalen Zulassungsschein meines Fahrzeugs temporär gewähren.	14.e Temporarily grant other persons access to the digital registration certificate of my vehicle.
14.f Anderen Personen Zugang zum digitalen Zulassungsschein meines Fahrzeugs dauerhaft gewähren.	14.f Permanently grant other persons access to the digital registration certificate of my vehicle.
14.g Mein Fahrzeug ummelden.	14.g Re-register my vehicle.
14.h Mein Fahrzeug verkaufen.	14.h Sell my vehicle.
14.i Neue Kennzeichen anfordern, falls die vorherigen verloren gehen oder gestohlen werden.	14.i Request new license plates if the previous ones are lost or stolen.
14.j Die Zulassung meines Fahrzeugs im EU-Ausland nachweisen.	14.j Prove my vehicle's registration in another EU country.
14.k Die Zulassung meines Fahrzeugs außerhalb der EU nachweisen.	14.k Prove my vehicle's registration outside the EU.
15. Bei einer Verkehrskontrolle in Österreich denke ich, dass: (Mehrfachauswahl möglich)	15. At a traffic stop in Austria, I believe that the following apply: (Mulitple selections possible)
15.a Mein digitaler Führer- oder Zulassungsschein von der Polizei genau gleich behandelt werden *müsste*, wie ein Papier oder Scheckkartenführerschein.	15.a My digital driver's license or vehicle registration certificate must be treated by the police exactly the same as a paper or card-format.
15.b Mein digitaler Führer- oder Zulassungsschein von der Polizei genau gleich behandelt *wird*, wie ein Papier oder Scheckkartenführerschein.	15.b My digital driver's license or vehicle registration format will be treated by the police exactly the same as a paper or card-format document.
15.c Mein digitaler Führer- oder Zulassungsschein auch ohne physischen (Papier- oder Scheckkarte) Lichtbildausweis anerkannt wird.	15.c My digital driver's license or vehicle registration certificate will be accepted without a physical (paper or card-format) photo ID.
15.d Die Polizei meinen digitalen Führer- oder Zulassungsschein im QR-Code Format sofort erkennt.	15.d The police immediately recognizes my digital driver's license or vehicle registration certificate in QR-code form.
15.e Die Polizei meinen digitalen Führer- oder Zulassungsschein im QR-Code Format ohne Probleme auslesen kann.	15.e The police is capable of scanning my digital driver's license or vehicle registration certificate in QR-code form without any problems.
15.f Die App keine technischen Probleme haben wird.	15.f The application will not experience technical problems.
15.g Ich meinen digitalen Zulassungs- oder Führerschein auch ohne Empfang vorweisen kann.	15.g I can present my digital driver’s license or registration certificate even without a mobile signal.
15.h Falls mein Akku leer ist oder mein Handy ein technisches Problem hat, der digitale Führer- oder Zulassungsschein trotzdem gültig ist oder ich ihn nachreichen kann.	15.h If my phone’s battery is dead or it has a technical issue, the digital driver’s license or registration certificate is still valid or I will be allowed to submit it at a later point.
15.i Ich, wenn die eAusweise App aufgrund eines Systemversagens oder technischen Problems seitens des Staates nicht funktioniert, so bestraft werden kann, als würde ich keinen Führerschein mitführen.	15.i If the eAusweise app fails due to a government-related system error or technical issue, I could be penalized as if I were not carrying a driver’s license.

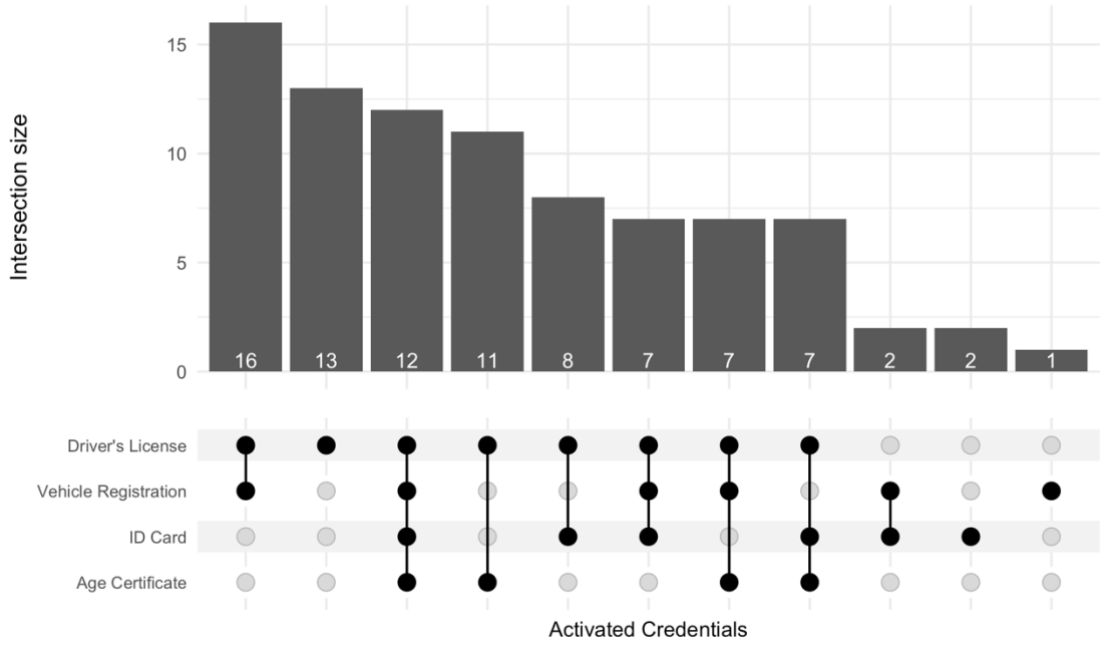
B User Adoption Funnel Data

Note: Own table based on survey data (n=405).

Stage	Count	% of Total	% of Previous
1. Total Respondents	405	100	n/a
2. General Eligibility (has eID)	323	79.8	79.8
3. Awareness of ATDI Wallet	293	72.3	90.7
4. Eligibility - has ID Austria	292	72.1	99.7
5. Previously downloaded ATDI	159	39.3	54.5
6. Activated credential	86	21.2	54.1
7. Credential presented	17	4.2	19.8

C UpSet Plot for ATDI Credential Combinations (n=86)

Note: Own illustration based on survey data (n=86).



D Ordinal Logistic Regression for ATDI Familiarity

Note: Own table based on survey data (n=405).

Group	Predictor	Log-Odds Estimate	Std. Error	Statistic	CI Lower	CI Upper	p-value
Gender	Diverse	-0.282	0.68	-0.41	-1.733	1.062	0.678
	Male	0.513	0.353	1.45	-0.185	1.259	0.147
	Female	-0.231	0.353	-0.65	-0.922	0.461	0.513
Age	<=19	-0.116	0.461	-0.25	-1.04	0.78	0.801
	20-29	-0.215	0.235	-0.92	-0.678	0.25	0.36
	30-39	-0.262	0.29	-0.91	-0.833	0.307	0.365
	40-49	-0.173	0.304	-0.57	-0.771	0.427	0.57
	50-59	-0.135	0.269	-0.5	-0.664	0.395	0.617
	60-69	-0.029	0.264	-0.11	-0.549	0.492	0.912
	70-79	-0.838	0.58	-1.45	-2.03	0.282	0.148
	80-89	1.768	0.99	1.79	-0.172	3.709	0.074
Region	Rural (<=5k)	0.114	0.217	0.53	-0.311	0.541	0.598
	Village (<=10k)	0.04	0.29	0.14	-0.53	0.61	0.89
	Small town (<=20k)	-0.084	0.284	-0.3	-0.643	0.472	0.767
	Medium city (<=100k)	0.388	0.28	1.38	-0.162	0.941	0.167
	Large city (<=1M)	-0.18	0.282	-0.64	-0.737	0.373	0.524
	Metropolis (>=1M)	-0.278	0.167	-1.67	-0.606	0.049	0.096
License	Has driver's license	0.357	0.179	2	0.01	0.713	0.046*
ID Austria	Has ID Austria	0.8	0.113	7.08	0.581	1.024	<0.001***

E Linear Regression for Feeling Well-Informed about ATDI

Note: Own table based on survey data (n=405).

Group	Predictor	Estimate	Std. Error	Statistic	CI Lower	CI Upper	p-value
Gender	Diverse	0.065	0.382	0.17	-0.687	0.817	0.865
	Male	0.016	0.198	0.08	-0.374	0.406	0.937
	Female	-0.081	0.2	-0.4	-0.474	0.312	0.688
Age	<=19	0.463	0.284	1.63	-0.095	1.022	0.104
	20-29	0.018	0.162	0.11	-0.3	0.337	0.909
	30-39	-0.276	0.195	-1.41	-0.66	0.108	0.158
	40-49	-0.027	0.2	-0.14	-0.42	0.366	0.892
	50-59	0.089	0.18	0.49	-0.265	0.443	0.622
	60-69	0.291	0.18	1.62	-0.064	0.645	0.107
	70-79	-0.046	0.312	-0.15	-0.659	0.568	0.884
	80-89	-0.512	0.855	-0.6	-2.188	1.163	0.549
Region	Rural (<=5k)	0.259	0.132	1.96	-0.001	0.518	0.051
	Village (<=10k)	0.064	0.163	0.39	-0.256	0.384	0.695
	Small town (<=20k)	-0.162	0.174	-0.93	-0.504	0.181	0.354
	Medium city (<=100k)	-0.167	0.161	-1.04	-0.485	0.15	0.3
	Large city (<=1M)	-0.094	0.187	-0.5	-0.463	0.274	0.614
	Metropolis (>=1M)	0.101	0.098	1.04	-0.09	0.292	0.301
License	Has driver's license	0.041	0.108	0.38	-0.171	0.253	0.701
ID Austria	Has ID Austria	0.023	0.068	0.34	-0.111	0.157	0.736
Familiarity	Never heard of it	-1.041	0.095	-10.98	-1.228	-0.855	<0.001***
	Heard of it, never downloaded	-0.192	0.091	-2.11	-0.371	-0.013	0.036*
	Used before, not active	0.185	0.112	1.65	-0.035	0.405	0.1
	Active use with credentials	1.049	0.106	9.88	0.841	1.257	<0.001***

F Linear Regression for Factual Knowledge

Note: Own table based on survey data (n=405).

Group	Predictor	Estimate	Std. Error	Statistic	CI Lower	CI Upper	p-value
Gender	Diverse	-0.068	0.038	-1.77	-0.144	0.008	0.077
	Male	0.038	0.02	1.88	-0.002	0.077	0.06
	Female	0.03	0.02	1.51	-0.009	0.07	0.132
Age	<=19	0.005	0.028	0.16	-0.051	0.06	0.871
	20-29	0.038	0.015	2.54	0.009	0.068	0.011*
	30-39	0.043	0.018	2.36	0.007	0.08	0.019*
	40-49	0.037	0.019	1.92	-0.001	0.075	0.055
	50-59	0.03	0.017	1.78	-0.003	0.063	0.076
	60-69	0.001	0.017	0.08	-0.032	0.035	0.935
	70-79	-0.073	0.033	-2.2	-0.138	-0.008	0.028*
	80-89	-0.081	0.07	-1.16	-0.22	0.057	0.248
Region	Rural (<=5k)	-0.001	0.013	-0.09	-0.027	0.025	0.928
	Village (<=10k)	-0.029	0.017	-1.71	-0.063	0.004	0.087
	Small town (<=20k)	0.026	0.017	1.54	-0.007	0.06	0.123
	Medium city (<=100k)	-0.027	0.017	-1.61	-0.06	0.006	0.109
	Large city (<=1M)	0.039	0.017	2.28	0.005	0.073	0.023*
	Metropolis (>=1M)	-0.008	0.01	-0.8	-0.028	0.012	0.425
License	Has driver's license	-0.002	0.011	-0.21	-0.023	0.019	0.835
ID Austria	Has ID Austria	0.001	0.007	0.21	-0.012	0.015	0.837
Familiarity	Never heard of it	-0.031	0.01	-3.07	-0.051	-0.011	0.002**
	Heard of it, never downloaded	-0.001	0.009	-0.07	-0.019	0.017	0.947
	Used before, not active	-0.03	0.011	-2.72	-0.052	-0.008	0.007**
	Active use with credentials	0.062	0.011	5.63	0.04	0.084	<0.001***

G Linear Regression for Confidence to Drive Without Analog Driving Credentials

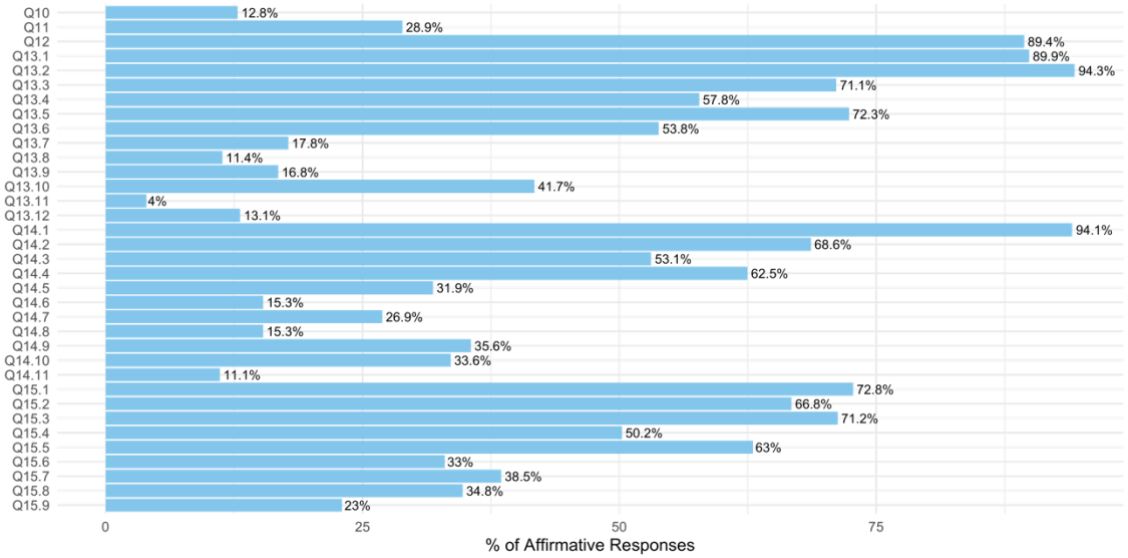
Note: Own table based on survey data (n=405).

Group	Predictor	Estimate	Std. Error	Statistic	CI Lower	CI Upper	p-value
Gender	Diverse	-0.111	0.526	-0.21	-1.145	0.922	0.832
	Male	0.222	0.272	0.82	-0.313	0.757	0.415
	Female	-0.111	0.273	-0.41	-0.646	0.425	0.685
Age	<=19	0.177	0.363	0.49	-0.536	0.89	0.626
	20-29	-0.024	0.219	-0.11	-0.454	0.407	0.914
	30-39	0.502	0.254	1.98	0.003	1.001	0.049*
	40-49	0.279	0.265	1.05	-0.243	0.8	0.294
	50-59	0.321	0.238	1.35	-0.147	0.79	0.178
	60-69	0.331	0.24	1.38	-0.141	0.804	0.168
	70-79	0.364	0.431	0.84	-0.484	1.213	0.399
	80-89	-1.951	1.18	-1.65	-4.264	0.362	0.098
Region	Rural (<=5k)	-0.001	0.166	0	-0.328	0.327	0.997
	Village (<=10k)	0.11	0.212	0.52	-0.308	0.527	0.605
	Small town (<=20k)	-0.19	0.205	-0.93	-0.593	0.213	0.355
	Medium city (<=100k)	-0.02	0.21	-0.1	-0.433	0.392	0.923
	Large city (<=1M)	0.122	0.217	0.56	-0.304	0.549	0.574
	Metropolis (>=1M)	-0.021	0.127	-0.17	-0.269	0.227	0.867
License	Has driver's license	0.084	0.143	0.59	-0.197	0.365	0.557

Group	Predictor	Estimate	Std. Error	Statistic	CI Lower	CI Upper	p-value
ID Austria	Has ID Austria	0.108	0.09	1.2	-0.069	0.286	0.231
Familiarity	Never heard of it	-0.165	0.126	-1.31	-0.412	0.083	0.191
	Heard of it, never downloaded	-0.076	0.117	-0.65	-0.305	0.154	0.517
	Used before, not active	-0.158	0.138	-1.15	-0.429	0.113	0.251
	Active use with credentials	0.399	0.136	2.93	0.132	0.665	0.003**

H Affirmative Responses (Q10-Q15)

Note: Own illustration based on survey data (n=405).



I Ordinal Logistic Regression for Belief in Functional Equivalence

Note: Own table based on survey data (n=405).

Group	Predictor	Estimate	Std. Error	Statistic	CI Lower	CI Upper	p-value
Gender	Diverse	-0.692	0.694	-1	-2.057	0.732	0.319
	Male	0.428	0.36	1.19	-0.311	1.134	0.235
	Female	0.265	0.358	0.74	-0.438	0.967	0.46
Age	<=19	-0.31	0.429	-0.72	-1.173	0.527	0.47
	20-29	0.074	0.22	0.34	-0.358	0.511	0.735
	30-39	0.268	0.274	0.98	-0.272	0.812	0.328
	40-49	-0.307	0.287	-1.07	-0.872	0.26	0.285
	50-59	0.561	0.247	2.27	0.073	1.049	0.023*
	60-69	0.481	0.252	1.91	-0.019	0.978	0.057
	70-79	-0.265	0.538	-0.49	-1.323	0.8	0.622
	80-89	-0.502	0.915	-0.55	-2.295	1.291	0.583
Region	Rural (<=5k)	-0.117	0.216	-0.54	-0.542	0.308	0.588
	Village (<=10k)	-0.102	0.27	-0.38	-0.635	0.429	0.707
	Small town (<=20k)	0.064	0.266	0.24	-0.46	0.589	0.81
	Medium city (<=100k)	0.098	0.261	0.37	-0.418	0.613	0.708
	Large city (<=1M)	0.012	0.251	0.05	-0.485	0.506	0.963
	Metropolis (>=1M)	0.045	0.157	0.29	-0.262	0.353	0.774

Group	Predictor	Estimate	Std. Error	Statistic	CI Lower	CI Upper	p-value
Familiarity	Never heard of it	0.449	0.167	2.7	0.123	0.78	0.007**
	Heard of it, never downloaded	0.588	0.146	4.04	0.303	0.876	<0.001***
	Used before, not active	-0.405	0.172	-2.35	-0.745	-0.067	0.019*
	Active use with credentials	-0.632	0.174	-3.63	-0.974	-0.291	<0.001***
License	Has driver's license	0.283	0.175	1.62	-0.062	0.627	0.106
ID Austria	Has ID Austria	-0.077	0.112	-0.69	-0.298	0.144	0.491
Confidence	Confidence (Q16)	0.27	0.074	3.67	0.126	0.415	<0.001***

J Ordinal Logistic Regression for Belief in Regulatory Equivalence

Note: Own table based on survey data (n=405).

Group	Predictor	Estimate	Std. Error	Statistic	CI Lower	CI Upper	p-value
Gender	Diverse	0.02	0.816	0.02	-1.458	2.074	0.981
	Male	-0.151	0.425	-0.35	-1.198	0.624	0.723
	Female	0.131	0.427	0.31	-0.705	0.967	0.759
Age	<=19	-1.081	0.529	-2.04	-2.151	-0.049	0.041*
	20-29	0.79	0.271	2.92	0.261	1.329	0.004**
	30-39	-0.42	0.307	-1.37	-1.024	0.186	0.171
	40-49	0.448	0.352	1.27	-0.225	1.166	0.203
	50-59	-0.079	0.278	-0.28	-0.627	0.47	0.776
	60-69	-0.211	0.274	-0.77	-0.752	0.329	0.442
	70-89	0.554	0.699	0.79	-0.816	1.923	0.428
Region	Rural (<=5k)	-0.343	0.264	-1.3	-0.859	0.18	0.194
	Village (<=10k)	-0.475	0.341	-1.39	-1.139	0.208	0.164
	Small town (<=20k)	-0.276	0.336	-0.82	-0.927	0.4	0.411
	Medium city (<=100k)	0.487	0.374	1.3	-0.213	1.268	0.192
	Large city (<=1M)	0.742	0.435	1.7	-0.05	1.689	0.088
	Metropolis (>=1M)	-0.135	0.215	-0.63	-0.557	0.287	0.53
Familiarity	Never heard of it	0.07	0.216	0.32	-0.35	0.5	0.747
	Heard of it, never downloaded	-0.033	0.195	-0.17	-0.413	0.353	0.865
	Used before, not active	0.207	0.236	0.88	-0.244	0.683	0.379
	Active use with credentials	-0.244	0.224	-1.09	-0.682	0.194	0.275
License	Has driver's license	-0.296	0.265	-1.12	-0.853	0.197	0.263
ID Austria	Has ID Austria	-0.177	0.155	-1.14	-0.488	0.123	0.254
Confidence	Confidence (Q16)	-0.162	0.096	-1.68	-0.354	0.025	0.092

K Ordinal Logistic Regression for Trust in Enforcement Authorities' Capability

Note: Own table based on survey data (n=405).

Group	Predictor	Estimate	Std. Error	Statistic	CI Lower	CI Upper	p-value
Gender	Diverse	0.852	0.685	1.24	-0.485	2.32	0.214
	Male	-0.473	0.354	-1.34	-1.226	0.218	0.181
	Female	-0.378	0.357	-1.06	-1.078	0.321	0.289
Age	<=19	-1.011	0.475	-2.13	-1.958	-0.087	0.033 *
	20-29	-0.535	0.245	-2.19	-1.048	-0.062	0.029 *
	30-39	0.318	0.302	1.05	-0.293	0.909	0.293
	40-49	-0.289	0.309	-0.93	-0.914	0.313	0.35
	50-59	0.582	0.278	2.09	0.015	1.124	0.036 *

Group	Predictor	Estimate	Std. Error	Statistic	CI Lower	CI Upper	p-value
	60-69	0.247	0.277	0.89	-0.319	0.785	0.372
	70-79	-0.078	0.53	-0.15	-1.129	0.97	0.883
	80-89	0.766	1.158	0.66	-1.504	3.036	0.508
Region	Rural (<=5k)	-0.052	0.221	-0.23	-0.483	0.383	0.814
	Village (<=10k)	-0.031	0.279	-0.11	-0.575	0.521	0.912
	Small town (<=20k)	-0.007	0.281	-0.02	-0.555	0.55	0.981
	Medium city (<=100k)	0.356	0.284	1.25	-0.197	0.923	0.211
	Large city (<=1M)	-0.115	0.266	-0.43	-0.635	0.41	0.667
	Metropolis (>=1M)	-0.152	0.162	-0.94	-0.469	0.166	0.349
Familiarity	Never heard of it	-0.117	0.168	-0.7	-0.446	0.212	0.484
	Heard of it, never downloaded	0.29	0.151	1.92	-0.006	0.587	0.055
	Used before, not active	-0.422	0.181	-2.34	-0.777	-0.068	0.019 *
	Active use with credentials	0.25	0.18	1.39	-0.103	0.603	0.165
License	Has driver's license	0.162	0.186	0.87	-0.204	0.527	0.383
ID Austria	Has ID Austria	-0.048	0.118	-0.41	-0.279	0.182	0.682
Confidence	Confidence (Q16)	0.377	0.075	5.02	0.23	0.525	<0.001 ***

L Ordinal Logistic Regression for Perceived Technical Reliability

Note: Own table based on survey data (n=405).

Group	Predictor	Estimate	Std. Error	Statistic	CI Lower	CI Upper	p-value
Gender	Diverse	0.623	0.602	1.03	-0.557	1.802	0.301
	Male	-0.056	0.316	-0.18	-0.676	0.564	0.86
	Female	-0.567	0.319	-1.78	-1.193	0.059	0.076
Age	<=19	-0.363	0.517	-0.7	-1.377	0.65	0.482
	20-29	0.425	0.22	1.93	-0.006	0.856	0.054
	30-39	0.987	0.277	3.57	0.445	1.53	<0.001***
	40-49	-0.022	0.31	-0.07	-0.629	0.585	0.943
	50-59	0.48	0.251	1.91	-0.013	0.972	0.056
	60-69	-0.01	0.262	-0.04	-0.524	0.504	0.969
	70-89	-1.496	0.695	-2.15	-2.858	-0.135	0.031*
Region	Rural (<=5k)	0.241	0.231	1.04	-0.213	0.694	0.298
	Village (<=10k)	-0.472	0.311	-1.52	-1.082	0.138	0.13
	Small town (<=20k)	-0.179	0.3	-0.6	-0.767	0.409	0.551
	Medium city (<=100k)	0.434	0.284	1.53	-0.122	0.99	0.126
	Large city (<=1M)	0.241	0.289	0.83	-0.326	0.808	0.404
	Metropolis (>=1M)	-0.265	0.178	-1.49	-0.614	0.084	0.137
License	Has driver's license	0.109	0.189	0.58	-0.262	0.479	0.565
ID Austria	Has ID Austria	-0.147	0.124	-1.18	-0.39	0.097	0.239
Familiarity	Never heard of it	0.049	0.179	0.27	-0.302	0.4	0.785
	Heard of it, never downloaded	0.136	0.162	0.84	-0.181	0.453	0.399
	Used before, not active	-0.321	0.201	-1.6	-0.715	0.072	0.11
	Active use with credentials	0.136	0.191	0.71	-0.238	0.511	0.475
Confidence	Confidence (Q16)	0.249	0.079	3.15	0.094	0.404	0.002**

M Ordinal Logistic Regression for Perceived Risk of Punishment

Note: Own table based on survey data (n=405).

Group	Predictor	Estimate	Std. Error	Statistic	CI Lower	CI Upper	p-value
Gender	Diverse	-0.125	0.646	-0.19	-1.421	1.179	0.846
	Male	-0.104	0.339	-0.31	-0.785	0.573	0.759
	Female	0.229	0.34	0.67	-0.437	0.895	0.5
Age	<=19	-1.511	0.498	-3.03	-2.506	-0.54	0.002 **
	20-29	-0.435	0.267	-1.63	-0.983	0.086	0.102
	30-39	-0.743	0.317	-2.34	-1.382	-0.123	0.019 *
	40-49	0.13	0.34	0.38	-0.548	0.799	0.702
	50-59	0.35	0.298	1.17	-0.252	0.937	0.241
	60-69	0.061	0.294	0.21	-0.534	0.638	0.836
	70-79	0.895	0.633	1.41	-0.316	2.212	0.158
	80-89	1.254	1.23	1.02	-1.156	3.665	0.308
Region	Rural (<=5k)	-0.304	0.231	-1.32	-0.758	0.148	0.188
	Village (<=10k)	-0.156	0.294	-0.53	-0.734	0.423	0.596
	Small town (<=20k)	-0.207	0.291	-0.71	-0.779	0.363	0.476
	Medium city (<=100k)	0.512	0.302	1.7	-0.075	1.112	0.09
	Large city (<=1M)	0.022	0.304	0.07	-0.573	0.621	0.942
	Metropolis (>=1M)	0.133	0.178	0.75	-0.215	0.481	0.454
Familiarity	Never heard of it	0.365	0.179	2.04	0.015	0.718	0.042 *
	Heard of it, never downloaded	-0.12	0.161	-0.75	-0.437	0.196	0.456
	Used before, not active	0.266	0.196	1.36	-0.116	0.653	0.174
	Active use with credentials	-0.511	0.195	-2.62	-0.892	-0.129	0.009 **
License	Has driver's license	-0.172	0.194	-0.89	-0.554	0.207	0.373
ID Austria	Has ID Austria	-0.059	0.125	-0.47	-0.305	0.185	0.635
Confidence	Confidence (Q16)	0.503	0.082	6.14	0.344	0.666	<0.001 ***

N Ordinal Logistic Regression for Belief in Equivalence in Non-Driving Scenarios

Note: Own table based on survey data (n=405).

Group	Predictor	Estimate	Std. Error	Statistic	CI Lower	CI Upper	p-value
Gender	Diverse	-0.412	0.611	-0.67	-1.67	0.794	0.501
	Male	0.388	0.322	1.21	-0.245	1.045	0.228
	Female	0.024	0.318	0.08	-0.6	0.648	0.939
Age	<=19	0.215	0.427	0.5	-0.628	1.055	0.615
	20-29	0.132	0.225	0.59	-0.312	0.577	0.556
	30-39	0.313	0.285	1.1	-0.246	0.875	0.272
	40-49	-0.361	0.293	-1.23	-0.939	0.213	0.217
	50-59	0.244	0.25	0.98	-0.248	0.737	0.328
	60-69	0.146	0.25	0.58	-0.348	0.639	0.56
	70-79	-0.572	0.493	-1.16	-1.556	0.395	0.245
	80-89	-0.117	0.95	-0.12	-1.979	1.746	0.902
Region	Rural (<=5k)	-0.024	0.219	-0.11	-0.453	0.405	0.914
	Village (<=10k)	-0.255	0.269	-0.95	-0.786	0.273	0.344
	Small town (<=20k)	0.235	0.262	0.9	-0.281	0.748	0.37
	Medium city (<=100k)	-0.082	0.274	-0.3	-0.62	0.454	0.764
	Large city (<=1M)	0.022	0.26	0.08	-0.49	0.534	0.933
	Metropolis (>=1M)	0.104	0.161	0.65	-0.212	0.42	0.519
License	Has driver's license	0.163	0.171	0.96	-0.173	0.499	0.339
ID Austria	Has ID Austria	-0.055	0.113	-0.49	-0.276	0.165	0.623
Familiarity	Never heard of it	0.572	0.165	3.46	0.249	0.897	<0.001***
	Heard of it, never downloaded	0.479	0.149	3.21	0.188	0.773	0.001**
	Used before, not active	-0.513	0.177	-2.9	-0.862	-0.167	0.004**
	Active use with credentials	-0.538	0.182	-2.96	-0.894	-0.182	0.003**
Confidence	Confidence (Q16)	0.258	0.075	3.45	0.112	0.405	<0.001***

O Ordinal Logistic Regression for Belief in International Recognition of ATDI

Note: Own table based on survey data (n=405).

Group	Predictor	Estimate	Std. Error	Statistic	CI Lower	CI Upper	p-value
Gender	Female	-0.405	0.36	-1.12	-1.11	0.301	0.261
	Diverse	0.999	0.691	1.44	-0.493	2.316	0.148
	Male	-0.594	0.36	-1.65	-1.282	0.176	0.099
Age	<=19	-0.189	0.454	-0.42	-1.089	0.704	0.677
	20-29	-0.111	0.247	-0.45	-0.591	0.405	0.653
	30-39	-0.108	0.309	-0.35	-0.715	0.514	0.726
	40-49	-0.151	0.32	-0.47	-0.78	0.488	0.637
	50-59	0.044	0.275	0.16	-0.492	0.607	0.873
	60-69	-0.155	0.279	-0.56	-0.699	0.413	0.578
	70-79	0.678	0.493	1.38	-0.305	1.648	0.169
	80-89	-0.008	1.125	-0.01	-2.212	2.197	0.995
Region	Rural (<=5k)	-0.061	0.227	-0.27	-0.511	0.382	0.789
	Village (<=10k)	0.252	0.297	0.85	-0.34	0.828	0.395
	Small town (<=20k)	-0.305	0.295	-1.03	-0.899	0.265	0.303
	Medium city (<=100k)	0.496	0.277	1.79	-0.054	1.037	0.073
	Large city (<=1M)	-0.214	0.289	-0.74	-0.793	0.346	0.46
	Metropolis (>=1M)	-0.169	0.173	-0.98	-0.508	0.17	0.328
License	Has driver's license	-0.033	0.182	-0.18	-0.389	0.328	0.855
ID Austria	Has ID Austria	-0.039	0.117	-0.34	-0.268	0.19	0.736
Familiarity	Never heard of it	0.562	0.173	3.24	0.222	0.902	0.001**
	Heard of it, never downloaded	0.335	0.157	2.14	0.028	0.642	0.032*
	Used before, not active	0.144	0.19	0.76	-0.231	0.515	0.447
	Active use with credentials	-1.041	0.213	-4.89	-1.459	-0.624	<0.001***
Confidence	Confidence (Q16)	0.224	0.08	2.81	0.069	0.382	0.005**