Opportunities and threats and acceptance of electronic identification cards in Germany and New Zealand

Masterarbeit

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1   Introduction

1.1   Motivation and Relevance

The rapid growth in and development of electronic identification cards has steadily replaced the use of paper identification documents. Some of the more advanced identification cards do not only comprise a magnetic stripe to transfer information but have in addition build-in radio-frequency identification (RFID) chips that can contain personal and biometric data.

Long term aspirations to move towards an e-government structure as well as the increase in terrorist attacks, have induced governments to improve and stabilise their identification systems.[1] This in turn, has also prompted the German government to announce the introduction of the electronic national identification card, as part of a resolution regarding the modernisation of federal administration passed by the federal cabinet in September 2006.[2]

Since the 1st of November 2010, the electronic identification card is available for all German citizens.[3] The introduction of this new identification document has initiated a controversial debate regarding the potential threats and opportunities the implementation and use of this card possibly implies. Proponents argue that the implementation holds a wide variety of opportunities for new business processes as well as models in both, the private and the public sector. Opponents on the other hand, are convinced that the use of the electronic identification card and its electronic identification functions provides an unprotected target area designed for identity theft.

As a result, the German public is confronted with a continuing debate of the different pros and cons associated with the use of the electronic identification card, which in turn raises the question whether and if so, to what extent its use will be implemented and accepted. Therefore, the present study provides an empirical review of the acceptance of the electronic identification card, conducted in Germany and New Zealand to outline country specific as well as common influencing factors.

1.2   Objective and Scope of the Study

The main objective of this study is to contribute to the development of acceptance research in the context of the electronic identification functions available on the German identification card. This implies in particular a thorough analysis of the possible influencing factors that are

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[1]   cf. Bennett/Lyon (2008), p. 3.
[2]   cf. Dietrich (2008), p. 7.
[3]   cf. Kempter et al. (2011), p. 14.

likely to impact the outcome of the acceptance process. Therefore, the present study comprises two empirical analyses regarding this process, implemented and conducted in Germany and New Zealand. The aim of this comparative assessment is the identification of possible influencing factors, which are fostered by country specific characteristics and hinder the success of the acceptance process.

A theoretically established structural equation model enables the prognostication and evaluation process of the user acceptance, with the objective to identify the critical influencing factors. This evaluation process is limited by two specific distinctions:

1. The electronic identification card has been introduced to Germany seven months before the implementation of this study. Therefore, the German probands have so far had little or no opportunities to obtain any experience with regard to the use of the electronic identification card.
2. There is currently no identification card existing in New Zealand that comprises the same functions as those available on the German electronic identification card. Consequently, all New Zealand test persons were presented with a hypothetical scenario with regard to the use of the electronic identification functions.

Both these particularities have a significant influence on the structure of the empirical review. Due to the probands' limited experience with the use of the electronic identification card, it is impossible to assess the actual use. Thus, the empirical review comprises an evaluation of the intended use of the electronic identification card and its functions. This in turn, prevents the implementation of a multiple-stage acceptance assessment, which could outline in what ways the continuous use of the electronic identification card could impact acceptance process in the long run. Therefore, the structural equation model is entirely based on models that allow the evaluation of the acceptance at one point in time.

Furthermore, the present study specifically focuses on international information systems research, to fulfil the requirements of an empirical, international comparison. The focus on international acceptance studies and models additionally increases the potential to achieve a higher level of validity and robustness with regard to the structural equation model.

Thus, the overall objective of the present study is the development of a structural equation model, based on a synthesis of various acceptance research models as well as the identification of critical aspects, opportunities and threats associated with the use of the electronic identification card.

1.3   Procedural Approach and Structure

The structure of the present study is subdivided into six thematic sections as illustrated in figure 1.1. Following the introduction, chapter 2 provides the fundamental knowledge necessary to comprehend the user acceptance process of technological innovations in the context of the electronic national identification card. Additionally, a comparison of Germany and New Zealand outlines differences and similarities between these two countries. The aim of this comparison is to construct a basis that helps to explain fundamental dissimilarities as well as common characteristics evident in the empirical assessment of the country specific acceptance process.

Chapter 3 presents a comprehensive overview of diverse acceptance research models as well as an evaluation of their applicability for the present study. Using the Technology Acceptance Model (TAM) as the foundation, this chapter additionally outlines the conceptualisation and structure of the research model used for the empirical analysis.[4] The implementation of all relevant constructs is then followed by the development and illustration of the hypotheses, which in turn allows for the derivation of the structural equation model.

Chapter 4 comprises the empirical review of the user acceptance with regard to the electronic identification functions. The first stage of this review includes a description of the quantitative analytical methods with particular emphasis on the quality criteria of measurement models as well as structural equation models. An illustration of the data collection and research design is then followed by a description of both samples based on the sociodemographic characteristics of the country specific probands. With the aim to validate the overall appropriateness and robustness of the research model, both, the measurement models and the structural equation model, are tested using the aforementioned quality criteria. This in turn, allows for an evaluation of the hypotheses established in chapter 3, providing an unambiguous result with regard to their confirmation or rejection. The final stage of the empirical review encompasses an interpretation and discussion of the hypotheses results.

In order to assess the opportunities and threats associated with the electronic identification functions, chapter 5 presents a critical acclaim of them. Furthermore, it provides recommendations for the successful implementation and acceptance of the electronic identification card in Germany.

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[4]   cf. Davis (1989).

The study closes with a final conclusion which summarises the most important results as well as a brief future outlook presenting potential issues that require further investigation.

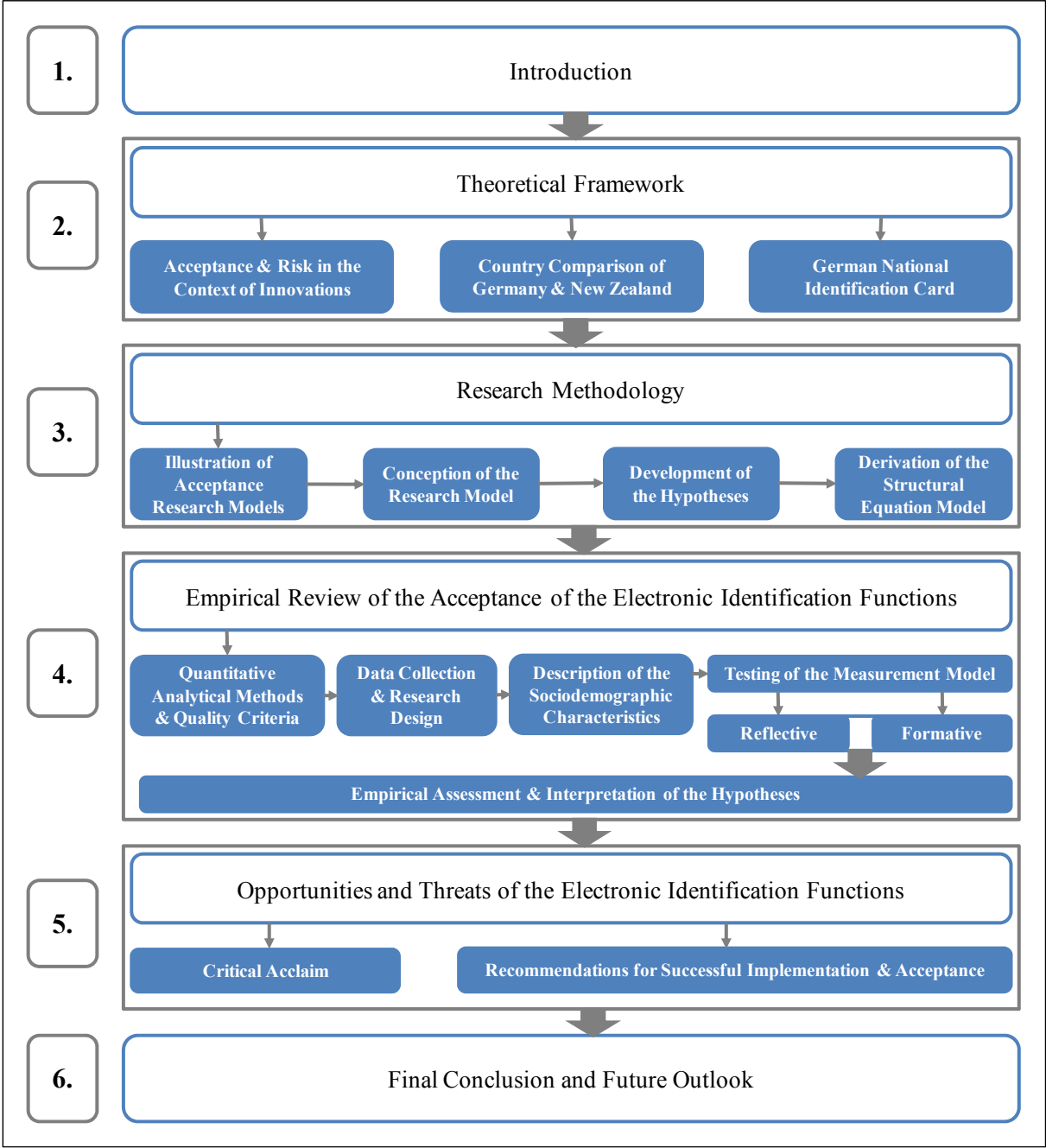| 1. | Introduction |
2.	**Theoretical Framework** Acceptance & Risk in the Context of Innovations — Country Comparison of Germany & New Zealand — German National Identification Card
3.	**Research Methodology** Illustration of Acceptance Research Models → Conception of the Research Model → Development of the Hypotheses → Derivation of the Structural Equation Model
4.	**Empirical Review of the Acceptance of the Electronic Identification Functions** Quantitative Analytical Methods & Quality Criteria → Data Collection & Research Design → Description of the Sociodemographic Characteristics → Testing of the Measurement Model (Reflective / Formative) Empirical Assessment & Interpretation of the Hypotheses
5.	**Opportunities and Threats of the Electronic Identification Functions** Critical Acclaim — Recommendations for Successful Implementation & Acceptance
6.	Final Conclusion and Future Outlook

Figure 1.1:   Structure and Procedural Approach of the Study.
Source: Own illustration.

6   Final Conclusion and Future Outlook

"Innovative technologies create new opportunities for individuals and society as a whole, but they also generate new problems; both implications are temporally and causally interdependent; one cannot be achieved without the other."[338]

The same is true for the implementation of the electronic identification card and the use of its functions. Although the use of the electronic identification functions can be regarded as the key to promote an e-business and e-government oriented society, allowing for a variety of time and cost saving opportunities, the media as well as information system analysts have outlined potential threats their use is also likely to imply.

Therefore, it was the objective of this study to develop and validate an empirical model with the aim to test the acceptance of the electronic identification functions in Germany and New Zealand. Based on the TAM and extended by additional constructs such as perceived risk and personal innovativeness, the constructed structural equation model was used as the foundation for the implementation of an online survey distributed in both countries.

Conducting the survey in two countries with similar economic and governmental structures but different requirements for security and levels of risk aversion, proved to be a valuable measure to assess and evaluate the model's influencing factors. Whereas the German probands showed very little intention to make use of the electronic identification functions, the New Zealand sample demonstrated that their intention to use them is significantly higher than that of the German sample. Moreover, both country specific samples outlined that one of the major influencing factors on the intention to use is the perceived usefulness. Therefore, the perceived usefulness of the electronic identification functions in Germany ranks below that of New Zealand in accordance with the level of their intention to use. As these results apply to all probands regardless of age, income and education, a possible explanation of this difference provides the exceptionally high influence of the perceived risk on the intention to use, evident in the German sample.

Considering that the electronic identification card is only accessible for the German probands and unheard of in New Zealand, the results of the empirical review have helped to identify two aspects that have impacted this difference. On the one hand, the diverse underlying principles with regard security and risk of each country, illustrate that a nation's general risk perception and attitude is based on deeply ingrained structures. Since New Zealanders tend to

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[338] Own translation based on a citation by Renn (1993), p. 67.

have an overall lower risk perception compared to people in Germany, they do not only consider the possible risk and threats implied by the use of the electronic identification functions but also the opportunities associated with them. On the other hand, the enormous difference with regard to the intention to make use of the functions can be explained by the influence of the media. As the controversial debate about the implementation of the electronic identification card was only observable for the German probands, the New Zealand test persons were not confronted with any negative information regarding the use before the online survey had been carried out.

Consequently, the successful implementation and acceptance of the electronic identification card in Germany can only be achieved, if the government provides the public with comprehensive information that clearly outlines how to avoid potential safety and security threats. Additionally, all potential users should be informed of the opportunities and benefits implied by the adoption and use of the electronic identification functions. This includes matters such as the access to all governmental enquiries and applications at any time of the day as well as electronic, advanced banking transactions. Considering the cost and time reductions for the private and the public sector, the government as well as private businesses should subsidise this informing implementation process.

Overall, the empirical results demonstrate that the introduction of the electronic identification card and the debate regarding its use, have increased the level of uncertainty as well as the negative perception of potential threats among the German public. To reverse and lessen this effect, further research of possible influencing factors will provide businesses and governments with initiatives how to improve the acceptance process of the electronic identification card. This in turn is likely to enable the promotion of the opportunities and allay the threats associated with the use of the electronic identification card.