

# **Adaption of a Maturity Model for Electronic Invoicing Processes**

## **Masterarbeit**

zur Erlangung des akademischen Grades „Master of Science (M.Sc.)“ im Masterstudiengang  
Wirtschaftswissenschaft der Wirtschaftswissenschaftlichen Fakultät der  
Leibniz Universität Hannover

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Hannover, den 30. September 2012

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# 1 INTRODUCTION

## 1.1 MOTIVATION

*“The question is not whether information technology will have significant impact on a company’s competitive position; rather the question is when and how this impact will strike.”*

Michael E. Porter

The ongoing trend towards globalization and internationalization forces organizations to constantly explore new opportunities that help them maintain or enhance their productivity and profitability in order to prevail against domestic as well as global competitors. The recent economic and financial crisis placed an even stronger focus on activities that help organizations achieve competitive advantages, increase efficiency and identify cost-saving potentials. At the same time, organizations try to keep low value-adding activities such as administrative processes to a minimum. In this context, it has become essential to review “traditional”, low value-adding business processes and structures and, if necessary, to reorganize them, not least using the latest technologies.

The invoicing process represents one of those traditional business processes that do not create value or contribute to the ultimate product or service; however, the invoice is an indispensable part of the trade process between two business partners, being used for accounting and book-keeping purposes or to satisfy tax requirements. The electronification and automation of the invoicing process – i.e. the exchange of invoicing documents by electronic means excluding human intervention – is expected to generate benefits such as time and cost savings along the supply chain. The European Commission (EC) highlighted the importance of electronic invoicing, designating it as “one of most important sources of productivity growth in Europe”.<sup>1</sup> In fact, the dematerialization and automation of invoice processes offer organizations a good opportunity to trim down costs and expenses, optimize administrative tasks, but also enhance efficiency and productivity.

Despite the obvious advantages of automating invoicing processes, the uptake of electronic invoicing in the European Union (EU) has been modest up to now. Organizations are discouraged by the perceived complexity of electronic invoicing, with various implementation challenges additionally slowing down its broad adoption and use. Organizations therefore need tools and methods helping them overcome existing barriers and showing the path to a successful implementation of electronic invoicing processes.

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<sup>1</sup> Penttinen, Tuunainen (2009), p. 1

## 1.2 OBJECTIVE OF THE MASTER'S THESIS AND FOCAL QUESTIONS

The invoicing process constitutes a part of organizational business processes or “actions that firms engage in to accomplish some business purpose or objective”.<sup>2</sup> With a changing business environment, the need for reviewing, redesigning and improving existing business processes increases. Process improvement however often involves the reengineering of organizational IS/IT (Information Systems/Information Technology) and the change of people’s behavior. Consequently, there are many aspects and factors that affect business process redesign and possibly prevent innovation and improvement, making the journey towards business process excellence challenging.

One tool designed to assist organizations in the improvement of business processes, their management as well as reengineering is represented by maturity models.<sup>3</sup> Business process maturity models can be used for the assessment of the actual capability level, comparing the maturity of an organization’s practices and activities against an industry standard, and for the achievement of a desired capability level, helping “the organization set priorities for improving its product/service operations using a proven strategy and developing the capability required to execute its business strategy”.<sup>4</sup>

It is estimated that hundreds of maturity models addressing different application domains and areas of interest have been proposed by researchers and practitioners in the last two decades.<sup>5</sup> However, there is no maturity model that addresses the implementation of electronic invoicing processes, and the applicability of existing business process maturity models to electronic invoicing as a business process is limited.

Thus, the objective of this work is the adaption of an Electronic Invoicing Maturity Model (EIMM). In this context, it must be clarified, whether the development of a new maturity model specifically for electronic invoicing processes is useful and whether such a model can provide organizations assistance in the implementation process of electronic invoicing.

In the course of the Master’s thesis, the following research questions will be clarified:

*RQ1: Can the implementation of electronic invoicing processes in organizations be facilitated by an Electronic Invoicing Maturity Model?*

*RQ2: Which components must be included in an Electronic Invoicing Maturity Model?*

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<sup>2</sup> Ray, Barney, Muhanna (2004), p. 24

<sup>3</sup> Cf. Röglinger et al. (2012), p. 8

<sup>4</sup> Lee et al. (2007), p. 385; van Looy et al. (2011), p. 1133

<sup>5</sup> Cf. Pöppelbuß, Röglinger (2011), p. 1

The answering of these research questions is approached theoretically: the essential EIMM components and its fundamental structure are derived from critical success factors and barriers to implementation identified through literature reviews rather than the observation of the electronic invoicing implementation process in practice. Nevertheless, the adaption of the EIMM contains a non-theoretical component, including comments on the model's usefulness and advices on its architecture and elements from electronic invoicing practitioners.

### 1.3 METHODOLOGY AND STRUCTURE OF THE MASTER'S THESIS

Overall, the Master's thesis is divided into five chapters, with the first chapter explaining the content of the Master's thesis, its objective and the relevance of the topic. Chapter two provides the theoretical background and definitions related to electronic invoicing, its use in the European Union as well as its benefits and implementation barriers.

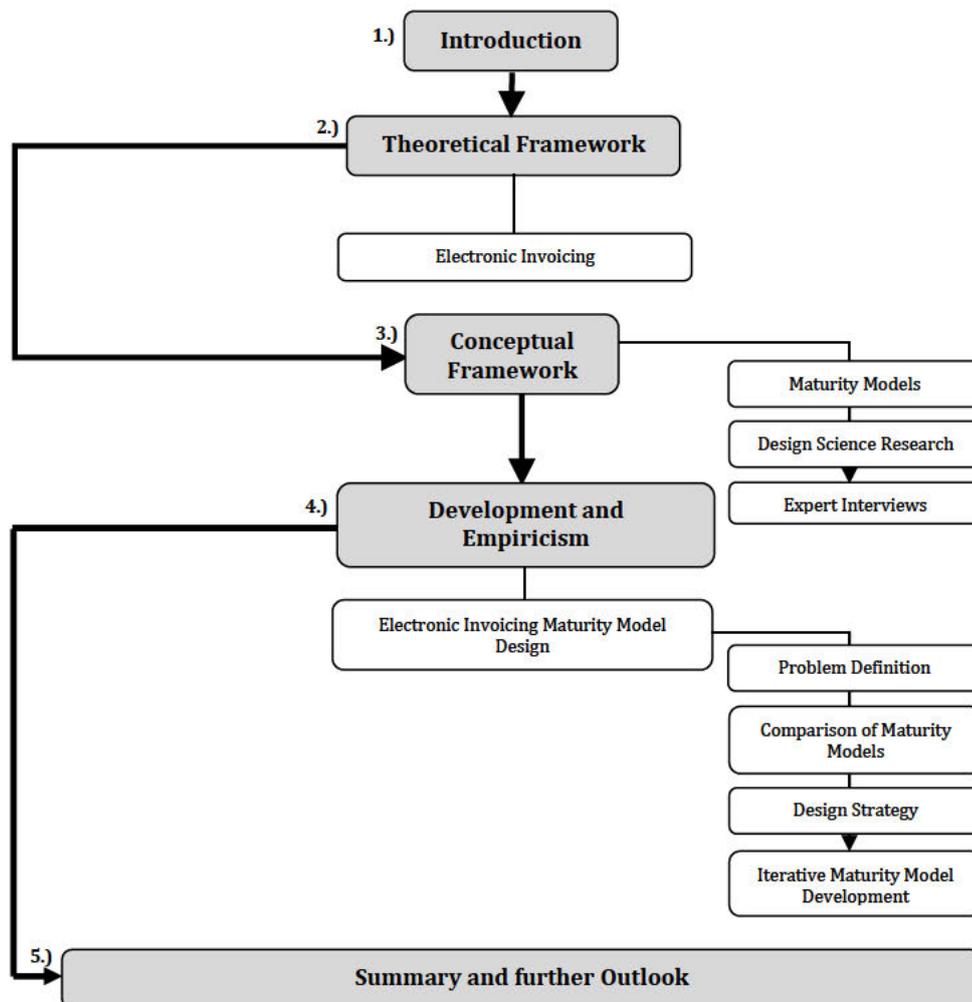


Figure 1: Course of the study  
Source: own illustration

The intention of the third chapter is to provide a conceptual framework that creates a basic understanding of the maturity model concept and presents different techniques and methodologies used to develop IT artifacts and maturity models in practice. An important part of the development methodology represents the expert interview, which is hence described generically and in detail.

The fourth chapter represents the main part of this Master's thesis. Based on the theoretical insights of the previous chapters, it describes the development process of the EIMM and presents the resulting maturity model.

This Master's thesis ends in the fifth chapter with a summary of the results, limitations and a prospect on further research.

## 5 SUMMARY

### 6.1 RESULTS AND LIMITATIONS

The overarching research questions of this Master's thesis were whether a maturity model for electronic invoicing would facilitate the implementation of electronic invoicing processes in organizations and how this maturity model would look like. To answer these questions, the theoretical background of electronic invoicing was provided, including main electronic invoicing terms and definitions, the legal framework, different models of electronic invoicing as well as its potential benefits and implementation challenges.

In a further step, the conceptual background for developing maturity models was provided. This included a description of the maturity model concept, followed by the maturity model design methodology, placing it in the context of Design Science Research. The description of the methodology was completed by an outline of basic design principles for maturity models and expert interviews (their types, conducting and evaluation) as an instrument to improve and validate newly designed maturity models.

The three research questions introduced at the beginning of the Master's thesis were largely answered in the following section, where the main results of seven interviews conducted with experts from European organizations were presented and the suggestions regarding the structure of the EIMM made by the experts were transferred to the model. The first question

*RQ1: Can the implementation of electronic invoicing processes in organizations be facilitated by an Electronic Invoicing Maturity Model?*

was answered directly by the experts, considering the EIMM to be a helpful and valuable instrument that demonstrates the complexity of the implementation process (cf. chapter 4.4.2). The experts also contributed to the answer of the second research question

*RQ2: Which components must be included in an Electronic Invoicing Maturity Model?*

commenting on the importance of five interdependent factors, which were identified through an extensive literature review, and the necessity to include these factors in the EIMM. The main components as well as the structure of the EIMM at the current stage of research are described in chapter 4.5.

However, there are a number of limitations. First, the development process of the EIMM, which was performed in accordance with Becker's et al. procedure model for the design of maturity models, could not be completed due to limited time: procedure steps "Conception of transfer

and evaluation”, “Implementation of transfer media” as well as “Evaluation” must be performed prior to deciding what happens with the model (rejection, reiteration, modification etc.). Second, the testing of the model at the end of the iterative EIMM development is partial, referring only to the validation of model’s structure, domain components and sub-components as well as maturity levels, excluding the testing of Good Practices for usefulness, quality and effectiveness. Finally, although the experts consider the EIMM to be able to facilitate the implementation of electronic invoicing process in organizations, no statements can be made at this stage about the universality and generalizability of the EIMM’s application, i.e. whether it can help organizations adopt electronic invoicing regardless of which industry sector they operate in, or whether adjustments of the model to a specific branch must be made before its application.

## 6.2 FURTHER STUDIES

As mentioned above (cf. chapter 6.1), the EIMM development process could not be fully performed due to limited time. However, the concept of how the results can be transferred to the target audience, the implementation of a transfer media as well as the evaluation of a new model with respect to its utility, quality and effectiveness constitute essential process phases in the development of maturity models.<sup>222</sup> Therefore, future research must include the described process steps as is suggested by Becker et al.

For the evaluation of the EIMM, its application in organizations intending to implement electronic invoicing is considered to be the most suitable method: it can be assumed that the model’s application in practice would reveal further domain components, sub-components and Good Practices that have not been and could not be considered from the theoretical perspective. This assumption is confirmed by the fact that there are already indications, pointing out that the domain component “Strategy” incorporates further sub-components: the list of Good Practices corresponding to the domain component “Strategy” includes several improvement measures and activities, which could not be linked to “Responsibility and Accountability”, “Cost-Benefit-Analysis” or “Policies and Legal Requirements”. However, these Good Practices are considered to be important in the context of strategic decisions related to the electronic invoicing implementation process.

Testing the EIMM in practice should additionally focus on the applicability of the model across different industry sectors and the necessary adjustments of the model to ensure that it can be used cross-sectorally.

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<sup>222</sup> Cf. Hevner et al. (2004), p. 85; de Bruin et al. (2005), p. 8; Becker et al. (2009), p. 214