

OLIVER LUKASON

Characteristics of firm failure
processes in an international context



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School of Economics and Business Administration, University of Tartu, Estonia

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LIST OF AUTHOR'S PUBLICATIONS AND CONFERENCE PRESENTATIONS

I. Chapters in monographs

1. **Lukason, O.** (2013) Firm bankruptcies and violations of law: analysis of different offences. In: Vissak, T., Vadi, M. (Eds.) *(Dis)honesty in Management*, Emerald Group Publishing Limited, pp. 127–148.
2. **Lukason, O.** (2012) Firm failure patterns: the interconnection of failure reasons and financial data. In: Ginevicius, R., Rutkauskas, A.V., Stankeviciene, J. (Eds.) *Business and Management*, Latvian University of Agriculture, pp. 108–113.
3. **Lukason, O.** (2012) Reasons of firm failures: example of Estonian agriculture, forestry and fishing industries in 2002–2009. In: Zvirbule-Berzina, A. (Ed.) *Economic Science for Rural Development: Rural Business and Finance*, Vilnius Gediminas Technical University Press “Technika”, Vol. 28, pp. 80–84.
4. **Lukason, O., Masso, J.** (2010) Performance of selected Estonian firms financed with start-up grant: ability to follow plans and grant usage efficiency. (2010) In: Raudjärv, M. (Ed.) *Discussions on Estonian Economic Policy*, Berliner Wissenschafts-Verlag, Vol. 18, pp. 253–265.
5. **Lukason, O.** (2010) Using publicly available data for building credit scoring models: the case of Estonia. In: Sander, P. (Ed.) *Financing of companies and private persons: theory, issues and Estonian evidences*, Tartu University Press, pp. 133–143.
6. **Varblane, U., Jüriado, R., Lukason, O.** (2009) Real Estate Bubble Bursts and Government Policy during Crisis: Examples of Estonia, Ireland, Sweden. In: Raudjärv, M. (Ed.) *Discussions on Estonian Economic Policy*, Berliner Wissenschafts-Verlag, Vol. 17, pp. 373–388.
7. **Lukason, O.** (2006). Ettevõtete ebaedu modelleerimine Eesti jae- ja hulgi-kaubandusettevõtete näitel diskriminantanalüüsi kasutades. In: Sander, P., Raudsepp, V. (Eds.) *Ettevõtte finantsjuhtimine: regionaalaspekt*, Tartu University Press, pp. 226–239.

II. Articles in international journals

1. **Lukason, O., Laitinen, E.K., Suvas, A.** (2016) Failure processes of young manufacturing micro firms in Europe. *Management Decision*, Vol. 54, No. 8, 1966–1985.
2. **Lukason, O., Laitinen, E.K.** (2016) Failure processes of old manufacturing firms in different European countries. *Investment Management and Financial Innovations*, Vol. 13, No. 2, 310–321.
3. **Lukason, O., Lukason, T., Varblane, U.** (2016) Firm failure causes in the forest sector: An analysis of Estonian bankrupted firms. *Baltic Forestry*, Vol. 22, No. 1, pp. 175–180.

4. **Lukason, O., Vissak, T.** (2016) Interconnecting financial performance and internationalization: A case of a rare earth metal producer. *REM – Revista Escola de Minas*, Vol. 69, No. 1, pp. 67–74.
5. **Lukason, O., Laitinen, E.K., Suvas, A.** (2015) Growth patterns of small manufacturing firms before failure: interconnections with financial ratios and nonfinancial variables. *International Journal of Industrial Engineering and Management*, Vol. 6, No. 2, pp. 59–66.
6. **Lukason, O., Hoffman, R.C.** (2015) Firm failure causes: a population level study. *Problems and Perspectives in Management*, Vol. 13, No. 1, pp. 45–55.
7. **Lukason, O., Hoffman, R.C.** (2014) Firm bankruptcy probability and causes: an integrated study. *International Journal of Business and Management*, Vol. 9, No. 11, pp. 80–91.
8. **Laitinen, E.K., Lukason, O., Suvas, A.** (2014) Are firm failure processes different? Evidence from seven countries. *Investment Management and Financial Innovations*, Vol. 11, No. 4, pp. 212–222.
9. **Laitinen, E.K., Lukason, O.** (2014) Do firm failure processes differ across countries: evidence from Finland and Estonia. *Journal of Business Economics and Management*, Vol. 15, No. 5, pp. 810–832.
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19. **Teral, A., Lukason, O., Sander, P.** (2012) The Influence of Financial Performance of Payout Policy: A Study of Estonian Firms. *Discussions on Estonian Economic Policy*, Vol. 20, No. 1, pp. 247–259.
20. **Sander, P., Lukason, O., Kask, K.** (2011) Discount rate for government projects: the case of government real estate in Estonia. *Discussions on Estonian Economic Policy*, Vol. 19, No. 1, pp. 212–227.
21. **Lukason, O., Ukrainski, K., Varblane, U.** (2011) Economic benefit of maximum truck weight change for Estonian forest sector. *Discussions on Estonian Economic Policy*, Vol. 19, No. 2, pp. 87–100.

III. Other research articles

1. **Lukason, O., Varblane, U.** (2009). Energiasääst majandussurutist leevendava vahendina. *Riigikogu Toimetised*, No. 19, pp. 44–49.

IV. Conference publications

1. **Teral, A., Lukason, O., Sander, P.** (2012) Finantstulemuste mõju väljamaksepoliitikale Eesti ettevõtetes. In: *Eesti majanduspoliitilised väitlused*, pp. 75–79.
2. **Sander, P., Lukason, O., Kask, K.** (2011). Diskonteerimismäärade leidmine riiklikele projektidele Eesti riigi kinnisvara näitel. In: *Eesti majanduspoliitilised väitlused*, pp. 78–82.
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5. **Lukason, O.** (2009) Using Public Data for Building Credit Scoring Models: the Case of Estonia. In: *Management Theory and Practice: Synergy in Organizations*, pp. 1–7.
6. **Lukason, O.** (2009) Using public and private data for building credit scoring models of individuals. In: *Recent Advances in Retailing & Services Science*, pp. 1–15.
7. **Lukason, O.** (2009) Economic Impact of Firm Reorganization in Estonia. In: *Accounting and Performance Management Perspectives in Business and Public Sector Organizations*, pp. 59–68.
8. **Varblane, U., Jüriado, R., Lukason, O.** (2009) Kinnisvarakriisid ja valitsuse poliitika – Eesti, Iirimaa ja Rootsi näited. In: *Eesti majanduspoliitilised väitlused*, pp. 118–122.

V. Textbooks

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2. **Reiljan, A., Kaseorg, M., Lukason, O.** (2004) *Excel ettevõtte majanduslike seoste analüüsil ja lahendamisel*. Tartu: Tartu Ülikooli Kirjastus, 134 pp.

VI. Editing

1. **Lukason, O.** (Ed.). (2008) *Tagasi koju?: konverents eestlaste repatrieerumisest*. Tartu: Korporatsioon Rotalia, 92 pp.

VII. Handbook articles

1. **Lukason, O.** (2009) Ettevõtte saneerimine. *Äripäeva finantsjuhtimise käsiraamat*. 16 pp.
2. **Lukason, O.** (2009) Finantsanalüüsi rakendamise näide. *Äripäeva finantsjuhtimise käsiraamat*. 7 pp.
3. **Lukason, O.** (2008) Finantsanalüüsi meetodid ja nende seosed. *Äripäeva finantsjuhtimise käsiraamat*. 26 pp.
4. **Lukason, O.** (2008) Finantsanalüüsi andmeallikad ja nende kasutamine. *Äripäeva finantsjuhtimise käsiraamat*. 5 pp.
5. **Lukason, O.** (2008) Ettevõtte finantsraskused. *Äripäeva finantsjuhtimise käsiraamat*. 20 pp.
6. **Lukason, O.** (2008) Finantsanalüüs ja selle eesmärgid. *Äripäeva finantsjuhtimise käsiraamat*. 3 pp.

VIII. Conference presentations

1. **Lukason, O.** Firm failure patterns: the interconnection of failure reasons and financial data. *7th International Conference on Business and Management; Vilnius, Lithuania; 10–11 May 2012*.
2. **Lukason, O.** Pre-bankruptcy financial performance of firms: do size and industry matter? *2nd International Conference of Economics, Trade and Development; Bangkok, Thailand; 7–8 April 2012*.
3. **Lukason, O.** Using Public Data for Building Credit Scoring Models: the Case of Estonia. *4th International Conference Management Theory and Practice: Synergy in Organizations; Tartu, Estonia; 3–4 April 2009*.
4. **Lukason, O.** Economic Impact of Introducing Reorganization Law in Estonia. *7th International Conference on Accounting and Finance in Transition, European & Asian Experience and Public Policy Considerations; London, United Kingdom; 23–25 July 2009*.
5. **Lukason, O.** Economic Impact of Firm Reorganization in Estonia. *Accounting and Performance Management Perspectives in Business and Public Sector Organizations Conference; Tartu, Estonia; 8–9 May 2009*.
6. **Lukason, O.** Using Public and Private Data for Building Credit Scoring Models of Individuals. *16th Recent Advances in Retailing & Services Science Conference; Niagara Falls, Canada; 6–9 July 2009*.

INTRODUCTION

List of papers

This thesis is based on four original papers listed as follows and co-authored by the thesis author:

Study 1. Laitinen, E.K., **Lukason, O.** (2014) Do firm failure processes differ across countries: evidence from Finland and Estonia. *Journal of Business Economics and Management*, Vol. 15, No. 5, pp. 810–832.

Study 2. **Lukason, O.**, Laitinen, E.K., Suvas, A. (2016) Failure processes of young manufacturing micro firms in Europe. *Management Decision*, Vol. 54, No. 8, 1966–1985.

Study 3. **Lukason, O.**, Laitinen, E.K. (2016) Failure processes of old manufacturing firms in different European countries. *Investment Management and Financial Innovations*, Vol. 13, No. 2, 310–321.

Study 4. **Lukason, O.**, Hoffman, R.C. (2015) Firm failure causes: a population level study. *Problems and Perspectives in Management*, Vol. 13, No. 1, pp. 45–55.

In the thesis, all papers together are referred to as “the Studies”.

Motivation for the research

The choice of research topic for the thesis is motivated by multiple considerations, which have been noted as follows¹.

Firm failure is a perpetual topic because as long as firms have existed they have also failed. Therefore, the research domain continues to attract the interest of numerous scholars (see e.g. recent literature reviews by Sun et al. 2014, Kücher et al. 2015, Amankwah-Amoah 2016). Despite substantial interest from the scientific community, different streams of failure research remain unbalanced and some domains (such as failure prediction models) receive remarkably more attention than others (see e.g. Pretorius 2008, Kücher et al. 2015). When the topic of firm failure can be traced back to classical economic theories (Mellahi and Wilkinson 2004) and earlier studies applying financial ratios for analysing failure appeared already in the 1930s (Horrigan 1968), failure research started to develop quickly about half a century ago and many pioneering studies originate from this period (e.g. Beaver 1966, Altman 1968, Argenti 1976). Amankwah-Amoah (2016: 3388) has noted about the failure research that it “has become increasingly complex and fragmented across multiple social science disciplines”. While on the one hand, spanning numerous domains of literature proves the universal importance of failure studies, on the other hand, it also makes the composition of a literature review more challenging.

There are different options for classifying the literature on firm failure. For instance, Pretorius (2008: 411) outlines a classification based on the context of studies, dividing them to four groups: “causes and preconditions, signs and prediction, recovery, cognition and learning”. The domain of firm failure causes suffers from a lack of theoretical consensus (Mellahi and Wilkinson 2004, Amankwah-Amoah 2016). Moreover, Mellahi and Wilkinson (2004: 22) have noted: “continued accumulation of fragmented and contradictory findings adds little to researchers’ understanding of organizational failure”. So far there are only a few large-population studies available about the causes of firm failure (e.g. Hall 1992, Baldwin et al. 1997²) and the findings in the literature review by Amankwah-Amoah (2016) indicate that the interaction of internal and external causes of failure should be studied more thoroughly. Intriguingly, quite a recent study by Ooghe and de Prijcker (2008: 224) noted: “an all-embracing approach that relates the causes of bankruptcy to the characteristics of the company and to the financial symptoms of distress has never been applied”. Therefore, studying the interconnections of financial and non-financial variables in the firm failure process could be an innovative avenue of research. More

¹ In this section, the emphasis on previous literature is only brief and a more detailed overview of it will be provided in Chapter 1. Also, this thesis focuses on a specific type of firm failure, namely bankruptcy, which should be kept in mind when following the context of the thesis (see Chapter 1.1 for the choice of specific failure type).

² See sample sizes in Chapter 1.2.2.

generally, the underdevelopment of the research area could partly be caused by different notions of the term “failure” (see Chapter 1.1).

An important deficiency in the available knowledge about firm failure is the lack of international comparisons of failed firms (Laitinen et al. 2014). There are studies³ available that compare (non-)financial variables for failed and non-failed firms in different countries. The inter-country comparison has been elaborated more in the bankruptcy prediction domain, where some studies (e.g. Laitinen and Suvas 2013, Altman et al. 2016) have recently been published, which encompass a large number of different countries and develop universal bankruptcy models. These models show that pre-failure values of financial variables can vary from country to country (see Laitinen and Suvas 2013, Altman et al. 2016), which in turn can be caused by the presence of different firm failure processes.

In the available empirical studies⁴ about different facets of firm failure processes, there is proportionally more focus on the USA and Western European countries, leaving former socialist countries (especially the new European Union member states from Eastern Europe) understudied. Also, past studies about firm failure processes have favoured medium- or large-sized old firms, leaving micro- and small-sized, but also young firms in all size categories, understudied (see e.g. samples used in Hambrick and D’Aveni 1988, D’Aveni 1989, Laitinen 1991, Moulton et al. 1996).

The study of firm failure processes could lead to important implications for practitioners and policy makers. The similarity or dissimilarity of the pathway to firm failure in different environments can offer important input for applying or composing bankruptcy prediction models. When they know the specifics of different failure pathways, managers can more efficiently plan a turnaround and apply the necessary countermeasures, or ideally, avoid problems altogether. The population level knowledge of firm failure causes is important for various stakeholders, such as entrepreneurs, trustees and judges. Last but not least, the results of the study could help policy makers. For instance, recent European Union policies are guided towards improving early warning systems for firms and restructuring opportunities (see European Commission 2012). Therefore, the understanding of how firms fail in different European countries enables both legislative and executive powers to design and implement regulations more efficiently either at the national or supranational level.

Therefore, this thesis focuses on the underdeveloped areas in firm failure research, aiming to fill several important gaps in the available knowledge. The aspects emphasized in this chapter will be elaborated upon further in the remainder of the introduction, and more specifically, in the other chapters of the thesis.

³ For instance, the model developed in Lussier (1995) based on US data has been tested in several different countries, e.g. in Croatia in Lussier and Pfeifer (2001) and in Chile in Lussier and Halabi (2010).

⁴ See the countries used in previous empirical studies in Table 1 in Chapter 1.2.1.

Research objective and tasks

The objective of the thesis is to provide an in-depth understanding of the characteristics of firm failure processes in an international context by using financial and non-financial variables.

In the thesis, the firm failure process⁵ is considered a **pathway** in a firm's lifecycle ending with bankruptcy, which using non-financial variables depicts **why** and financial variables **how** a firm becomes bankrupt⁶. The lifecycle can be firm's whole lifetime or a specified part in the end of it.

The terms "financial" and "non-financial" in the thesis mark the origin of specific variables. Financial variables are mainly⁷ financial ratios and growth rates, which have been calculated using different variables originating from balance sheets and income statements. Financial variables have been calculated from consecutive pre-bankruptcy annual reports, thus their development in time can be studied⁸. Non-financial variables in this thesis are insolvency causes, which mainly⁹ originate from the information provided by trustees to court. Non-financial variables in this thesis are nominal variables indicating the presence of a certain cause of failure without noting when it emerged or its duration¹⁰. The primary focus in the thesis is on modelling the failure processes using financial variables, leaving the usage of non-financial variables as secondary. In the objective, processes is written in plural, as past studies (e.g. D'Aveni 1989, Laitinen 1991) have shown that firm failure occurs due to different processes.

As the thesis is based on four Studies, each of them focusing on failure processes in a specific context, they must be presented in a common framework. Consequently, the following research tasks have been set for the thesis:

1. Synthesize past literature concerning the definitions of failure and failure processes. (Chapters 1.1 and 1.2.1)
2. Synthesize the theoretical foundations, study designs and results of past studies researching the characteristics of failure processes, including the behaviour of financial and non-financial variables in the failure processes. (Chapters 1.2.1, 1.2.2, 1.2.3)
3. Outline research gaps based on previous literature. (Chapters 1.2.1, 1.2.2, 1.2.3)
4. Outline research (sub-)questions to be answered in the thesis based on the literature review, research gaps and the Studies. (Chapter 1.3)

⁵ In the following text, „failure process“ is used instead of „firm failure process“.

⁶ The description of failure process as a “pathway” relies exactly on the definition of Crutzen and van Caillie (2008: 301), where the integrative business failure process model composed showed: „in a global dynamic way, why (causes) and how (sequence of events) companies fail”.

⁷ Studies 1, 2 and 3 apply financial ratios and growth rates, but in Study 1 two size variables have also been used in modelling failure processes.

⁸ Such approach has been named „dynamic“ in Crutzen and van Caillie (2008: 291).

⁹ See Chapter 2.2 explaining the origin of failure causes in the thesis.

¹⁰ Such approach has been named „static“ in Crutzen and van Caillie (2008: 291).

5. Set up an appropriate study design to find answers to the outlined research (sub-)questions. (Chapter 2)
6. Present the empirical Studies to find answers to the research (sub-) questions and fill the research gaps detected. (Chapter 3)
7. Discuss and summarize the answers to research (sub-)questions, also outlining their contribution to the literature, limitations, future research directions and implications. (Chapter 4)

The research tasks set for the thesis do not include those tasks (e.g. data collection, processing and statistical analysis), which have already been fulfilled in the Studies. The thesis research tasks mainly facilitate the presentation of the four Studies in a common framework.

Thesis structure and context of the studies

This thesis is composed of an introduction and four main chapters. The introduction includes the following sections. The “Motivation for the research” outlines briefly why it is important to study the chosen topic. “Research objective and tasks” outlines what is the author’s aim in the thesis and what tasks are necessary to achieve the aim. “Thesis structure and context of the studies” outlines which chapters and what content is included in the thesis, and also, what the main role is of the four Studies included in the thesis. “Novelty of the thesis” briefly notes what is novel in each of the Studies included in light of existing literature. In addition, a detailed contribution will be outlined in Chapter 1, where the research gaps will also be presented, and in Chapter 4, where the results will be presented and discussed. The “Contribution of individual authors” outlines what role the thesis author had in composing each of the Studies.

The introduction is followed by Chapter 1 focusing on a review of the literature dealing with different aspects of firm failure processes. The thesis author intentionally does not apply the phrase “theoretical” for Chapter 1, as many streams of failure research (e.g. failure prediction) are dominated by empirical studies which are not grounded in any theory and/or do not seek to develop one. Chapter 1.1 focuses on the term “failure” and on one specific type of failure, namely bankruptcy (permanent insolvency declared at court) selected as the central definition in the thesis. Chapter 1.2 outlines previous literature on failure processes and is disaggregated to three sub-chapters. Chapter 1.2.1 considers the definition of “failure process” and previous empirical studies about failure processes. Chapter 1.2.2 considers causes in failure processes and Chapter 1.2.3 financial variables in failure processes. In Chapters 1.2.1, 1.2.2 and 1.2.3, research gaps will also be outlined. The topics considered in Chapters 1.1 and 1.2 have also been elaborated in the Studies, and therefore, the main focus in the thesis is on presenting the relevant topics in an integrated and concentrated form, by not repeating the literature reviews of the Studies. In

Chapter 1.3, based on the review of literature and research gaps, the research questions (5) and research sub-questions (18) for the thesis will be presented.

Chapter 2 outlines which data and methods are applied to achieve the objective of the thesis and answer the research (sub-)questions. All research (sub-)questions in the thesis will be addressed using (large) datasets, covering multiple countries in Studies 1, 2 and 3. All four Studies included in the thesis apply different statistical analysis tools. Studies 1, 2 and 3 apply financial variables originating from the annual reports of firms. Non-financial variables (failure causes) have been applied in Studies 1 and 4. All firms in the Studies have become bankrupt; that is, their permanent insolvency has been established at court. All the specific details of the thesis study design can be further followed in Chapter 2. In Chapter 3, the four Studies included in the thesis will be presented.

The thesis ends with Chapter 4 winding up the main results of the thesis. Chapter 4.1 “Discussion of the research questions” presents what results concerning each research (sub-)question were achieved and discusses them in the light of existing literature. In Chapter 4.1, the presentation of very detailed results is intentionally avoided, as they can be observed in the Studies. This is followed by Chapter 4.2 focusing on the implications of the thesis, Chapter 4.3 on limitations, Chapter 4.4 on future research directions and Chapter 4.5 “Conclusion of the thesis” shortly summarizes the most important findings of the thesis.

The role of the four Studies included in the thesis can be seen in Figure 1. The pilot Study 1 applies both financial and non-financial variables to model failure processes based on matched Estonian and Finnish firms. Therefore, Study 1 makes it possible to identify whether the failure processes of the same kinds of firms differ across two countries and exactly how. As shown in Figure 1, pilot Study 1 is followed by two sets of studies. Studies 2 and 3 focus on modelling failure processes using only financial variables. Manufacturing firms from different European countries have been included, and Study 2 focuses on young firms, while Study 3 on old firms. Studies 2 and 3 are methodologically more advanced than pilot Study 1, and are based on a large dataset of firms. In Study 1, the dataset was small (70 firms from each of the countries) and dispersed over multiple sectors. Unlike Study 1, where only factor analysis was used, in Studies 2 and 3, both factor and cluster analyses were used. In addition, the set of variables applied in Studies 2 and 3 is larger than in Study 1. Study 4 considers only failure causes and uses a large dataset of Estonian firms. In Study 4, the whole population of publicly available court judgements from the period 2002–2009 has been applied. Unlike Study 1, which interconnects failure causes with failure processes detected by using financial variables, Study 4 concentrates on the interconnection of failure causes with firm age and size. As three out of four of the Studies involve the international comparison of failure processes, the heading of the thesis also includes the phrase “in an international context”.

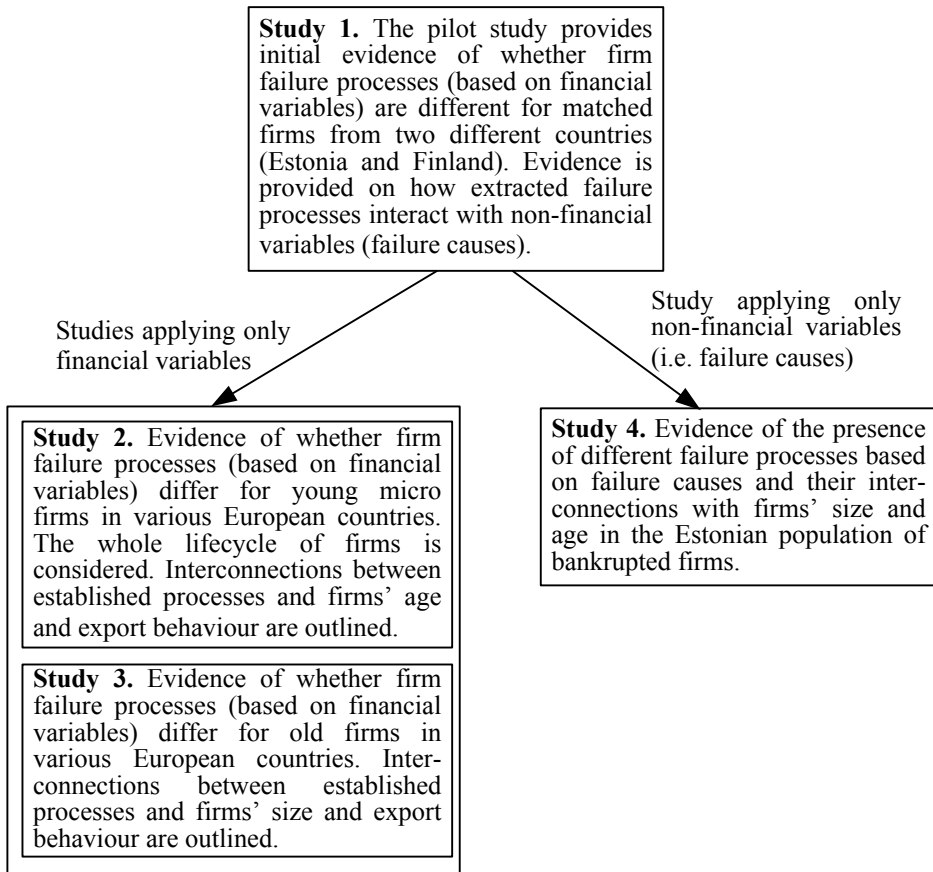


Figure 1. The role of the four Studies in the thesis (compiled by the author)

Novelty of the thesis

This section focuses on the novel aspects that the thesis offers in light of existing literature¹¹.

First, previous literature lacks international comparisons of failure processes. While Study 1 conducts an international comparison based on matched Finnish and Estonian firms, then Studies 2 and 3 do so on a larger set of European firms. As demonstrated in multiple literature review studies (Dimitras et al. 1996, Altman and Narayanan 1997, Bellovary et al. 2007), there is a large number of bankruptcy prediction models available from different environments, and there are also several studies, which create internationally applicable models (Laitinen and Suvas 2013, Altman et al. 2016). Still, the

¹¹ For more detailed information about the novel aspects of the thesis, Chapter 1 including the research gaps, Chapter 3 including the four Studies and Chapter 4 should be consulted. Novel aspects in the thesis have been presented as a random list, which does not reflect their importance.

evidence about the (dis)similarity of failure processes across countries is weak and this thesis shows that in some countries the representation of specific failure processes found is similar and in others not.

Second, several past studies about the failure processes of old firms are available (e.g. D'Aveni 1989, Laitinen 1991), which focus on different size categories, but so far studies have not been specifically conducted about young firms. In some studies (e.g. Ooghe and de Prijcker 2008), young firm failure has been presented as a single separate failure process, but no attention has been paid to whether young firms can fail in different ways or not.

Third, an innovative aspect lies in the period of firms' lifecycle applied in this thesis. More specifically, while Studies 1 and 3 use the last stages, as has been done for instance in D'Aveni (1989) and Laitinen (1991), then Study 2 introduces a different approach. In particular, it considers the whole lifecycle of failed young firms.

Fourth, in Study 1 failure causes have been studied in conjunction with failure processes modelled using financial variables. In past studies this has been achieved either using qualitative analysis (see e.g. Argenti 1976, Ooghe and de Prijcker 2008) or by interconnecting types of failing firms (detected based on failure causes) with financial symptoms (see e.g. Crutzen 2009).

Fifth, in Study 4, large-scale empirical evidence is offered about the representation of voluntaristic (failure due to internal causes), deterministic (failure due to external causes) and integrative (failure due to both internal and external causes) theories of failure causes. Although past research has applied the taxonomy of internal-external failure causes (e.g. Baldwin et al. 1997, Arditi et al. 2000, Thornhill and Amit 2003), the interactions of internal and external causes is an understudied area of research. Furthermore, except for a few examples (e.g. Hall 1992, Baldwin et al. 1997), past studies have relied on small samples of bankrupted firms to detect failure causes.

The above list of novel aspects arising from this thesis is not complete, but presents the most substantial examples. As noted earlier, the novel aspects in the thesis can have a largely varying weight. Namely, some of them consider topics which have not been (thoroughly) studied in past studies (e.g. the international comparison of failure processes), whereas others just fill (small) gaps or provide some technical improvements to the research of failure processes.

Contribution of individual authors

All Studies included in the thesis are joint studies by two or three authors. More specifically, three of the Studies have been written jointly with Vaasa University scholars professor Erkki K. Laitinen (Studies 1, 2, 3) and Arto Suvas (Study 2), and one study with Salisbury University scholar professor Richard C. Hoffman (Study 4). The author of the thesis contributed to each of the Studies as follows:

1. In **Study 1**, the thesis author was the second author. The study was composed so that two co-authors discussed and agreed upon the study design. Then, Finnish data was procured by Erkki K. Laitinen, which was followed by matching the Finnish firms with Estonian ones and procuring comparable data by the author of this thesis. The statistical analyses was initially conducted by Erkki K. Laitinen, but the thesis author possesses both the initial and output files of the analysis, and has checked the analysis results. The thesis author is aware of the same methods and has practiced them in Studies 2, 3 and 4. Also, in Chapter 4.1 the thesis author has provided some additional evidence based on the dataset applied in Study 1. Both co-authors contributed to the writing of the manuscript. The thesis author was responsible for submitting the study to the journal and responding to reviewers.
2. In **Study 2**, the thesis author was the main author. The study was composed so that the thesis author proposed the study design, which was discussed and agreed upon by three co-authors. Then, the thesis author downloaded data from the Amadeus database¹², processed it, conducted the statistical analyses and composed the preliminary draft of the study (including all parts). Then, the preliminary draft was commented upon by Erkki K. Laitinen and Arto Suvas and based on these comments the thesis author made the relevant corrections. The thesis author was responsible for submitting the study to the journal and responding to the reviewers.
3. In **Study 3**, the thesis author was the main author. The study was composed so that firstly the thesis author proposed a study design, which was discussed and agreed upon by two co-authors. Then, the thesis author downloaded data from the Amadeus database, processed it, conducted the statistical analyses and composed the preliminary draft of the study (including all parts). Then, the preliminary version was commented upon by Erkki K. Laitinen, and based on the comments, the thesis author made relevant corrections. The thesis author was responsible for submitting the study to the journal and responding to the reviewers.
4. In **Study 4**, the thesis author was the main author. The data for Study 4 had already been downloaded and processed before solely by the thesis author. The study was composed so that firstly the thesis author proposed a study design, which was discussed and agreed upon by two co-authors. Then, the thesis author ran the statistical analyses and composed the preliminary draft of the study (including all parts). Then, the preliminary version was improved by both co-authors. The thesis author was responsible for submitting the study to the journal and responding to the reviewers.

¹² Amadeus database, administered by Bureau van Dijk, contains financial information from annual reports of firms from all European countries and it has been presented in a comparable format.

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1. LITERATURE REVIEW AND RESEARCH QUESTIONS

1.1. Firm failure, permanent insolvency and bankruptcy

Chapter 1.1 of the literature review focuses on the term “failure”, which has obtained various meanings in previous studies. Different studies focusing on the definition of failure (e.g. Watson and Everett 1999, Pretorius 2009) univocally establish that failure can and has been defined differently. The widest definition of failure could be “deviation from expected and desired results” (see Cannon and Edmondson 2005: 162). Firms can have numerous non-financial and financial goals, the latter being for instance concerned with the rate of return, profitability or sales volume. Cochran (1981: 52) notes that “failures as opportunity costs” could be the most suitable widest definition of failure. The use of firms’ goals when studying failure is limited, as they are normally not observable for outside parties and can also quickly change. The definition of failure is dependent of the research stream under consideration, namely in accounting and finance literature (especially in studies focusing on failure prediction), bankruptcy has been the predominant definition used (Mellahi and Wilkinson 2004, Balcaen and Ooghe 2006, Pretorius 2009, Kücher et al. 2015). This could be because information about bankruptcies can easily be retrieved from databases, and unlike other definitions of failure, a large proportion of bankrupted firms have been dissolved. In turn, firms can for instance witness negative profitability in times of enlargement and they cannot be unambiguously considered as failed or non-failed.

Multiple scholars have relied on the definitions applied by data providers; for example, a widely used definition in US-based failure studies (see e.g. Fredland and Morris 1976, Sharma and Mahajan 1980, Lussier 1995) is the one provided by a recognized business information provider The Dun & Bradstreet Corporation. The Dun & Bradstreet Corporation (1986¹³) definition is: “businesses that ceased operations following assignment or bankruptcy; ceased operations with losses to creditors after such actions as foreclosure or attachment; voluntarily withdrew leaving unpaid debts; were involved in court actions such as receivership, reorganization or arrangement; or voluntarily compromised with creditors”. The Dun & Bradstreet Corporation (1986) definition mainly focuses on legal proceedings and on at least temporary insolvency.

As the declaration of bankruptcy and the inability to subsequently revitalize a firm leads to a compulsory (involuntary) liquidation, studies viewing failure in the context of bankruptcy have remarkable intersection with studies considering firm mortality. Cochran (1981: 53) considers business mortality as “death or discontinuance”. Although “death” and “discontinuance” can coincide with the deletion of a firm from an official register, “discontinuance” can also mean

¹³ The definition is provided on the turn of the cover page and that page does not have a number.

discontinuing (some) activities, leaving the firm registered. Also, in some legislations (e.g. in Estonia¹⁴), a *de facto* permanently insolvent firm can be deleted from the business register without an insolvency proceeding (i.e. it is not *de jure* insolvent).

There is a fair amount of research considering different facets of firm exits. Still, the meaning of “exit” can vary a lot, as exits can occur because of various reasons and the creation of losses to creditors is not essential (see e.g. Marcus 1967, Schary 1991, Wennberg et al. 2010). Exit has also been divided into different types in the literature. For instance, Balcaen et al. (2012: 950–951) distinguish between three types of exit: a) involuntary exit (following bankruptcy, compulsory liquidation or reorganization); b) voluntary exit through liquidation; and c) restructuring exit (being an acquisition, merger or split). Also, “exit” can be viewed as leaving a market bounded geographically and/or a market for a specific good (i.e. product or service), while the firm itself remains functional. Therefore, in some streams of the literature (e.g. firm internationalization), exit is not considered as failure (see e.g. Vissak and Francioni 2013). Furthermore, the use of “exit” in the meaning of dissolution of a firm might be arbitrary, as some inactive (and also insolvent) firms might not be dissolved but remain in a business register, albeit in a dormant form.

Therefore, the scope of this thesis is limited to studying firm failures based on bankrupt firms primarily due to the following:

1. Bankruptcy refers to a situation where a firm has “clearly failed”, as it has been unable to set up its business in a way to be able to service debt when it becomes due. Other definitions of failure might lead to a greater ambiguity without further inquiry, as they do not disclose exactly whether a firm is facing problems or not.
2. It is difficult to obtain information about some subsets of firm failure. For instance, information about the expected rate of return can mainly be obtained through questionnaires.
3. Firm bankruptcy and its subsequent liquidation refer to a certain point in time, when the activities have ceased. In the case of other definitions (e.g. earning losses), the situation can change, thus making the firm belong to either “failed” or “non-failed” groups depending on the period used in the analysis.
4. As subsequently indicated in this chapter, the meaning of “bankruptcy” has similarities in different legal environments, making the international comparison in the thesis and the subsequent international application of the results possible.
5. As bankruptcy is considered to be the final stage in the failure process (see e.g. Weitzel and Jonsson 1989), the usage of this definition for studying firm failure helps to integrate different definitions of “failure” in succession. For instance, it is possible to study, whether a firm was earning losses or had negative operating cash flow before declaring bankruptcy.

¹⁴ See the following Estonian laws: Bankruptcy Act (2016) and Commercial Code (2016).

Therefore, this thesis has been composed by choosing “bankruptcy” as the definition of firm failure. This definitely concerns the empirical studies included in the thesis, while multiple theoretical or literature review studies referred to in the thesis (e.g. Mellahi and Wilkinson 2004) have applied a broader meaning of “failure”. The limitation of the choice of “bankruptcy” as the central definition in the thesis is that the results might not be applicable in the case of other (i.e. broader) meanings of failure.

Terminological divergence exists in studies applying data on bankrupt firms. For instance, studies actually focusing on bankrupted firms have also used the following words (e.g. in the headings of studies): closure (Wertheim and Lynn 1993), collapse (Boothman 2000), crash (Jorissen and Otley 2010), crisis (Lin et al. 2011), death (Sheppard 1994), decline (D’Aveni 1989), default (Davydenko and Franks 2008), disappearance (Stubbart and Knight 2006), discontinuance (Bates and Nucci 1989), dissolution (Mitchell 1994), exit (Miklius and Casavant 1976), failure (Altman and Narayanan 1997), financial distress (Rotem 2011), insolvency (Hall 1992), liquidation (Hudson 1986), mortality (Queen and Roll 1985), non-viability (Argiles 2001), shut down (Singh and Mitchell 1996), termination (Gaeremynck and Willekens 2003), unsound (Appetiti 1984). Still, the majority of the aforementioned words have also been used in other meanings than bankruptcy in various studies. Therefore, numerous seemingly different studies are actually comparable, as they use data about firms with a similar status.

Consequently, the meanings of “(permanent) insolvency” and “bankruptcy” have been discussed. Firms become insolvent because (Uhrig-Homburg 2005: 1510): “either the available cash-flow is insufficient to meet payments to creditors (cash-flow shortage) or the firms’ liabilities exceed firms’ assets (over-indebtedness)”. The combination of cash shortage and over-indebtedness can result in four different possible conditions (Uhrig-Homburg 2005: 1519–1520): a) firm witnesses both, or b) none, c) firm witnesses either cash shortage, or d) over-indebtedness. When three of those conditions (i.e. conditions *a*, *c*, *d*) remain permanent, they refer to permanent insolvency. The detection of a cash shortage and over-indebtedness have been respectively referred to as “liquidity test” and “balance sheet test” (see The World Bank ... 2001: 29). A liquidity test should be the preferred criteria for detecting firm insolvency (The World Bank 2001: 29) and is used in most countries (Uhrig-Homburg 2005: 1510). In case over-indebtedness is permanent, it will also result in a shortage of cash (although this can occur with a time lag) and can thus be modelled using a cash shortage. The availability of cash can in turn be disaggregated into different variables (see e.g. Peat 2007); for instance, using operating, financing and investing cash flows applied in accounting (see International Accounting Standard 7 (2010) for a description of these cash flow types). When a firm has no cash left at a certain point in time and at the same time has also some unpaid debt that has fallen due, such a firm can be considered to be at least temporarily insolvent. “At least” in this context means that the temporariness of the situation

needs further inquiry. This “temporariness” can be detected during an insolvency proceeding.

To determine the inability to pay due debt in future periods, a firm’s cash flows have to be forecasted, but cash flow forecasts normally cannot be precise over an infinite time span (see e.g. Elton and Gruber 1972, Chatfield et al. 1989). Ideally, firms should start insolvency proceedings with an aim to reorganize debt already in case of future threatening insolvency; that is, in case it is likely that they are not able to pay a debt at some point in the future. In different legislations, the options for reducing and/or rescheduling debt can vary (see INSOL Europe 2014, McCormak et al. 2016). Also, during an insolvency proceeding, a question might arise as to whether a firm has submitted a petition to start the insolvency proceeding too late. This aspect is considered by the theory of deepening insolvency (see e.g. Heaton 2005, Siev and Goldfarb 2007), which aims to clarify the circumstances in which increasing debt is harmful to a firm.

As noted earlier, a balance sheet test is used to detect whether a firm is over-indebted or not (i.e. whether it has less assets than liabilities, or in other words, whether its equity is negative). A balance sheet test is only used as an insolvency criterion in a few countries (Uhrig-Homburg 2005: 1510). The usage of a balance sheet test as a criterion to determine whether a firm is permanently insolvent or not, has numerous limitations, and was therefore strongly criticised decades ago (see e.g. Levit 1973).

The word “bankruptcy” has a legal background and reflects permanent insolvency declared at court¹⁵. The word “bankruptcy” originates from Italy, where it meant “the breaking of the tradesman/banker’s money table” because it owed money (Pontani 2004: 2). In several countries, the word “bankruptcy”, is not used in the name of the specific law. For instance, in Estonia the specific law is named the Bankruptcy Act (2016) (i.e. *Pankrotiseadus*), while in Germany the relevant law is named the Insolvency Statute (2011) (i.e. *Insolvenzordnung*) and in the United Kingdom, the Insolvency Act (1986). In the United States, on the other hand, the relevant law is titled the U.S. Code Title 11 Bankruptcy (2005), but in the definitions section 101 it does not define bankruptcy, and instead, the term “insolvent” has been defined.

¹⁵ For instance in Estonia, the Bankruptcy Act (2016) §1 defines bankruptcy: „Bankruptcy means the insolvency of a debtor declared by a court ruling“. For instance in Finland, the Bankruptcy Act (2004) defines bankruptcy: „Bankruptcy is a form of insolvency proceedings covering all the liabilities of the debtor, where the assets of the debtor are used in payment of the claims in bankruptcy“. Thus, “bankruptcy” can refer to a specific situation or a legal proceeding. Still, the intersection of the aforementioned definitions is, that permanent insolvency has been established at court, thus in the thesis, “bankruptcy” and “permanent insolvency declared at court” have been considered as synonyms, and therefore, in the thesis the word “bankruptcy” has been used. This is especially important, as Chapter 1.1 indicates, that in insolvency legislations of some countries the word “bankruptcy” is not used (see e.g. Insolvency Statute 2011). Also, as all firms included in the Studies have been dissolved after bankruptcy, then in the thesis “bankruptcy” directly refers to the decision to liquidate a firm because of permanent insolvency.

The way insolvency legislation is set up in different countries can differ. Generally, two types of legal traditions are distinguished, namely civil and common law, where civil law is in turn divided into German, French and Scandinavian legislation families (La Porta et al. 1996). Another common distinction between insolvency legislations in different countries is made on the basis of whether they are debtor or creditor friendly (Davydenko and Franks 2008). Actually, the comparative sophistication of insolvency legislations between countries can be even more complex or far-reaching than just debtor or creditor friendliness. For instance, Blazy et al. (2008: 256–259), based on three variables (automatic stay on secured creditors' claims, absolute priority rule between claimants, manager does not stay at head of firm during reorganization process), outlined four different types of insolvency codes: 1) a social pro debtor model, 2) an entrepreneurial pro debtor model, 3) a repressive model, and 4) a pro secured creditors model. Therefore, there is extensive evidence in the academic literature that insolvency legislation differs across countries.

When considering the specific laws, extensive recent studies by INSOL Europe (2014) and McCormak et al. (2016) outline the diversity of insolvency legislations in different European countries. Based on the comparison of the legislations of the countries provided in these studies, the following conclusions can be drawn. Firstly, the conditions under which insolvency proceedings can be opened vary across countries – in respect to the time debt has to be due and the amount of due debt (McCormak 2016: 184–192). More specifically, in most EU countries the time a debt has to be due to start insolvency proceeding ranges in between 20 days and 2 months (McCormak 2016: 190–192). Therefore, European countries do not differ remarkably in respect to the time the debt has to be due to open insolvency proceedings. Nevertheless, how long debtors and creditors delay in submitting a petition in practice is an important consideration. Secondly, the availability and use of reorganization proceedings can vary a lot (INSOL Europe 2014, McCormak 2016). In some countries there are also separate reorganization and liquidation proceedings, but in some they are dealt with under the same law (INSOL Europe 2014, McCormak 2016). Therefore, commencing insolvency proceedings can signify different things in different countries, and therefore, the moment when permanent insolvency is established at court, could lead to less ambiguous results.

Still, the application of data of bankrupt firms from different countries is not free from limitations. For instance, differences in respect to whether firms have attempted or gone through a reorganization before bankruptcy, the submission of a bankruptcy petition by the management or creditors was delayed, or the debt was renegotiated before bankruptcy could have some effect on the empirical results when modelling failure processes.

1.2. The characteristics of firm failure processes

1.2.1. The concept of firm failure processes

As Chapter 1.1 indicated, there are multiple meanings of firm failure, and therefore, the definition of a failure process is dependent on which definition of failure is applied. As this thesis applies “bankruptcy” as the definition of failure, Chapter 1.2.1 considers previous studies that have researched failure processes in the context of firms that have become bankrupt. The general definition of a process is (Merriam-Webster 2016): “a series of actions that produce something or that lead to a particular result”. Therefore, the definition of “process” refers to dynamics (i.e. development in time), triggers of events (i.e. causes) and outcomes (both, intermediate or final). “The particular result” in the thesis is firm bankruptcy.

Failure process has been elaborated in Crutzen and van Caillie (2008: 301), where it is defined as follows: “it presents in a global and dynamic way, why (causes) and how (sequence of events) companies fail”. Furthermore, Crutzen and van Caillie (2008: 302) describe a failure process as consisting of the following four consecutive stages: 1) internally observable failure origins, 2) appearance of failure symptoms, 3) appearance of warning signals, and 4) bankruptcy. This thesis utilizes the definition provided by Crutzen and van Caillie (2008) by empirically viewing **why** (depicted using causes as non-financial variables) and **how** (depicted using financial variables from consecutive pre-bankruptcy years) firms become bankrupt.

The empirical studies of failure processes presented in Table 1 vary terminologically when depicting dynamically why and how firms become bankrupt. More specifically, these studies¹⁶ use the following terminology (see Table 1): trajectories (Argenti 1976), decline patterns (D’Aveni 1989), failure processes (Laitinen 1991, Ooghe and de Prijcker 2008, Laitinen et al. 2014), failure pathways (Moulton et al. 1996), failure patterns (Crutzen and van Caillie 2010).

The pioneering work by Argenti (1976) considering firm failure processes in detail, applied causes, symptoms and firm health to portray different failure processes (named respectively as “trajectories” in Argenti 1976). Although not specifically defined, Argenti’s (1976: 122) study considered causes as triggers, some of which were present already before the failure started, and symptoms such as indicators of failure (both financial and non-financial) observable to parties outside the firm. No formula was offered in Argenti (1976: 153) to calculate a firm’s health, but instead, it noted that multiple indicators could fit that purpose. Although being a highly cited work about firm failure, Argenti’s (1976) study has been criticised, among other reasons, for not disclosing the exact difference between causes and symptoms or not providing proper

¹⁶ The study by Wu (2010: 2373) listed in Table 1 does not specifically outline the relevant definition, and instead, considers different classes of failed firms.

scientific proof for the existence of the three failure processes outlined (see e.g. Gold 1977). Criticisms pointing to similar methodological issues can be followed in more recent studies; for example, Ropega (2011: 479) noted that “in theory and practice, it is often difficult to differentiate symptoms from reasons”.

Later research has provided an improved meaning of the failure process. Sharma and Mahajan (1980: 81–82) present a simple concept of the failure process, where managerial mistakes and external factors lead to performance decline, which in the absence of corrective action leads to failure. Therefore, the concept by Sharma and Mahajan (1980) described both internal and external forces as being important contributors to firm failure. In another research stream focusing on firm turnarounds, a similar concept as in Sharma and Mahajan (1980) has been elaborated (see e.g. Robbins and Pearce 1992, Pearce and Robbins 1993).

A more elaborate possibility to portray the failure process is the multistage approach. Ooghe and de Prijcker (2008) have outlined four similar stages as in Crutzen and van Caillie (2008). In Ooghe and de Prijcker (2008: 229–233) the failure process consisted of: a) initial shortcomings, b) negative signals, c) financial consequences, and d) final outcomes ending with bankruptcy. Still, as in Ooghe and de Prijcker (2008), four different failure processes were detected, then for each of them some stages (especially the initial shortcomings phase) differed respectively. The multistage model by Weitzel and Jonsson (1989) concentrated on managerial actions in the failure process. The Weitzel and Jonsson (1989: 97) model consisted of five stages: 1) a blinded stage, 2) an inaction stage, 3) a faulty action stage, 4) a crisis stage, and finally, 5) the dissolution stage¹⁷. Such a sequence of events as outlined by Weitzel and Jonsson (1989) might be better observable for larger firms (e.g. the “downward spiral” starting ten years before failure in Hambrick and D’Aveni 1988). The observance of managerial actions and their suitability (e.g. in order to consider, whether the managerial responses were overly passive or active, as indicated in van Witteloostuijn 1998) would demand information that is normally not available to parties outside the firm.

In previous empirical studies notable divergence exists (see Table 1) on how to model failure processes. Table 1 presents the designs and results of different studies of failure processes. Firstly, it can be seen from Table 1 that studies detecting failure processes might not rely on theoretical foundations. Instead, previous empirical studies have been cited and their designs set as exploratory; in other words, to find out whether different failure processes exist or not. Secondly, the study designs show a high variation in respect to data and methods applied (see Table 1). Process extraction (i.e. taxonomy/typology creation) methods include qualitative (e.g. Ooghe and de Prijcker 2008) and quantitative (e.g. factor analysis in Laitinen 1991, cluster analysis in D’Aveni 1989, different machine learning approaches in Wu 2010). The final years of the

¹⁷ As the Weitzel and Jonsson (1989) model was conceptual, then bankruptcy could be one possible option in the dissolution stage.

existence of older firms have primarily been modelled (see e.g. D'Aveni 1989, Laitinen 1991, Laitinen et al. 2014), not the whole life cycle. Samples of most studies are rather small, being below 100 observations (see Table 1). Thirdly, a common feature is that all studies detect a small number of processes, in Table 1 specifically ranging from 2 to 5. Still, the simple number of processes detected might not be a good measure here, as study designs have been highly diverse (see Table 1). The results of the studies presented in Table 1 are commented upon in more detail below.

The pioneering study on firm failure processes is Argenti (1976). In Argenti (1976), three failure processes (see Table 1) were described by outlining causes, symptoms and financial health for each. The failure processes proposed in Argenti (1976) can be considered more conceptual rather than scientifically justified, mainly because of a sporadically opaque study design. In turn, the follow-up studies present very clear study designs so their results are easier to rely on. More specifically, D'Aveni (1989) and Laitinen (1991) have reached quite a similar conclusion about the number and nature of failure processes, by focusing on the last years of the existence of old firms. Although using different variables, the studies by D'Aveni (1989) and Laitinen (1991) describe three failure processes (see Table 1): 1) a chronically inefficient firm for which failure symptoms were already observable years before bankruptcy, 2) a gradually failing firm for which performance becomes worse step-by-step during the years before bankruptcy, and 3) a quickly (acutely) failing firm which fails very quickly and for which the signs of forthcoming failure might not be observable before bankruptcy. In general, the processes proposed by D'Aveni (1989) and Laitinen (1991) share similarities with the last years of existence in Argenti's (1976) processes. In D'Aveni (1989), a cluster analysis of a specially composed D-score (based on one non-financial and one financial variable) and in Laitinen (1991) a factor analysis of six financial variables was used to detect the failure processes. Argenti's (1976) study has been developed by Richardson et al. (1994) by adding one additional process, but that study also lacks empirical proof. Moulton et al. (1996) used a simpler method to create a taxonomy by outlining a matrix based on industry and firm growth (both either positive or negative) and describing firms belonging to different matrix cells using various variables.

In the late 2000s, two studies were published based on Belgian data describing different types of failing firms. Based on thorough cases studies of 12 Belgian firms, Ooghe and de Prijcker (2008) described four different failure processes, and for each type of failure process, they provided the initial shortcomings, negative observable signals and resulting financial consequences. These firm types were (Ooghe and de Prijcker 2008): unsuccessful start-up firms, ambitious growth firms, dazzled growth firms and apathetic established firms. Furthermore, for each process Ooghe and de Prijcker (2008) outlined a specific list of causes.

Table 1. Empirical studies outlining different failure processes

Study	Theoretical foundation of empirical analysis	Data and methodology	Number of processes detected
Argenti 1976	None.	Processes with causes, symptoms and changes in financial health created based on a review of past scientific and applied research, interviews, case studies.	3 processes. Type 1 failure – a firm never improving beyond poor performance (young firms). Type 2 – a firm witnessing fantastic performance before sudden collapse (adolescent firms). Type 3 – mature firms dropping from good/excellent performance to poor/good, and witnessing it for multiple years before collapse.
D’Aveni 1989	No specific theory created. Monograph by Argenti (1976) is applied and various voluntaristic approaches mentioned.	49 large bankrupt US firms from different industries. A custom built D-score (based on financial and managerial resources) indicating resource munificence was applied in clustering. Additional group of control variables (for management, strategy and size) applied to study whether these variables are different in the case of detected processes.	3 processes reflecting lingerers, gradual decliners and sudden decliners.
Laitinen 1991	The basic model of identical investment projects created in the study. The model explained the choice of financial variables used in the extraction of failure processes.	40 bankrupt Finnish firms from different industries. Failure processes were extracted using a factor analysis of six financial variables and commented upon based on descriptive statistics of these six financial variables in each group.	3 processes reflecting the “chronic failure firm”, “revenue financing failure firm”, “acute failure firm”.
Moulton et al. 1996	Environmental determinism expressed using industry growth, managerial choice (voluntarism) expressed via firm sales growth.	73 large bankrupt US firms from different industries. Based on negative/positive growth of industry/firm sales, a matrix was created and each of the four cells described via growth in assets, debt and sales, and ROA.	4 predefined processes reflecting: market deterioration, market maladaptation, fight for market share, loss of control pathways.

Ooghe and de Prijcker 2008	Exploratory study with no specific underlying theory. A conceptual model of failure causes and monograph by Argenti (1976) are thoroughly discussed in the literature review section.	12 bankrupt Belgian firms of different size, age and industry. The extraction of processes was conducted via case study analysis using court documents and financial statements.	4 processes reflecting: unsuccessful start-up company, ambitious growth company, dazzled growth company, apathetic established company.
Crutzen and van Caillie 2010	Past studies about failure processes.	51 bankrupt Belgian firms of different size, age and industry. Qualitative analysis: interviews with managers and judges, and additional supplementary information has been applied to describe failure causes. Cluster analysis applied on failure causes.	5 processes detected: badly managed firms, apathetic firms, firms that fail after a punctual managerial error, firms serving other interests, shocked firms.
Wu, W.-W. 2010	None. Past studies about failure prediction (and processes) considered.	163 failed Taiwanese firms from various industries. Different machine learning clustering methods applied on financial ratios and the one chosen with highest accuracy of distinguishing groups (based on the application of different classification methods on established groups).	2 processes. Different machine learning clustering methods resulted in 2, 3 and 4 groups, out of which the 2 group solution was considered the best. Two classes: class 1 respectively 26% and class 2, 74%.
Laitinen et al. 2014	Based on the motivation for variable selection in Laitinen (1991).	558 bankrupt firms from six European countries (Belgium, Czech Republic, Croatia, Estonia, Russia, United Kingdom). Processes extracted using consecutive factor and cluster analyses on six financial variables.	4 processes. Two different types of acute failure firms, one type of gradual failure firms, one type of chronic failure firms.

Source: compiled by the author based on information provided in the studies in the first column.

Some of the failure processes detected in Ooghe and de Prijcker (2008) are similar to those found in previous studies; for example, the failure process of apathetic established firms in Ooghe and de Prijcker (2008) might be of a gradual nature as depicted in D'Aveni (1989) and Laitinen (1991).

Similarly, Crutzen and van Caillie (2010)¹⁸ described five types of failing firms based on the failure causes obtained from a thorough analysis of 51 Belgian bankrupt firms, for which information was obtained from different stakeholders. The firm types in Crutzen and van Caillie (2010: 452) were: 1) badly-managed firms, 2) firms that fail after a punctual error, 3) apathetic firms, 4) firms serving other interests, 5) shocked firms. Although based on failure causes, the firm types in Crutzen and van Caillie (2010) share similarities with those established in earlier studies. The shocked firms and firms failing after a punctual error symbolize quickly failing firms and their main difference seems to be in the causes of failure; that is, for shocked firms, external causes are common, while for firms failing after a punctual error, internal causes are of greater importance (Ibid.: 451–453). Badly managed firms are characterized by the lack of numerous competences and are often young firms (Ibid.: 453). Non-reactive apathetic firms mainly symbolize a gradually failing firm (Ibid.: 453). An important addition to the literature is the type “firms serving other interests”, which symbolizes a firm, where instead of ordinary corporate goals, firms follow different objectives (e.g. a firm created for conducting fraud) (Ibid.: 452).

Recently, with the rapid advance of machine learning techniques and their applications in the literature stream of bankruptcy prediction, several studies have been composed in conjunction with two areas (i.e. bankruptcy prediction and failure processes). Wu (2010) applied different machine learning techniques to cluster failing firms from Taiwan, and found that a taxonomy based on two clusters is the most efficient. Wu (2010) study mainly focuses on the application of different techniques and is thus lacking a more specific description of the processes detected. Similarly, different failure processes have been modelled for instance in studies by du Jardin and Severin (2012) and du Jardin (2015).

Previous studies about failure processes are characterized by several limitations discussed below. Such studies have been dispersed over different types of firms. For instance, the studies by D'Aveni (1989), Laitinen (1991), Ooghe and de Prijcker (2008) and Laitinen et al. (2014) have included firms from different sectors. Also, these studies have treated the time between bankruptcy declaration and the last financial report available quite liberally. More specifically, either only the last available report has been applied or the time between bankruptcy declaration and the last report varies greatly. The datasets have been quite small (e.g. 49 firms in D'Aveni 1989 and 40 firms in Laitinen 1991). Therefore, the question remains whether a study design relaxing these limitations would result in similar or different failure processes when compared to those established in previous studies. **Therefore, there is a lack of**

¹⁸ The study is actually based on the doctoral thesis Crutzen (2009).

knowledge on whether different failure processes exist for similar¹⁹ firms (GAP1).

Previous studies about firm failure processes have mostly focused on the last stages of failure using the example of old firms, being at least five years old (see e.g. D’Aveni 1989, Laitinen 1991, Laitinen et al. 2014). Based on case-study evidence, the studies by Argenti (1976) and Ooghe and de Prijcker (2008) prove the existence of different processes for young and old firms. Still, these studies propose only a single type of failure process for a certain age category, for instance in Ooghe and de Prijcker (2008: 228, 233) “the failure process of an unsuccessful start-up company” and “the failure process of an apathetic established company”. **Therefore, there is a lack of knowledge on whether different failure processes exist for young firms (GAP2) and how those processes change with firm age (GAP3).**

In D’Aveni (1989), only a specific firm group (i.e. very large firms) has been applied, while in others (e.g. Laitinen 1991 and Laitinen et al. 2014) the data include firms from different size groups. As firm size distributions were different across countries, and the distributions of detected failure processes also differed across countries in the study by Laitinen et al. (2014), it could be assumed that firms in different size categories follow different failure processes. Still, such a proposition needs further analysis. **Therefore, there is a lack of knowledge on how failure processes change with firm size (GAP4).**

An underdeveloped area in the research about firm failure processes is their variation across countries. One study (i.e. Laitinen et al. 2014) co-authored by the thesis author, but not included in this thesis, has considered differences in failure processes across countries, but in that study the firms used were different. In Laitinen et al. (2014), data from six European countries were used, but firms from different countries had largely varying mean or median sizes, and in some countries, the exact bankruptcy moment was not known (instead, a proxy was used based on the average length of insolvency proceedings)²⁰. Furthermore, in the study by Laitinen et al. (2014), the traditional cash flow ratio applied in Laitinen (1991) was replaced by the ratio of operating cash flow to cash operating revenue. **Therefore, there is a lack of knowledge on whether different failure processes exist for firms in different countries (GAP5).**

The interconnection of failure processes and firm exporting behaviour is an underdeveloped research area. None of the studies detecting failure processes brought out in Table 1 focuses on the comparison of failure processes between

¹⁹ „Similar“ in the thesis means, that unlike in (many) past studies, in Studies 2 and 3 firms are only manufacturing firms, they belong to same age and/or size groups. In Study 1 matched firms from two countries have been applied. Also, in Studies 1, 2 and 3, the time between bankruptcy declaration and t-1 annual report is more homogenous than in previous studies.

²⁰ A master’s thesis by Stahlman (2015), which was supervised by the thesis author, replicated the analysis in Laitinen et al. (2014). That thesis suffered from the same limitations as Laitinen et al. (2014). Namely, the time between the last report and bankruptcy was up to two years and in some countries the bankruptcy dates were not known.

exporting and non-exporting firms. In internationalization literature, mostly de-internationalization in the meaning of full or partial exit has been considered (Benito and Welch 1997), but exit should not be considered as failure (Vissak and Francioni 2013). It has been noted that there is insufficient knowledge on how exporting firms fail (Nummela et al. 2016). Also, internationalization studies mainly focus on the survival/failure of (non-)exporters, but do not specifically compare failing (non-)exporters (see e.g. Wagner 2012). **Therefore, there is a lack of knowledge on whether different failure processes exist for exporting and non-exporting firms (GAP6).**

There are a few studies available detecting whether failure causes are interconnected with failure symptoms depicted using financial variables. For instance, the studies by Argenti (1976) and Ooghe and de Prijcker (2008) outline some interactions of causes and financial variables, but without sufficient empirical proof. In D'Aveni (1989), the interconnections between some of the established processes and variables explaining the firms' management boards, strategy and environment were studied, but these variables cannot be specifically considered as failure causes. In Crutzen (2009), the interconnections between failure processes established based on failure causes and some financial variables were studied. None of the aforementioned studies has specifically researched how failure processes detected using financial variables are interconnected with failure causes. **Therefore, there is a lack of knowledge on how failure processes identified using financial variables interact with failure causes (GAP7).**

1.2.2. Failure causes in firm failure processes

The initial theoretical explanations for why firms fail divide between two large streams – the deterministic and voluntaristic theories – offering opposing explanations for why firms fail (Mellahi and Wilkinson 2004). Namely, on the one hand, studies focusing on (managerial) voluntarism have argued that firm-level decisions (i.e. internal causes) are the (main or only) contributors to the final outcome (i.e. success/survival or failure) (Daily 1994, Mellahi and Wilkinson 2004, Amankwah-Amoah 2016). On the other hand, studies emphasizing environmental determinism see outside forces (i.e. external causes) as the (main or only) factors conditioning firm destiny (Daily 1994, Mellahi and Wilkinson 2004, Amankwah-Amoah 2016). Still, several voluntarists or determinists do not necessarily oppose the other school, but rather rely on their own explanation (Mellahi and Wilkinson 2004). In business practice, it is possible to find examples of both voluntaristic and deterministic approaches. For instance, when a well-functioning firm suddenly bankrupts because of managerial fraud (see e.g. Crutzen and van Caillie 2010, Lukason 2013), it is highly possible to assume that only internal triggers were the cause of bankruptcy. On the other hand, when a firm is engaged in credit sales and the claims have always been secured, then in the case of client bankruptcies, which lead to unsatisfied claims and the bankruptcy of the firm under question, the

cause is of external origin. Still, in the case of the previous example of credit sales, additional questions need to be answered; for example, whether the securities (guarantees) were of sufficient quality or whether the share of (specific) credit sales out of total sales was too large. Mellahi and Wilkinson (2004: 32) have noted that voluntaristic or deterministic theories can explain firm failure “only in extreme situations, such as major environmental disaster or economic crisis, or extreme cases of management misbehaviour”.

Nowadays, integrative approaches, which emphasize the role of both, voluntaristic and deterministic streams (i.e. failure caused by both, internal and external causes), are more favoured (Daily 1994, Mellahi and Wilkinson 2004, Amankwah-Amoah 2016). Although it has been noted that it is important to consider the environmental developments and managerial actions as a process, rather than statically (i.e. not by just indicating the (non-)presence of some cause) (Weitzel and Jonsson 1989, Dubrovski 2009, Ropega 2011, Amankwah-Amoah 2016), the empirical analysis of the internal and external causes in the failure process can be challenging (especially in the *ex post* context) due to the lack of information. An elaborate portrait of the complexity of causal mechanisms in firm failure processes has been provided through the detailed case studies in Argenti (1976), Sheppard and Chowdhury (2005) and Pajunen (2005).

The empirical research considering the causes of failure is infrequent (Altman and Narayanan 1997). Also, much of the available research focuses on causes statically, namely just detecting them and not positioning them in a sequence and/or timeframe (Crutzen and van Caillie 2008). For instance, in one of the most elaborate studies available focusing on failure causes by Baldwin et al. (1997), a thorough overview has been provided of different failure causes, but not about their dynamics. An additional serious limitation in studies focusing on failure causes is the absence of their interaction, namely how different causes occur concurrently²¹.

All the empirical studies reviewed here are static; that is, they do not position failure causes on a time frame (see Table 2). So far, the dynamics of failure causes have been captured by a few case studies (e.g. Argenti 1976, Pajunen 2005, Sheppard and Chowdhury 2005). The choice of the four studies presented is based on the fact that those studies are highly cited and have specifically detected the causes of failure for bankrupted firms (except for Arditi et al. 2000, where the failure definition was based on The Dun & Bradstreet Corporation definition,²² and is therefore, somewhat wider). Out of the four studies, two (Baldwin et al. 1997, Arditi et al. 2000) have directly employed the taxonomy of internal and external causes, whereas the other two have relied on either factor analysis for taxonomy creation (Gaskill et al. 1993) or the researcher’s grouping based on the opinions of the firms’ owners (Hall

²¹ Out of the four studies presented in Table 2, only Gaskill et al. (1993) considers the interconnections of failure causes using factor analysis.

²² See Chapter 1.1.

1992). Studies in Table 2 have used various data sources, such as owner perceptions (e.g. Hall 1992) and information from trustees (Baldwin et al. 1997). Datasets in studies about failure causes have occasionally been rather large; for example, in the study by Hall (1992), even 857 firms, although in that study for each firm only one main cause was listed. From Table 2 it can be followed that internal and external causes obtained almost equal importance in only one study (i.e. Baldwin et al. 1997). Still, in Baldwin et al. (1997) no interconnections between the causes were outlined, and therefore, it is not possible to tell, the extent to which the internal and external causes exist together. In other studies outlined in Table 2, internal causes seem to be prevalent.

A study by Thornhill and Amit (2003: 504–505), applying the same dataset as in Baldwin et al. (1997), confirms that younger firms bankrupt more due to general and financial management deficiencies and older firms in turn because of market developments. This finding is in accordance with the liabilities of newness, adolescence and obsolescence theories (see Aldrich and Auster 1986, Singh and Lumsden 1990, Henderson 1999), although the aforementioned theories mostly deal with failure rates rather than specific failure causes. The prevalence of different external and internal causes among old and young firms can also be followed in Baldwin et al. (1997: 56–59). What concerns the liabilities of smallness theory (see Aldrich and Auster 1986), there is no univocal understanding of what relationships to expect between firm size and failure causes. For instance, Aldrich and Auster (1986: 181) note: “empirical evidence suggests that small size does not make survival problematic”. **Therefore, there is a lack of knowledge on how the voluntaristic, deterministic and integrative theories are associated with firm age (GAP8) and size (GAP9).**

1.2.3. Financial variables in firm failure processes

Different studies provide either conceptual or empirical evidence about the development of financial variables in the failure process. The most general approach practiced has been to depict firm performance or financial health on the y-axis and draw trajectories based on the behaviour of these variables (see e.g. Argenti 1976, Weitzel and Jonsson 1989). Still, in conceptual models, authors often do not disclose what would be the best option for measuring such a specific single variable (see Argenti 1976, Weitzel and Jonsson 1989). Probably, different options would suit such a purpose; for example, variables like profitability (see Moulton et al. 1996) or some (bankruptcy) score (see D’Aveni 1989). Still, such approaches do not pay attention to how different variables are interconnected in the failure process.

Table 2. Designs and results from static studies focusing on failure causes

Study	Country / timespan / sample size / sector(s)	Method of data collection	Taxonomy applied	Main results
Hall 1992	UK; years 1973, 1978, 1983; 857 obs.; mixed sectors	Owner opinions from official receiver report.	Operational management (OM), strategic, environmental, personal technological, marketing, rises in different costs. Source of taxonomy not disclosed in article.	Most frequent category OM accounting for 50.6%. Most frequent individual reason: undercapitalization (27.4%). Significant differences in reasons for firms varying in age, size and sector.
Gaskill et al. 1993	USA, years 1987–1991; 91 obs., apparel and accessory retail sectors	Questionnaire with 35 randomly ordered items on a 5-point Likert scale.	Taxonomy of four causes (factors) based on factor analysis: 1) managerial and planning functions, 2) working capital management, 3) competitive environment, 4) growth and overexpansion. 35 items based on past literature and expert panel input.	Proportion of variance explained by Factor 1 39.7%, by Factor 2 10.4%, by Factor 3 8.5%, by Factor 4 5.9%. Factor 1 had highest factor loadings based on inadequate knowledge of pricing strategies, ineffective advertising/promotional strategy, failure to generate a long-term business plan.
Baldwin et al. 1997	Canada; year 1996; 550 obs.; different sectors	Thorough custom-built questionnaire sent to trustees after bankruptcy declaration.	External factors, internal factors (general management skills, firm strategies, expansion/buyouts, financial planning, financial management and record keeping, human resources, marketing, production and operations).	The main external reason noted was economic downturn (68% of firms), followed by increased competition and customer difficulties (i.e. different types of customer losses). The main internal causes were deficiencies in general management and financial management (both accounting for 71% of firms).
Arditi et al. 2000	USA; years 1989–1993; number of firms not disclosed; construction sector	Dun & Bradstreet annual Business Failure Record.	Causes provided by Dun & Bradstreet classified to a matrix developed by Boyle and Desai (1991). Internal administrative: budgetary issues, human/organizational issues; external administrative: business issues; internal strategic: issues of adaption to market conditions; external strategic: macroeconomic issues, natural factors.	The main causes of failure were as follows: internal administrative 67.7%, external administrative 3.6%, internal strategic 2.6%, external strategic 26.0%.

Source: compiled by the author based on information provided in the studies in the first column.

Despite the abundance of bankruptcy prediction literature, no single and widely supported theory is available in that literature stream for how firms bankrupt (Balcaen and Ooghe 2006). One stream of literature originates from Beaver (1966: 80), who viewed “a firm as a reservoir of liquid assets, which is supplied by inflows and drained by outflows”. Beaver (1966: 80) also postulated that *ceteris paribus* the probability of failure reduces when: a) the reservoir of liquid assets increases, b) net cash flows from operations increase, c) debt decreases, and d) fund expenditures decrease. Therefore, Beaver’s (1966) approach focuses on the classical insolvency definition (i.e. the inability to pay debt as it becomes due) and discloses some variables important to model this. Still, bankruptcy prediction models based on cash flows might perform worse than models based on balance sheet and income statement data (see e.g. Laitinen 1994).

Another stream of literature since the pilot study by Wilcox (1971) has made use of the gambler’s ruin theory in bankruptcy prediction. An important development of this stream is the study by Scott (1981), who conjointly applied gambler’s ruin and perfect access models. In the setting in Scott’s study (1981), firm bankruptcy was modelled using equity, which is impacted by net income. Scott (1981: 341) concluded that past empirical results from bankruptcy studies can be explained (although not fully) with a purposefully developed theory. Another stream has used option theory to explain the probability of bankruptcy (see e.g. Hillegeist et al. 2004). As demonstrated above, the studies by Beaver (1966) and Scott (1981) use different definitions of bankruptcy and prioritize different variables (i.e. cash flow *versus* profit) in the pathway towards bankruptcy. Therefore, when modelling failure processes, both concepts (liquidity and solidity) should be accounted, especially, as Chapter 1.1 demonstrated, that both criteria are used as legal definitions of bankruptcy and firms can face multiple combinations of liquidity and solidity problems.

Liquidity and solidity can be reflected by different variables, both dynamically and statically (Laitinen 1995). Static liquidity has been mostly depicted using a ratio of either cash or current assets to current liabilities (Laitinen 1991, Laitinen 1995). Liquidity has also been modelled dynamically, reflecting the ability to generate cash flows, and has been depicted using a ratio of operating or traditional cash flow to net sales (Laitinen 1993, Laitinen 1995). When calculating traditional cash flow (TCF), the numerator is composed of the sum of net income (i.e. net profit) and depreciation and amortization (Laitinen 1995). Likewise with liquidity, solidity (solvency) can also be depicted in a static or dynamic way (Laitinen 1995). Static solidity has been mainly depicted using an equity ratio (total equity divided by total assets) (Laitinen 1991, Laitinen 1995). This ratio also resembles the criterion in the insolvency or business laws of different countries. Dynamic solidity has been depicted for instance using a traditional cash flow to total debt ratio (Laitinen 1995); a similar variable obtained high classification accuracy in Beaver’s (1966) study. Another known solidity ratio (which was also used e.g. in the ZETA-model by Altman et al. 1977) is the interest coverage ratio calculated as earnings before

interest and taxes (EBIT) divided by interest expenses. Indeed, the traditional cash flow to total debt ratio and EBIT to interest expenses ratio are similar ratios²³.

Most of the studies in the domain of bankruptcy prediction seek to find higher prediction accuracies for cross-sectional models (sometimes with the help of novel variables) and neglect the failure process topic (Balcaen and Ooghe 2006). Commonly, the descriptive statistics in bankruptcy prediction studies include means, standard deviations, medians, minimums and maximums of the variables used. High variation in the values of the variables used (e.g. based on the standard deviation or range calculated as the difference between maximum and minimum) can increase the likelihood that different failure processes exist, but does not specifically prove it. Also, cross-sectional bankruptcy prediction models normally focus on a very short period of time, most commonly one year before bankruptcy, when most of the ratios have already obtained poor values, and therefore, do not pay attention to the dynamics in the longer time horizon (Balcaen and Ooghe 2006, Bellovary et al. 2007). Some statistical analysis methods used in bankruptcy prediction, such as survival analysis, allow accounting for the time dimension, namely by studying how the failure risk is interconnected with the development of variable values over time (see e.g. Balcaen and Ooghe 2004). Also, in some recent bankruptcy prediction studies, a self-organizing map has been used to outline failure processes based on different financial variables (see e.g. du Jardin and Severin 2012, du Jardin 2015).

In order to detect different failure processes, a theoretical model of identical investment projects was proposed in Laitinen (1991). The main foundation of the model was that insolvency (defined as a lack of cash) can be avoided by creating enough revenue (Laitinen 1991). Therefore, the model could be especially applicable in the case of older firms that have established themselves on the market and are therefore able to create revenue. The model, intended to be a simplification, was composed of six different dimensions important in disclosing how a firm can become insolvent, and these dimensions were represented by the following variables (Laitinen 1991: 651–657): return on investment (ROI) – a profitability ratio; change in total assets (GTA) – a growth variable; net sales to total assets (NSA) – an efficiency (of using assets) ratio; traditional cash flow to net sales (CFR) – a cash flow ratio (reflecting both, dynamic liquidity and profitability); total debt to total assets (DAR) – a ratio reflecting capital structure and static solvency; and current ratio (CUR) – a static liquidity ratio. Laitinen (1991) used a factor analysis to reveal the interconnections between these six variables from three different pre-failure periods (i.e. t-2, t-4, t-6). Laitinen (1991: 660) established three factors, of which the first had the highest loadings with debt to assets ratio (positive loading) and cash flow to net sales ratio (negative loading), the second with

²³ Traditional cash flow = EBIT – interest – taxes + amortization & depreciation. Total debt and interest accounted are linked with the firm's weighted average interest rate.

current ratio (positive loading) and the third with return on investment (positive loading) and net sales to total assets (positive loading) ratios. In Laitinen's (1991) study, 32.5% of firms belonged to a chronic failure group, 27.5% to a revenue financing failure group, and 40.0% to an acute failure group (see Table 3), although the dataset was very small (40 observations).

Table 3. The characteristics of failure processes in Laitinen (1991)

Failure process	Characteristics (based on variable medians)
Chronic failure firm (32.5%)	Most ratios were poor already four years before failure. ROI and CFR negative, DAR exceeding one, low NSA, CUR below one. Most of the ratios deteriorated during the pre-failure years.
Revenue financing failure firm (27.5%)	ROI and CFR were negative for two years before failure. The other ratios also deteriorated from normal levels during the pre-failure years.
Acute failure firm (40.0%)	ROI and CFR were negative only one year before bankruptcy, but the evidence concerning other ratios was mixed. For instance, CUR was low throughout the six years studied, but NSA was high for all years.

Notes: ROI – return on investment ratio; GTA – change in total assets; NSA – net sales to total assets; CFR – traditional cash flow to net sales; DAR – total debt to total assets; CUR – current ratio.

Source: Laitinen (1991).

Despite a number of variables included in modelling the failure processes in Laitinen (1991), the main explanation of the processes can actually be made based on the traditional cash flow to sales ratio and return on investment ratio. This logically connects to the model's setup, as the central idea in the Laitinen (1991) study was to model the sufficiency of revenue (and the profit emerging from it) to keep a firm supplied with cash. In D'Aveni (1989), the three detected processes were quite similar in respect to the behaviour of return on assets (ROA). Lingers in D'Aveni (1989), like the chronic failure firms in Laitinen (1991), had a negative ROA for five pre-failure years. Gradually failing firms in D'Aveni (1989), like the revenue financing failure firms in Laitinen (1991), dropped to negative profitability two years before failure. Suddenly collapsing firms in D'Aveni (1989), like the acute failure firms in Laitinen (1991), had negative profitability one year before failure. An interesting aspect here is that in Laitinen (1991), acute failures had the largest proportion (40.0%), while in D'Aveni (1989) the smallest (only 10.2%). The greatest similarity was in the gradual failure groups: 38.8% in D'Aveni (1989) compared to 27.5% in Laitinen (1991). Firms with lengthy poor performance had the highest share

51.0% in D'Aveni (1991), but 32.5% in Laitinen (1991). The study by Laitinen et al. (2014) strongly opposes previous studies by establishing that gradual failure is the most common process (accounting for 62% of all firms analysed) for SMEs in Europe. In Laitinen et al. (2014), the median for ROA for gradually failing firms was also negative for two pre-failure years. In Laitinen et al. (2014), variables from Laitinen (1991) were applied (except for the traditional cash flow ratio, which was replaced with operating cash flow to cash operating revenue ratio) and in the case of gradually failing firms all other variables besides ROA also indicated a gradual worsening during the pre-failure years.

In Laitinen (2005), a six-stage financial distress model was proposed. The stages starting from the earliest and the variables used to depict them (in brackets) were (Laitinen 2005: 78): 1) low profitability / high growth rate (return on investment ratio, net profit to net sales ratio, growth in net sales), 2) low cash flow (cash flow to net sales ratio), 3) increase in debt financing (equity ratio, cash flow to debt ratio), 4) increase in current debt (equity ratio, quick ratio), 5) decrease in financial assets (quick ratio), 6) payment default. The four processes outlined in Ooghe and de Prijcker (2008: 229–233) had different starting points, but all trajectories were explained using four similar final stages: 1) insufficient cash flow and/or profitability (= lack of internal finance), 2) liquidity problems, 3) increase of liabilities (= weaker solvency), 4) mistrust of all financiers and acute cash shortage. Although the stages outlined in Laitinen (2005) and Ooghe and de Prijcker (2008) are similar, in Ooghe and de Prijcker (2008) the sequence of financial developments has been outlined in more detail compared to Laitinen (2005), and also Laitinen (1991).

More specifically, in Ooghe and de Prijcker (2008), insufficient profitability and/or operating cash flow has been disaggregated to components such as development in sales, operating costs and capital expenditures. These components can play different roles in the case of different failure processes, as for instance firms can witness different underlying problems like over-enlargement or reducing market share (Ooghe and de Prijcker 2008: 228–234). The changes in different income statement accounts (e.g. changes in revenue and costs) do not separately offer much informational value, but are valuable when viewed concurrently with profitability. For instance, the changes in these financial variables can reveal whether a drop in profitability was caused by: 1) an increase in costs being larger than an increase in sales, 2) a decrease in sales exceeding the retrenchment of costs, or 3) an increase in costs when sales in turn decreased. Beaver (1966: 80) has outlined that the *ceteris paribus* growth in expenditures will increase the bankruptcy probability. Another important element depicted in the models by Laitinen (2005) and Ooghe and de Prijcker (2008) is the “increase of liabilities”. Financial ratios like the equity ratio do not reveal whether a firm has been engaging additional debt to finance its operations. Therefore, the growth in total debt (or specific types of debt) can offer additional valuable information about the failure process. Beaver (1966: 80) outlined that the *ceteris paribus* increase in debt will increase the bankruptcy probability. In summary, the most elaborate empirical setting so far

interconnecting financial variables in the failure process by Laitinen (1991) can be developed even further by introducing additional dimensions to the analysis. **Therefore, there is a lack of knowledge about what the characteristics are of failure processes extracted with an extended set of financial variables compared to previous studies (GAP10).**

Therefore, based on the synthesis of the previous studies, different variables can obtain importance in the failure process and this has been depicted in Figure 2.

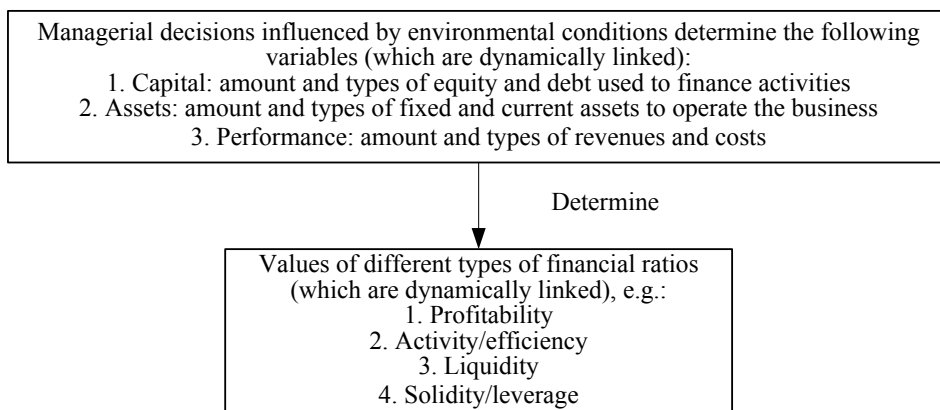


Figure 2. A general scheme of financial developments in the failure process (compiled by the author)

Figure 2 outlines the general scheme of the behaviour of financial variables in the failure process. First, the managerial decisions influenced by environmental conditions determine the values of financial statement variables. These values are obviously dynamically interconnected, as for instance, the availability of capital determines the investments made, and the latter in turn influences future revenues and costs. For instance, the debt engaged several years ago can also influence the availability of new debt and future costs. Financial ratios are calculated based on financial statement variables, and therefore, are directly influenced by their values. The classification of financial ratios on Figure 2 is directly based on the classification applied in Study 2, which is in turn based on a thorough analysis of previous studies in the domain of failure prediction. The scheme provided in Figure 2 will be applied in Chapter 2 outlining the study design and the specific financial variables applied.

1.3. Research questions of the thesis

The research questions (RQs) have been compiled on the basis of the literature review, which has outlined the knowledge gaps in past research (see Table 4). These RQs represent key issues that have not received enough attention in previous research. The RQs presented here have been set up intentionally in a

broad manner to summarize all research gaps and the four Studies in the thesis. Each of the Studies can address the specific RQ in its own way; therefore, under each RQ, specific research sub-questions (RSQs) have been outlined. For each RQ and its RSQs, below a motivation has been provided for why they have been set in their current form. This motivation is logically interconnected to the research gaps outlined in Chapter 1.2; therefore, the information provided when outlining the research gaps is not fully repeated here. The relationships between the RQs, the Studies and the research gaps can be followed in Table 4. Concerning the motivation of the RSQs, the Studies should be consulted as well. The specific study designs addressing the research questions will be presented in Chapter 2. As each of the Studies includes hypotheses set to guide the research (see Appendix 1), behind each RSQ, it has been noted in brackets what hypothesis from a specific Study is interconnected with the RSQ in question. The thesis applies RQs and RSQs instead of using the specific hypotheses from the Studies. The main reason for this is that the thesis objective requires viewing all four Studies in an integrated way, which will be better facilitated by using RQs and RSQs. Furthermore, as in the case of using research questions, propositions (expectations) concerning them have to normally be outlined, and therefore, the propositions have been presented in Appendix 2. Still, these propositions are directly based on the hypotheses set in the Studies (see Appendix 1) and their motivation can be followed in detail in the Studies themselves. This set of RQs and RSQs represents only a fraction of the topics of importance and does not aim to solve all unanswered questions concerning firm failure processes.

Table 4. Research questions of the thesis and their linkage with Studies and research gaps

Research question (RQ)	Studies where RQ is considered	Research gaps considered under RQ
RQ1. Do different firm failure processes exist?	Study 1, Study 2, Study 3, Study 4	GAP1, GAP2, GAP7, GAP10
RQ2. Do failure processes vary across countries?	Study 1, Study 2, Study 3	GAP5
RQ3. Do failure processes vary with firm size?	Study 3, Study 4	GAP4, GAP9
RQ4. Do failure processes vary with firm age?	Study 2, Study 4	GAP3, GAP8
RQ5. Do failure processes vary between exporting and non-exporting firms?	Study 2, Study 3	GAP6

Source: compiled by the author.

The format for denoting RSQ numbers is as follows: RSQ(Research question number – given in the thesis, see Table 4)(Study number – predefined, see Introduction)(Research sub-question number – given in the thesis). Therefore,

for instance, the fourth RQ considered in Study 2 with one RSQ will be noted as 4.2.1. In brackets after each RSQ, the hypothesis number from the specific Study has been noted as Hn (e.g. hypothesis 1 is noted as H1).

RQ1 focuses on the existence of different failure processes and is vital for the other RQs, as before comparing different failure processes they must be detected. Although previous studies have proven the existence of different failure processes (see Chapter 1.2.1), RQ1 addresses the detection of failure processes in several novel ways. Study 2 is unique, as there is no previous research known to the thesis author specifically about the detection of different failure processes of young firms, and no specific attention has been paid to micro firms. In addition to the use of variables proposed by Laitinen (1991) in Study 3, in that study an extended study design with more variables has also been used. Although previous research exists about the failure processes of old firms (e.g. D’Aveni 1989, Laitinen 1991, Laitinen et al. 2014), as noted in Chapter 1.2.1, the study designs have (serious) limitations, and therefore, this thesis uses a study design addressing many of the limitations of previous studies in order to confirm or reject whether different failure processes exist for old firms and what these processes specifically are. Studies 2 and 3 consider firms from a single sector and some other treatments (e.g. all firms have bankrupted and after that dissolved; the time between last annual report and bankruptcy is more homogenous) have been applied to make the large datasets from different countries as comparable as possible. Study 4 uses a taxonomy reflecting the voluntaristic, deterministic and integrative theories. In Study 1, failure processes extracted based on financial variables have been linked to failure causes.

RQ1. Do different firm failure processes exist?

Study 1:

RSQ1.1.1. Do different failure processes (based on financial variables) exist in Finland? (H1)

RSQ1.1.2. Do different failure processes (based on financial variables) exist in Estonia? (H1)

RSQ1.1.3. Are different failure processes (based on financial variables) interconnected to specific failure causes in Finland? (H1)

RSQ1.1.4. Are different failure processes (based on financial variables) interconnected to specific failure causes in Estonia? (H1)

Study 2:

RSQ1.2.1. Do different failure processes (based on financial variables) exist for young manufacturing micro firms in Europe (grouped as 3-, 4-, 5- and 6-year-old firms)? (H1)

Study 3:

RSQ1.3.1. Do different failure processes (based on two different study designs applying financial variables) exist for old (at least 10-year-old) manufacturing firms in Europe? (H1)

Study 4:

RSQ1.4.1. What are the shares of different failure processes (based on non-financial variables, i.e. failure causes reflecting the deterministic, voluntaristic and integrative theories) in Estonia? (H1.1, H1.2, H1.3)

RQ2 focuses on a major gap in the research of failure processes, namely on the comparison of failure processes across different countries. A few studies (e.g. Laitinen et al. 2014) have considered the inter-country comparison of failure processes besides Studies 1, 2 and 3 included in this thesis. Still, as noted in Chapter 1.2.1, in Laitinen et al. (2014), the dataset consisted of different firms; therefore, it has remarkable limitations. RQ2 deals mostly with exploratory analysis. The number of different countries included in the analysis through different Studies is as follows: Study 1 – 2 countries, Study 2 – 11 countries, Study 3 – 15 countries. Still, one limitation is that in Study 2 and 3 the number of cases applied in the analysis from different countries can vary considerably. RQ2 does not concern Study 4, as it is based on Estonian data only.

RQ2. Do failure processes vary across countries?

Study 1:

RSQ2.1.1. Can matched Finnish and Estonian firms be distinguished based on pre-failure financial variables? (H1)

RSQ2.1.2. Can matched Finnish and Estonian firms be distinguished based on pre-failure non-financial variables (failure causes)? (H1)

RSQ2.1.3. Is there a contingency between the Finnish and Estonian failure processes? (H1)

Study 2:

RSQ2.2.1. Do extracted failure processes differ across European countries for young manufacturing micro firms (grouped as 3-, 4-, 5- and 6-year-old firms)? (H3)

Study 3:

RSQ2.3.1. Do extracted failure processes (based on two different study designs applying financial variables) differ across European countries for old (at least 10-year-old) manufacturing firms? (H2a)

RQ3 focuses on another domain not sufficiently elaborated previously in the literature, namely how are failure processes interconnected with firm size. There

is some evidence in the literature of interconnections existing between firm size and failure processes, but none of the available studies has specifically focused on this. For instance, based on Hambrick and D'Aveni (1988), it could be assumed that large firms go through a lengthy failure process starting even ten years before bankruptcy. Still, the results in Laitinen et al. (2014) indicate that the profitability of one group of SMEs can be lower even earlier than for large corporations in Hambrick and D'Aveni (1988). Therefore, previous studies offer contradictory evidence in this respect. In respect to failure causes and firm size, some simple descriptive evidence is available based on large samples (see e.g. Hall 1992), but the topic needs to be studied in more detail. More generally, the analysis of the interconnection of firm size and failure processes aims to contribute to the theories of liabilities of size (for these theories, see Aldrich and Auster 1986).

RQ3. Do failure processes vary with firm size?

Study 3:

RSQ3.3.1. Do extracted failure processes (based on two different study designs applying financial variables) differ across size groups for old (at least 10-year-old) European manufacturing firms? (H2b)

Study 4:

RSQ3.4.1. How does the likelihood of following different failure processes (based on non-financial variables, i.e. failure causes reflecting the deterministic, voluntaristic and integrative theories) in Estonia change with firm size? (H2.1, H2.2, H2.3)

RQ4 focuses on another domain not sufficiently elaborated previously in the literature, namely how do failure processes change with firm age. RQ4 concerns Studies 2 and 4. Study 1 does not distinguish firms based on age. Study 3 considers only the last stages in the failure process of old firms (the age of which is at least 10 years at the moment of declaring bankruptcy) and these firms have not been distinguished in respect to their age either. The lack of previous studies concerns mostly modelling failure processes using financial variables. There is evidence of comparing failed and non-failed young firms in bankruptcy prediction studies (see e.g. Laitinen 1992, Huyhebaert et al. 2000, Wiklund et al. 2010), but no specific attention has been paid to the aspect of whether failure processes change when the age of young firms increases and how. The interactions of age and failure causes have been modelled before (e.g. Thornhill and Amit 2003), but this has been done by viewing only specific failure causes, not a comprehensive taxonomy covering different theoretical perspectives. More generally, the analysis of the interconnection of firm age and failure processes, aims to contribute to the theories of liabilities of age (for these theories, see Henderson 1999).

RQ4. Do failure processes vary with firm age?

Study 2:

RSQ4.2.1. How do the number and types of failure processes change with a growth in age for young manufacturing micro firms in Europe? (H2)

Study 4:

RSQ4.4.1. How does the likelihood of following different failure processes (based on non-financial variables, i.e. failure causes reflecting the deterministic, voluntaristic and integrative theories) in Estonia change with firm age? (H3.1, H3.2, H3.3)

RQ5 focuses on another domain not elaborated previously in the literature, namely how are failure processes interconnected with previous firm engagement and non-engagement in exporting. RQ5 is mainly exploratory and concerns only Studies 2 and 3. In the case of Studies 1 and 4, exporting behaviour information was not available for the thesis author.

RQ5. Do failure processes vary between exporting and non-exporting firms?

Study 2:

RSQ5.2.1. Do the extracted failure processes differ between young European manufacturing micro firms (grouped as 3-, 4-, 5- and 6-year-old firms) engaged in exporting and not engaged in exporting? (H4)

Study 3:

RSQ5.3.1. Do extracted failure processes (based on two different study designs applying financial variables) differ between old (at least 10-year-old) European manufacturing firms engaged in exporting and not engaged in exporting? (H2c)

It is also important to note what is the interconnection of the four Studies with the definition of failure processes outlined in Chapter 1.2.1: **why** (depicted using causes as non-financial variables) and **how** (depicted using financial variables from consecutive pre-bankruptcy years) do firms become bankrupt. Studies 2 and 3 focus only on the **how** question in a dynamic way, namely by using financial variables from different consecutive pre-bankruptcy years. Study 4 focuses only on the **why** question by using failure causes statically. Study 1 answers both of these questions, also by considering **why** and **how** simultaneously, but in Study 1 still the main focus is on the **how** question.

2. THESIS DATA AND METHODS

This chapter describes the data and methods employed to achieve the objective of the thesis, fill the research gaps and find answers for the RQs and RSQs. All the Studies included in the thesis rely on empirical analysis. The data and methods applied in the Studies are described in Table 5.

Table 5. Data and methods in the Studies included in this thesis

Study	Data	Quantitative methods applied
Study 1 (Laitinen and Lukason 2014)	Firm financial data from Finnish and Estonian business registers (i.e. EBR), bankruptcy causes from court judgements downloaded from Estonian Data System of Courts and its previous version Database of Court Statistics and Decisions (together as EDSC), Finnish causes from different public sources (including trustee reports). Sample: 70 from both countries, Estonia and Finland.	Statistical tests, correlation analysis, binary logistic regression, factor analysis.
Study 2 (Lukason, Laitinen and Suvas 2016)	Firm financial data from Amadeus. Sample: 1,216 firms from different European countries.	Statistical tests, factor analysis, cluster analysis.
Study 3 (Lukason and Laitinen 2016)	Firm financial data from Amadeus. Sample: 1,235 firms from different European countries.	Statistical tests, factor analysis, cluster analysis.
Study 4 (Lukason and Hoffman 2014)	Bankruptcy causes from court judgements downloaded from EDSC, firm financial and background data from EBR. Sample: 1,281 from Estonia.	Statistical tests, multinomial logistic regression.

Source: Studies noted in the first column.

Six different data sources have been used in the Studies, which are the Amadeus database (Studies 2 and 3), Estonian Business Register (Studies 1 and 4), Estonian Data System of Courts (previously Database of Court Statistics and Decisions; Studies 1 and 4), Finnish Business Information System (Study 1) and various other Finnish public data sources including trustee reports (Study 1). The data collection and coding from all Estonian databases and the Amadeus database was done by the thesis author, whereas from Finnish databases by Erkki K. Laitinen. The Finnish data sources were used only in Study 1 to obtain comparable data from two countries – Finland and Estonia.

The thesis makes use of two broad groups of variables, which will be described below with the methods for detecting the failure processes. The two broad groups of variables are: 1) financial variables originating from the annual reports of firms, and 2) non-financial variables as failure causes.

For the detection of failure processes, Studies 1, 2 and 3 make use of factor and cluster analyses. In addition, correlation analysis and logistic regression have been used in Study 1. In Study 4, multinomial logistic regression has been used. In all Studies, statistical tests have been used.

2.1. Financial variables

In Studies 2 and 3 only and in Study 1 mainly financial variables have been used. Financial variables in this thesis are financial ratios, changes in financial statement variables and financial statement variables (i.e. total sales and assets). Financial variables have been chosen based on their theoretical importance and usage in the previous studies on failure processes and prediction (see Chapter 1.2.3). Table 6 documents the general setting of financial variables for the detection of failure processes and Table 7 documents the specific variables used.

The financial variables used in different Studies are similar, but not identical. The variables in Study 1 are similar to those in Laitinen (1991), but a few amendments have been made in order to include additional relevant variables in the analysis. Study 3 uses two settings, of which the first makes use of the same variables as in Laitinen (1991) and the second an extended set of variables. Many of the variables in Study 2 are similar to those in Laitinen (1991), but also several additional variables have been used.

In Studies 2 and 3, the t-1 period means 0.75–1.25 years to bankruptcy, whereas the relevant mean and median values in both Studies are exactly 1.00 years. Thus, the t-1 period reflects the time approximately one year before the compulsory liquidation decision in court because of permanent insolvency. In pilot Study 1, this figure has a wider span, namely ranging from 0.5–1.5 years.

Table 6 documents the general setting of financial variables used in the Studies. Three columns in Table 6 indicate how many different financial ratios, financial statement variables and the changes in them have been used in each of

the Studies, the last column presenting the total number of variables²⁴ used. One column indicates which pre-failure periods have been included in the analysis.

Table 6. The application of financial variables in Studies 1, 2 and 3

Study	Financial ratios	Changes in financial statement variables	Financial statement variables	Periods involved	Total variables
Study 1	6	2	2	t-1 and t-2	16
Study 2	8	3	0	Whole lifecycle	11, 22, 33, 44 depending on firm age
Study 3 (two different settings applied, namely 1 st and 2 nd)	5 (1 st) / 7 (2 nd)	1 (1 st) / 4 (2 nd)	0	Five periods from t-1 to t-5	30 (1 st) and 55 (2 nd)

Source: Studies noted in the first column.

The Studies make use of the general scheme of financial developments in the context of bankrupted firms (see Figure 2). Four change variables have been used in the Studies: a) change in total assets, b) change in total debt, c) change in operating revenue, and d) change in operating costs. These changes reveal the main underlying developments that the financial ratios depend on. As noted in Study 2 (page 1973) “changes in total assets show the developments in firm’s total resource base”; that is, changes in the resources a firm is using for revenue creation. Change in total debt reflects whether a firm involves additional debt or not. Debt is not disaggregated here, as a firm can switch between different debt sources (e.g. between bank loans or accounts payable), and therefore, using only an increase/decrease of a specific source of debt might lead to controversial results. Change in equity has not been accounted, as the empirical data revealed that firms included in the Studies rarely involve additional share capital or pay dividends (especially during the years closer to failure), and therefore, the profitability ratios already serve as proxies of the change in equity.

Changes in operating revenue and operating costs (without amortization and depreciation, as it is an estimated, not real cost) reflect the two main developments in the income statement. These changes offer an insight into whether a firm’s revenues shrink or increase, accompanied by that fact, how costs behave simultaneously. The changes in these income statement variables provide an explanation for why a firm’s profit has changed. In the second design of Study

²⁴ This means, that each variable has been multiplied with the number of years for which it has been calculated.

3, all the above-described four change variables have been used. The first design of Study 3 only makes use of the variables in the Laitinen (1991) model, and therefore, only the change in total assets has been used. In Study 2, the change in operating costs was not included in the analysis, as information about amortization and depreciation was not available for most of the young micro firms.

Table 7. Specific financial variables applied in the Studies

Type of financial variable	Study 1	Study 2	Study 3 (design 1)	Study 3 (design 2)
Size				
Natural logarithm of total assets ¹ , natural logarithm of total operating revenue ²	X ¹ X ²			
Changes in financial statement variables				
Change in total assets	X	X	X	X
Change in operating revenue	X	X		X
Change in total debt		X		X
Change in operating costs				X
Profitability				
Profit (EBIT ¹ and/or net profit ³) to total assets ratio	X ¹	X ¹ X ²	X ¹	X ¹
Profit (net profit) to operating revenue ratio	X			
Liquidity				
Traditional cash flow to operating revenue ratio (reflecting also profitability)	X		X	X
Static liquidity ratio(s) (quick ratio ¹ and/or current ratio ² and/or NWC to total assets ³)	X ¹	X ¹ X ² X ³	X ²	X ¹ X ²
Solidity (solvency)				
Equity ratio (static solidity, also reflecting capital structure)	X	X	X	X
Traditional cash flow to total debt ratio (dynamic solidity)				X
EBIT to financial expenses ratio (dynamic solidity)		X		
Activity/efficiency				
Operating revenue to total assets ratio		X	X	X
Total debt to operating revenue	X			

Source: compiled by the author based on the Studies.

Notes: Multiple X-s mean that several variables from the first column have been applied and superscript denotes which specific variable from the first column has been applied.

Study 1 has also used the Laitinen (1991) model with only a few amendments. As the firms in Study 1 are from different size categories, it is the only study where size variables have been used in the study design.

Profitability plays a central role in the existence of each firm, and this measure has been portrayed with the profitability of assets ratio in each Study. This exactly follows the example from Laitinen (1991) and shows how successfully assets have been utilized in creating a rate of return. Similarly, each Study makes use of the variable reflecting the productivity of assets in creating operating revenue (in Table 7, the activity/efficiency group). Only in Study 1, was this replaced by the total debt to operating revenue ratio. The traditional cash flow ratio (i.e. the ratio of the sum of net profit and depreciation/amortization divided by operating revenue) also reflects profitability, namely a certain type of sales margin. But even more importantly, this ratio reflects dynamic liquidity; that is, how the created revenue contributes to the firm's cash position. Traditional cash flow ratio is used in Studies 1 and 3, but not in Study 2. This is because for the young micro firms in Study 2, the amortization and depreciation information was mostly missing, disabling the calculation of that variable. Study 2 makes use of three different static liquidity ratios. In some circumstances, the quick ratio might offer a more realistic picture of static liquidity than the current ratio, as in the case of the latter the non-cash items under current assets have mainly been estimated, and therefore, might be more subject to a possible misreporting. In all Studies, the static solidity is reflected by the classical equity ratio. In Studies 2 and 3, different dynamic solidity ratios have been used, mainly because for Study 2 the amortization and depreciation information was not available. As Study 1 mainly uses variables similar to the Laitinen (1991) model, the dynamic solidity variable is not used in that study.

Studies 1, 2 and 3 differ in respect to the time periods used in the analysis. In Study 2, the whole lifecycle for short-lived firms has been used. In Study 1, the two pre-bankruptcy years have been used, as the ages of the firms are mixed. In Study 3 inclusive of five years before failure, the length of the pre-failure time used in the analysis has been chosen based on a similar time in previous studies (e.g. six years in Laitinen 1991, six years in Moulton et al. 1996 and four years in Laitinen et al. 2014).

2.2. Failure causes

This chapter focuses on obtaining information about failure causes. As only 6 out of 18 RSQs focus on failure causes (1 RSQ only on Finland, 4 RSQs only on Estonia, 1 RSQ on Finland and Estonia together), then in this chapter, general and/or Estonia-specific information will be presented first, leaving Finland-specific and country-comparative information to the end of the chapter.

Obtaining information about failure causes is remarkably more challenging compared to the usage of financial data, and in Chapters 1.2.1 and 1.2.2, multiple different options from previous studies about how to obtain such information were presented. Specifically, Chapters 1.2.1 and 1.2.2 outlined that

failure causes can originate from either managers/owners or trustees/court, but the former might be unreliable (Mellahi and Wilkinson 2004: 33). Therefore, trustees must be considered a more impartial source of information. When using trustee opinions about failure causes, two questions can arise: 1) how much work they have done to detect the causes in a specific bankruptcy case, and 2) what are the specific cause detection algorithms. Unfortunately, the aforementioned two questions might remain undisclosed when using the information, which has already been presented by the trustees (e.g. the information about the failure causes in the court judgement). Still, when a population is enough large (especially when the whole population is used), a reasonable expectation would be that the results are not influenced by the peculiarities of specific trustees (including their work practice). In the bankruptcy laws of both countries (i.e. Finland and Estonia), trustees are obliged to detect bankruptcy causes and present them to court²⁵. Therefore, the failure causes presented by trustees can be extracted from court documents (including the court judgement about each bankruptcy case).

Another option would be to run a questionnaire among trustees (see e.g. Baldwin et al. 1997). Still, conducting a questionnaire should be done in a live principle (namely, at the time when the trustees are working with the specific cases), as the *ex post* approach would probably just duplicate what the trustee has already noted to the court. It is also evident that treating cases in a live principle (as in Baldwin et al. 1997 and Crutzen 2009) does not make it possible to capture a population of such size and variety as in Study 4. Moreover, questionnaires can include a bias by leading respondents towards the questions provided, and therefore, important aspects of the failure process might remain undisclosed. Therefore, in previous studies, interviews have also been conducted on the participation of several stakeholders (see e.g. Crutzen 2009) to find out the causes of failure, but as such a method is extremely laborious, evidently only a small number of cases can be used. Therefore, the author is well aware of the different options for obtaining information about the failure causes, and the usage of court judgements has been a deliberate choice in the thesis.

An important question is the reliability of the information about failure causes in the court judgements. There is no grounds to suspect intentional misreporting of the causes, as in Estonia the trustees are obliged to state bankruptcy causes to the court according to the Bankruptcy Act (2016). In turn, the question of whether a trustee can detect the causes correctly, can arise. As the dataset of Estonian court judgements applied in this thesis includes assessments by 53 different trustees, it can be assumed that any assessment biases or faults in the data are random. Each trustee can have its own methodology for making the assessment about causes, but that methodology is usually not disclosed in the court judgement.

²⁵ See Bankruptcy Act (2004) and Bankruptcy Act (2016).

Due to the diversity of information presented in court judgements, it is evident that they might not be applicable when failure causes are needed in a very disaggregate format. This has also been kept in mind when composing Studies 1 and 4. For instance, the taxonomy of failure causes in Study 4 is in a very aggregate form. An example of the failure causes summarized from court judgements about bankrupt manufacturing firms can be followed in a recent study (see Lukason and Hoffman 2014: 90) co-authored by the thesis author.

The detection of causes from Estonian court judgements was conducted by the thesis author. As the causes have normally been brought out as a list in court judgements, this list can easily be copied from the court judgement. On the other hand, their classification into relevant taxonomies can lead to a bias from the person doing the classifying. Therefore, in Study 4, a separate person has also been used to classify the causes to provide reliability in the classification process. Such a separate classifier was not used in Study 1, but as in Study 4 there were no differences between the results obtained by the thesis author and the independent assessor, this provides at least some support for the accuracy of the thesis author's classification in Study 1 as well.

When classifying causes as internal and external, past examples from the literature were used in Studies 1 (see page 816) and 4 (see page 49). Examples of classifying causes as internal and external can be followed in other studies co-authored by the thesis author (see Lukason and Hoffman 2014: 90, Lukason et al. 2016: 177–178).

In summary, the usage of bankruptcy causes from court judgements evidently has limitations. As noted above, two major questions might arise. First, there is no information available for exactly how proficient an average trustee is in detecting the failure causes (i.e. in determining the causality). This also concerns whether all of the failure causes noted could be considered of equal importance or not. In previous important studies (e.g. Baldwin et al. 1997, Thornhill and Amit 2003), such proficiency has not been questioned, and therefore, it could be assumed that the use of information from trustees is an acceptable choice in the available literature. Second, some failure causes might cause ambivalence when coding, namely whether to consider them as purely internal or external. In such cases the court judgement must always be consulted in more detail to understand how such a cause has emerged in the failure process.

In summary, the stages of obtaining the failure causes for statistical analysis were as follows:

1. Obtaining a list of court judgements about bankruptcies for the period 2002–2009 from the Estonian Ministry of Justice in late 2009.
2. Downloading court judgements from the Estonian Data System of Courts (judgements from 2006 on) and its previous version Database of Court Statistics and Decisions (judgements to 2005)²⁶.

²⁶ The difference in the databases concerns their structure, not the content of court judgements.

3. Linking court judgements with firms' business registry codes. Firms' business registry codes must be found from the judgements, as there was no separate file available to link the court judgement numbers and the firms' business registry codes.
4. Extraction of the text concerning the failure causes from the court judgements. In this phase, the court judgements which did not have the failure causes listed or did not present them understandably, were abandoned.
5. Writing out specific failure causes from the extracted text about the failure causes.
6. Classification of the failure causes into an intermediate taxonomy (18 causes) to facilitate their quick use afterwards.
7. Usage of the intermediate taxonomy to classify causes for the taxonomy in Study 1.
8. Usage of the intermediate taxonomy to classify causes for the taxonomy in Study 4. As noted earlier, in Study 4 an independent researcher was given a sample of the texts including failure causes (see point 4) and was asked to classify them to the taxonomy applied in Study 4. The latter was necessary for inter-rater reliability.

The thesis includes Study 1, in which Finnish and Estonian firms are compared in respect to failure causes (RSQ2.1.2), and also in each of the countries separately, the association of failure causes and failure processes (detected by using financial variables) has been studied (RSQ1.1.3 and RSQ1.1.4). Bankruptcy causes for Finnish firms have been obtained from different public sources (i.e. trustee reports, annual reports, published interviews). When starting to compose Study 1, the collection of information about the failure causes from both countries had already ended; therefore, it was decided with co-author Erkki K. Laitinen to unify the available information under a common taxonomy, and not to start a new inquiry into failure causes (e.g. based on questionnaires). A unified taxonomy consisting of five different causes was agreed upon. Subsequently, the original Finnish and Estonian causes were classified into a 5-cause taxonomy (general external environment developments, specific external environment developments, problems/lacks in general management, financial management and control, operations management). The classification of the causes from both countries to the homogenous taxonomy was administered first by the thesis author, then checked by co-author Erkki K. Laitinen, and then, the final classification was agreed upon. The thesis author acknowledges that the study designs concerning the few RSQs concerned with inter-country comparison of failure causes are subject to several limitations, but the best effort was made with the available information.

2.3. Detection of failure processes with financial variables

The research on whether different failure processes exist is a search for a taxonomy/typology in the population. In practice, the probability of finding two identical failing firms based on their financial ratio values is almost zero. As a simple example, based only on the fact of whether pre-failure profitability is negative or positive, and looking at two pre-failure periods t-1 and t-2, there are four different combinations possible: a) positive in both periods, b) negative in both periods, c) positive in t-1 and negative in t-2, d) negative in t-1 and positive in t-2. When expanding previous analysis by increasing the number of observed periods or introducing additional variables, the number of different failing firm types will grow very quickly. As financial variables are originally continuous variables, the problem of detecting different types of failing firms becomes even more difficult. Therefore, the creation of a taxonomy of failure processes inevitably means that groups of firms where the behaviour of studied variables is similar during the pre-failure years are sought. In such a setting, the content of the term “similar” will be mainly a question of the study design chosen. More specifically, there is no universal rule available for this purpose.

When using statistical techniques to model failure processes, financial variables from different points in time are a useful input. First, there is a solid theoretical basis for their inclusion (see e.g. Laitinen 1991). Second, financial variables are continuous variables from different points in time, and therefore, suit statistical analysis well. Failure causes extracted from court judgements reflect the whole pre-failure period (i.e. court judgements normally do not include information about the time the causes emerged) and are of binary/nominal nature (i.e. whether some cause was present or which of the different causes the failure was subject to). Moreover, the possibility that some causes detected might have a certain overlap with financial variables (e.g. the trustee detected that a firm was undercapitalized), cannot be excluded. Therefore, it is not reasonable to apply failure causes simultaneously with financial variables in the statistical analysis.

As noted in Chapter 1.2.1, the research question about detecting different failure processes has been addressed either qualitatively or quantitatively. Among quantitative methods, factor analysis (e.g. Laitinen 1991) and cluster analysis (e.g. D’Aveni 1989) have proven to be useful in detecting different failure processes. Also, in a study co-authored by the thesis author, the consecutive use of factor and cluster analyses for the detection of failure processes was introduced and was efficient in taxonomy creation (see Laitinen et al. 2014). Subsequently, the settings for the factor and cluster analyses in the Studies have been summarized in Table 8.

It is important to re-emphasize an important aspect. The detection of failure processes in Studies 1, 2 and 3 by applying either factor or factor-cluster analysis on financial variables from different pre-failure points in time is directed at finding the **main failure processes** among the analysed firms, rather than each possible pathway towards bankruptcy.

Table 8. Settings for factor and cluster analyses in the Studies

Study	Method	Robustness check and notes
Study 1	Factor analysis method: unweighted least squares and Varimax rotation. Firms classified to processes based on the largest factor score.	Larger number of factors and subsequent classification of factor scores with k-medians did not yield different results. The usage of k-means and k-medians with financial variables resulted in a situation, where most of the cases were in one cluster (evidently, because financial variables are skewed, unstandardized and have different scales). Financial variables were winsorized before usage in the factor analysis. Variance explained by factor solutions was acceptably high (i.e. 82%).
Study 2	Factor analysis method: unweighted least squares and Varimax rotation. Cluster analysis method: factor scores clustered using k-medians and solution chosen based on the first local maximum of pseudo-F statistic. Firms classified to processes based on their cluster membership.	Higher values for k than that chosen in k-medians clustering did not yield a solution with higher pseudo-F. Financial variables winsorized before usage in the factor analysis. Variance explained by factor solutions was acceptably high (i.e. 77%–81%).
Study 3	Factor analysis: unweighted least squares and Varimax rotation. Cluster analysis: factor scores clustered using k-medians and solution chosen based on the first local maximum of pseudo-F statistic. Firms classified to processes based on their cluster membership.	Higher values for k than that chosen in k-medians clustering did not yield a solution with higher pseudo-F. Financial variables winsorized before usage in the factor analysis. Variance explained by factor solutions was acceptably high (80%–84%).

Source: compiled by the author based on the Studies.

The author of the thesis is aware that different extensions to classical factor and cluster analysis methods exist, but also various machine learning tools can be applied. As noted in Jain (2010), there are by now thousands of clustering algorithms available. Still, it is reasonable to apply a known method, when it is applicable to specific data. Moreover, in the case of machine learning clustering, it might be difficult or impossible to follow based on what criteria firms are clustered, but the latter is essential for the replicability of the analysis. The tandem factor-cluster analysis has been applied in multiple areas of economics and management in different studies, some of which are highly cited and published in journals with high impact factor (see e.g. Cha et al. 1995, Chen

et al. 2001, Davidova et al. 2003, Iraizoz et al. 2007, Jun and McCleary 1999, McDougall and Robinson 1990). Of course, the thesis author is aware that like all clustering methods, the tandem factor-cluster analysis is also not free from limitations, but it has proven to be efficient in the creation of a taxonomy of failure processes (see Laitinen et al. 2014), before being applied in Studies 2 and 3 in this thesis.

2.4. Summarized study designs

Below short descriptions of the study designs in each of the Studies have been provided. This makes it possible to follow quickly how the results in different Studies have been obtained.

Study 1 design

For Study 1, financial and non-financial variables were initially available for 70 Finnish bankrupt firms, which had been collected in Finland during a research project. The Finnish firms were matched with Estonian firms, which had the same information available. The matching was achieved by finding firms from Estonia as similar as possible to the Finnish ones based on industry, size (number of workers) and time of bankruptcy. Although the entire Estonian population was used, there were few suitable firms with the necessary information available for each match. Failure causes were initially based on different taxonomies, and therefore, those taxonomies had to be unified.

In the first stage of the analysis, statistical tests were run and logistic regression was used to find out how the failure causes and financial variables differ for firms from the two countries. Then, failure processes were detected for each country separately using factor analysis on financial variables. As in Laitinen (1991), each factor was considered to depict a specific failure process and firms were classified to follow a specific failure process based on the highest factor score value. After that, the contingencies of failure processes in the two countries were checked using a chi-square test (based on firm groupings) and correlation analysis (based on factor score values). In the final stage, the interconnection of failure causes and extracted processes were studied in each country separately using a statistical test.

Study 2 design

The data in Study 2 originated from the Amadeus database and concerns young manufacturing firms from different European countries. In total, 1,215 firms have been used in the analysis, which breaks down into four groups: 3-, 4-, 5- and 6-year-old firms. Each group was analysed separately, as the aim was to model the whole lifetime of firms, and therefore, different lifetimes would have complicated the analysis. All firms belonged to NACE C – the manufacturing industry. The limitation of the analysis on a single sector was necessary, as in

this way the possible sectoral impacts on the results were eliminated. The largest number of firms originated from Italy and France, the other countries being represented with a lower number of cases.

The financial variables (ratios and changes) were selected based on previous studies of failure prediction and (old firm) failure processes. The detection of failure processes was achieved using a factor-cluster analysis. After the detection of the failure processes, the contingencies between failure processes and firm countries of origin and exporting behaviour were studied.

Study 3 design

The data in Study 3 originated from the Amadeus database and concerned old manufacturing firms (at least ten years old at the time of declaring bankruptcy) from different European countries. The sample consisted of 1,235 firms and the countries with the highest number of cases represented were Italy, France, Romania, Spain and Hungary. All firms belonged to NACE C – the manufacturing industry, and as with Study 2, such a limitation was necessary to avoid a sectoral impact on the results.

Study 3 used two different study designs. First, the failure processes were extracted using the factor-cluster analysis on the six financial variables from the Laitinen (1991) study. Secondly, these six financial variables were supplemented with five additional financial variables and the failure processes were again extracted using the factor-cluster analysis. After the extraction of the failure processes, the contingencies between the failure processes and firm country of origin, size and exporting behaviour were studied.

Study 4 design

The data in Study 4 encompassed failure causes obtained from court judgements. The dataset included all publicly available court judgements about bankruptcies at the moment of downloading. The strategy for detecting failure causes from the judgements was described earlier in this chapter. In total, 1,281 court judgements, where failure causes had been brought out, were applied. In Study 4, a different taxonomy compared to Study 1 was applied. Namely, failure causes were depicted using a single nominal variable, namely either only internal, only external or both of those causes were noted in the specific court judgement. Such a taxonomy facilitates depicting whether the failure can be explained by voluntaristic, deterministic or integrative theories. Besides outlining the frequencies of the three different causes, a multinomial logistic regression was used to study how the failure causes (the nominal dependent variable) are interconnected with firm age and size.

3. EMPIRICAL STUDIES

4. DISCUSSION OF RESULTS AND CONCLUSIONS

4.1. Discussion of research questions

In this chapter, the results of the analysis in answer to the research questions (RQs) and research sub-questions (RSQs) will be provided with a discussion in the light of available literature. The chapter is set up so that the answers to each RQ with its RSQs will be expounded and discussed separately. In Table 9, Table 11, Table 13, Table 14 and Table 15, all the results in response to the RSQs have been provided. The information in those tables has still been presented in a shortened form, meaning that the main findings have been presented, but the replication of all specific results from the Studies has been intentionally avoided. Therefore, concerning the details of the findings, the relevant Studies should be consulted.

RQ1. Do different firm failure processes exist?

All four Studies confirmed the findings in previous literature, that different failure processes exist (see Table 9). Studies 1, 2 and 3 used financial variables to detect failure processes. In Study 1, only factor analysis was used for that purpose, which resulted in 5 different processes for Finnish firms and 6 different processes for Estonian firms. These processes describe remarkably different pathways of failure (also when comparing the two countries) and have been presented on pages 821–825 of Study 1. A limitation of Study 1 is that the datasets from both countries are small and dispersed over different sectors. Therefore, Studies 2 and 3 concentrate on a single sector – manufacturing firms. Studies 2 and 3 reveal two failure processes for old firms (see pages 69–71 in Study 3) and two to four failure processes for young micro firms (see pages 1974–1978 in Study 2).

There are no specific guidelines from previous studies on how to distinguish acute, gradual or chronic failure processes. This is especially topical in the case of (very) young firms, as for such firms, it is not possible to view many consecutive pre-failure years. In the case of the acute failure process, failure prediction using information from annual reports is difficult, as for this process, financial ratio values do not signal problems one year before failure, or they obtain poor values only in the last year before failure (see Laitinen 1991). In the case of the gradual failure process, the decline can be followed during several pre-failure years (Laitinen 1991). This decline has mostly been portrayed by reducing profitability (see Laitinen 1991, D’Aveni 1989), but the values other financial ratios can worsen as well. The changes in some other ratios are at least partly caused by falling profitability. For instance, earning losses *ceteris paribus* reduces a firm’s equity.

Table 9. Results of RSQs under RQ1

RQ1. Do different firm failure processes exist?	Result
Study 1	
RSQ1.1.1. Do different failure processes (based on financial variables) exist in Finland?	Yes. <u>5 different failure processes</u> were detected. Shares of processes: 17.1%, 32.9%, 30.0%, 7.1%, 12.9%. The processes have been outlined in detail on pages 821–822 in Study 1.
RSQ1.1.2. Do different failure processes (based on financial variables) exist in Estonia?	Yes. <u>6 different failure processes</u> were detected. Shares of processes: 8.6%, 28.6%, 8.6%, 20.0%, 11.4%, 22.9%. The processes have been outlined in detail on pages 823–824 in Study 1.
RSQ1.1.3. Are different failure processes (based on financial variables) interconnected to specific failure causes in Finland?	Yes. Specifically, in the case of only two causes (general external developments and general management skills) out of five, the means are significantly different through failure processes. See pages 824–827 in Study 1.
RSQ1.1.4. Are different failure processes (based on financial variables) interconnected to specific failure causes in Estonia?	No. None of the causes used have significantly different means through failure processes. See pages 824–827 in Study 1.
Study 2	
RSQ1.2.1. Do different failure processes (based on financial variables) exist for young manufacturing micro firms in Europe (grouped as 3-, 4-, 5- and 6-year-old firms)?	<p>Yes for all age groups of young firms.</p> <p><u>Four failure processes</u> were detected in the case of <u>3-year-old firms</u>. Shares of processes: 19.4%, 59.4%, 14.8%, 6.4%. The processes have been outlined in detail on pages 1975–1976 in Study 2.</p> <p><u>Four failure processes</u> were detected in the case of <u>4-year-old firms</u>. Shares of processes: 31.3%, 17.9%, 13.5%, 37.3%. The processes have been outlined in detail on pages 1975–1976 in Study 2.</p> <p><u>Two failure processes</u> were detected in the case of <u>5-year-old firms</u>. Shares of processes: 45.0%, 55.0%. The processes have been outlined in detail on pages 1977–1978 in Study 2.</p> <p><u>Two failure processes</u> were detected in the case of <u>6-year-old firms</u>. Shares of processes: 36.2%, 63.8%. The processes have been outlined in detail on pages 1977–1978 in Study 2.</p>

<p>RSQ1.3.1. Do different failure processes (based on two different study designs applying financial variables) exist for old (at least 10-year-old) manufacturing firms in Europe?</p>	<p style="text-align: center;">Study 3</p> <p>Yes in the case of both study designs. When applying financial variables only from the Laitinen (1991) study, <u>two failure processes</u> were detected. Shares of processes: 36.0%, 64.0%. The processes have been outlined in detail on pages 69–70 in Study 3. When applying an extended set of financial variables (i.e. the six financial variables from Laitinen 1991 supplemented with 5 additional five variables), <u>two failure processes</u> were detected. Shares of processes: 56.5%, 43.5%. The processes have been outlined in detail on pages 70–71 in Study 3.</p>
<p>RSQ1.4.1. What are the shares of different failure processes (based on non-financial variables, i.e. failure causes reflecting the deterministic, voluntaristic and integrative theories) in Estonia?</p>	<p style="text-align: center;">Study 4</p> <p>The shares of different failure processes are as follows: <u>31% firms failing due to only internal reasons</u> (voluntaristic theory), <u>26% due to only external causes</u> (deterministic theory), <u>43% due to both causes</u> (i.e. internal and external combined; integrative theory). See page 50 in Study 4.</p>

Source: compiled by the author using the results in the Studies.

In the case of the chronic failure process, serious problems are observable through financial ratios for multiple pre-failure years (Laitinen 1991). When analysing the results of Studies 2 and 3, the processes detected have been classified into three aforementioned types of processes, i.e. acute, gradual and chronic failure processes based on the following motivation (see also Table 10 for the summary of the categorized processes from Studies 2 and 3).

In Study 2²⁷, four age groups of firms have been studied separately. In the case of 3-year-old firms, four failure processes were detected. In Study 2, these processes have been categorized as one gradual failure process (Process 3.2), two acute failure processes (Processes 3.1 and 3.3) and one chronic failure process (Process 3.4). In the case of the gradual failure process 3.2, a profitability, liquidity and solidity drop was observed during the two pre-failure years studied. In the case of acute failure processes 3.1 and 3.3, financial ratios either do not reflect negative developments during pre-failure years or they appear only in the pre-failure year t-1. In the case of acute failure process 3.3, firms witness high growth with the help of substantially increasing debt, which in turn is not characteristic of acute failure process 3.1. Process 3.4 clearly reflects a firm with very poor performance throughout its lifetime.

In the case of 4-year-old firms, four processes were detected. In Study 2, these processes have been categorized as: gradual failure processes 4.1 and 4.4, acute failure process 4.2 and chronic failure process 4.3. In the case of gradual failure processes 4.1 and 4.4, most of the financial ratios drop during the three years studied. In the case of gradual failure process 4.4, firms witness high growth with the help of substantially increasing debt, which in turn is not characteristic of acute failure process 4.1. In the case of acute failure process 4.2, values of some financial ratios worsen, but are still high, and others do not worsen at all. In the case of chronic failure process 4.3, financial ratios have very poor values throughout three years.

In the case of 5- and 6-year-old firms, the two processes detected in the case of both firm groups have been classified as gradual failure processes. This is mainly motivated by the fact that profitability, liquidity and solidity for those processes become worse from year to year during their pre-failure life cycle. In the case of gradual failure processes 5.1 and 5.2 for 5-year-old firms and gradual failure processes 6.1 and 6.2 for 6-year-old firms, profitability is negative for the two pre-failure years, but for the preceding years it is either zero or positive (except for Process 6.1, in the case of which the profitability is negative (-0.6%) also for t-3 year).

In Study 3²⁸, the two processes detected in the case of both study designs applied have been classified as gradual failure processes. This is mainly motivated by the fact that profitability, liquidity and solidity for those processes

²⁷ See the pre-failure values of financial variables for different failure processes of 3-, 4-, 5- and 6-year-old firms on pages 1976–1977 in Study 2.

²⁸ See the pre-failure values of financial variables for different failure processes of old firms on pages 316–317 in Study 2.

become worse from year to year during the five pre-failure years studied. The two gradual failure processes detected in the case of both study designs applied in Study 3 are characterized by negative profitability for two years before failure (except for process 2.2, in the case of which it is slightly positive in period t-2, i.e. 0.7%).

Table 10. Failure processes and their shares detected in Studies 2 and 3

Firm group	Number of processes	Acute failure processes	Gradual failure processes	Chronic failure processes
3-year-old	4	2 processes (19.4% and 14.8%)	1 process (59.4%)	1 process (6.4%)
4-year-old	4	1 process (17.9%)	2 processes (31.3% and 37.3%)	1 process (13.5%)
5-year-old	2	None	2 processes (45.0% and 55.0%)	None
6-year-old	2	None	2 processes (36.2% and 63.8%)	None
At least 10-year-old (design 1)	2	None	2 processes (36.0% and 64.0%)	None
At least 10-year-old (design 2)	2	None	2 processes (56.5% and 43.5%)	None

Source: compiled by the author using the results in Studies 2 and 3.

Note: the percentages reflect the shares of respective processes in the firm groups.

In Study 1²⁹, the firms originate from different sectors, although in both countries (Finland and Estonia) 32 firms out of 70 are manufacturing firms. The thesis author additionally analysed the dataset used for Study 1 and the following conclusions can be made. Unlike in Studies 2 and 3, the ages of firms in Study 1 are different across the two studied countries (i.e. the median age of Estonian firms included is 7 and of Finnish firms 9). Therefore, Study 1 provides some evidence about the age groups not used in Studies 2 and 3 – in Study 2 the oldest firm was (about) 6 years old and in Study 3 the youngest firm at least 10 years old. When specifically analysing the processes characteristic to manufacturing firms, then Finnish manufacturing firms predominately follow processes 2 and 3³⁰, whereas Estonian manufacturing firms predominately follow processes 2 and 4³¹. Still, the number of manufacturing firms (32) in Study 1 is too small to draw any substantial conclusions and the use of only two periods (i.e. t-1 and t-2) does not enable unambiguous classification to the three types of failure processes.

²⁹ See the pre-failure values of financial variables for different failure processes of Finnish and Estonian firms on pages 822–823 in Study 1.

³⁰ See page 822 in Study 1.

³¹ See page 823 in Study 1.

Although the reasoning of classifying processes to acute, gradual and chronic failure types has been explained, it is still subject to limitations (especially in the case of very young firms for which only a few years can be studied). Namely, in case of some of the processes, the classification to the three types of failure processes might not be fully unambiguous. The classification to three types of processes has mainly been applied to enable easy characterization and comparison of the detected processes.

It can be concluded that the most common failure process in all firm groups studied is gradual failure. Although based on the studies by Laitinen (1991) and D'Aveni (1989), it could have been expected that acute and chronic failure processes exist for old firms, this thesis showed that they do not emerge as the main processes. The evidence about the presence of three types of failure processes (acute, gradual and chronic) was found only in the case of very young firms (i.e. 3- and 4-year-old firms).

The prevalence of gradually failing firms among older firms can be logically explained by two aspects. As older firms normally have established their market share, have easier access to capital (both, equity and debt) and are more experienced, their acute failure is quite unlikely except for extreme circumstances. In respect to the absence of chronic failure processes in the case of old firms, this might also be logical, as firms can witness lengthy unprofitable activities only in specific circumstances (e.g. if they have large reserves to employ and/or easy access to additional capital). As Studies 2 and 3 do not include Finnish (the country used in the Laitinen 1991 study) and US (the country used in the D'Aveni 1989 study) firms, the peculiarities of those countries could also explain the results obtained in those studies. Further, it is not possible to rule out the possibility that due to the small datasets in Laitinen (1991) and D'Aveni (1989), those studies do not reflect the whole population of firms very well. The findings in the thesis confirm the results in Argenti (1976) and Ooghe and de Prijcker (2008), as in those studies the failure of old firms was also depicted as a gradual process, although without substantial empirical proof to confirm such findings. The finding about the dominance of gradual failure processes for old firms also interconnects with the liability of obsolescence theory, which postulates that “firms become increasingly misaligned with their environments” (Henderson 1999: 281). The failure processes of young firms have also been commented under RQ4, as RSQ4.2.1 considers their change in time.

Study 4 showed that most commonly (43% of all firms) firm failure is explained by an integrative approach involving voluntaristic and deterministic theories (that is, internal and external causes simultaneously lead to the failure of a firm), which has been proposed, but not specifically tested in several studies (e.g. Mellahi and Wilkinson 2004, Amankwah-Amoah 2016). An interesting finding in Study 4 is that a large proportion of firm failures are still explained by only voluntaristic (31%, i.e. only internal causes) or only deterministic (26%, i.e. only external causes) theories. Study 1 indicated that failure processes extracted based on financial variables are mostly not

interconnected with specific failure causes. Namely, out of the two countries analysed, only in Finland did two causes out of five have significantly different mean values through the detected processes (see Study 1 pages 824–826). Specifically, firms that had witnessed very high pre-failure growth, had practically not been impacted by causes from the general environment, and firms with a low share of debt, but with very poor profitability during two pre-failure years, had been much more impacted by deficient general management skills (see Study 1 pages 822, 824–826).

RQ2. Do failure processes vary across countries?

RQ2 considered an avenue of research not elaborated in previous studies. The results of the RSQs set for RQ2 can be followed in Table 11. In Study 1, data of matched firms from Finland and Estonia were used. For those 70 matched firms from both countries, the failure processes were very different. The first indication of the differences was already provided by comparing the pre-failure financial variables and failure causes using statistical tests. More specifically, the majority of the pre-failure financial variables had significantly different median values, but such evidence was weaker in the case of the failure causes (see pages 815 and 817 in Study 1). The latter was reconfirmed using logistic regression analysis, which showed that Finnish and Estonian firms can be distinguished with a very high accuracy using the pre-failure financial variables (see pages 818–819 in Study 1). Based on the studies by Laitinen and Suvas (2013) and Altman et al. (2016), the presence of differences in the pre-failure values of financial variables in Estonia and Finland could be assumed, but these studies still did not provide very detailed evidence in this respect. The logistic regression model was not so efficient in discriminating Estonian and Finnish firms based on failure causes (see page 820 in Study 1). As the Finnish and Estonian firms were matched pairs, the chi-square contingency test was conducted to find out whether processes detected in the different countries are interconnected. Such a proposition of interconnection was clearly rejected, and also, the Estonian and Finnish factor scores were not correlated (see pages 824–825 in Study 1).

Studies 2 and 3 use a more elaborate approach for the detection of failure processes than Study 1, namely the tandem factor-cluster analysis. Failure processes were detected from a large dataset including different European countries, making it possible to directly compare the representation of the same failure processes through various countries. Study 3 showed that the two failure processes detected (in the case of both study designs applied) can be very differently represented through various countries (see Table 12). There were situations, where a process was very infrequent in one country, but in turn in another country it was dominant.

Table 11. Results of RSQs under RQ2

RQ2. Do failure processes vary across countries?		Result
Study 1		
RSQ.2.1.1. Can matched Finnish and Estonian firms be distinguished based on pre-failure financial variables?		Yes. The logistic regression model is able to discriminate firms with 95.7% precision. Likelihood to be a Finnish firm increases with an increase in pre-failure size and liquidity, but decreases with an increase in pre-failure profitability and share of equity in capital. See pages 818–819 in Study 1.
RSQ.2.1.2. Can matched Finnish and Estonian firms be distinguished based on pre-failure non-financial variables (failure causes)?		Yes. The logistic regression model is able to discriminate firms with 72.1% precision. Likelihood to be a Finnish firm increases when failure is caused by general management problems or financial management and control problems. See pages 818 and 820 in Study 1.
RSQ.2.1.3. Is there a contingency between the Finnish and Estonian failure processes?		No. Although the Finnish and Estonian firms are matched pairs, there is no statistically significant relationship between the processes they follow. Also, the correlations between Finnish and Estonian factor scores are all insignificant at 0.01 p-level. See pages 824–825 in Study 1.
Study 2		
RSQ.2.2.1. Do extracted failure processes differ across European countries for young manufacturing micro firms (grouped as 3-, 4-, 5- and 6-year-old firms)?		Yes for 3, 4 and 6-year-old firms. No for 5-year-old firms. For the specific results about the presence of different failure processes across countries in all four age groups studied see pages 1978–1980 in Study 2.
Study 3		
RSQ.2.3.1. Do extracted failure processes (based on two different study designs applying financial variables) differ across European countries for old (at least 10-year-old) manufacturing firms?		Yes in the case of both study designs. See pages 72 and 75 in Study 3 for both study designs applied.

Source: compiled by the author using the results in the Studies.

In Study 2, a similar finding was reached as in Study 3, that failure processes can be very differently represented in the countries studied (only with the exception of 5-year-old firms; see Table 12). As almost no cases from common law countries were present in the dataset, a comparison between civil and common law countries could not be made in Studies 2 and 3.

Table 12. Minimum and maximum shares of processes detected in Studies 2 and 3 across countries

Firm group	Min (%)	Max (%)	Min (%)	Max (%)	Min (%)	Max (%)	Min (%)	Max (%)	χ^2 test p-value
3-year-old firms	Process 3.1		Process 3.2		Process 3.3		Process 3.4		0.000
	10	28	42	65	6	32	3	15	
4-year-old firms	Process 4.1		Process 4.2		Process 4.3		Process 4.4		0.000
	10	54	5	30	10	20	8	60	
Firm group	Min (%)		Max (%)		Min (%)		Max (%)		χ^2 test p-value
5-year-old firms	Process 5.1				Process 5.2				0.186
	30		51		49		70		
6-year-old firms	Process 6.1				Process 6.2				0.000
	10		75		25		90		
At least 10-year-old firms (design 1)	Process 1.1				Process 1.2				0.000
	6		71		29		94		
At least 10-year-old firms (design 2)	Process 2.1				Process 2.2				0.000
	33		74		26		67		

Source: compiled by the author using the results in the Studies.

Note: “Min (%)” indicates the minimum share of specific process in countries studied and “Max (%)” indicates the maximum share of specific process in countries studied. “ χ^2 test p-value” indicates whether the processes have significantly different association with countries studied. Only countries where all processes were represented have been included in the analysis.

RQ3. Do failure processes vary with firm size?

Only Studies 3 and 4 viewed directly the interconnection of failure processes with size (see results in Table 13). Still, in Study 1, size has been applied when extracting the failure processes, and therefore, the descriptive statistics provide some evidence of the different size distributions of firms following different processes in Finland and Estonia. In Study 3, three size groups were distinguished, namely micro firms, small firms and medium-large firms, the latter as one group because only a few cases of large firms were available. In Study 3 it was shown that different size groups can be interconnected with

different failure processes, but such an association was not strong (see page 318 in Study 3).

Table 13. Results of RSQs under RQ3

RQ3. Do failure processes vary with firm size?	Result
Study 3	
RSQ3.3.1. Do extracted failure processes (based on two different study designs applying financial variables) differ across size groups for old (at least 10-year-old) European manufacturing firms?	Yes in the case of both study designs. See pages 72 and 75 in Study 3 for both study designs applied.
Study 4	
RSQ3.4.1. How does the likelihood of following different failure processes (based on non-financial variables, i.e. failure causes reflecting the deterministic, voluntaristic and integrative theories) in Estonia change with firm size?	With an increase in firm size, the likelihood that a firm fails because of only internal reasons decreases, but the likelihood that a firm fails because of both internal and external reasons increases. The likelihood of failing because of only external reasons is not affected by firm size. See pages 50–51 and 55 in Study 4.

Source: compiled by the author using the results in the Studies.

Study 4 (see page 51) showed that larger firms are less likely to fail due to internal reasons alone, which is an expected result, since the management of larger firms is often more experienced, which in turn decreases the possibility of single one-man errors to have a crucial effect on firm faith (see Aldrich and Auster 1986: 182–183). In turn, the likelihood of failing due to both problems, internal and external existing together, increases with firm size (see page 51 in Study 4). Therefore, for a large firm to fail, normally multiple problems (both, internal and external) must accumulate to become fatal. There is no significant relationship between firm size and failing due to external reasons alone (see page 51 in Study 4). This indicates that negative external developments (e.g. changes in laws, bankruptcy of a cooperation partner) can be similarly fatal for firms in different size categories. The interconnections between firm size and failure causes have been additionally commented on in Study 4.

RQ4. Do failure processes vary with firm age?

Interconnections between firm age and failure processes were considered in Studies 2 and 4 (see Table 14). Study 3 considered firms at least 10 years old at the moment of bankruptcy irrespective of their actual age, and in Study 1, the interconnections between the detected processes and age were not studied.

Table 14. Results of RSQs under RQ4

RQ4. Do failure processes vary with firm age?	Result
Study 2	
RSQ4.2.1. How do the number and types of failure processes change with a growth in age for young manufacturing micro firms in Europe?	The number of failure processes decreases with firm age. Namely, the 3- and 4-year-old firms are characterized by four different processes and 5 and 6-year-old firms by two different processes. In the case of 5- and 6-year-old firms, only gradual failure processes were detected, but in the case of 3- and 4-year-old firms all three types of processes are present (chronic, gradual and acute failure). See pages 1974–1978 in Study 2.
Study 4	
RSQ4.4.1. How does the likelihood of following different failure processes (based on non-financial variables, i.e. failure causes reflecting the deterministic, voluntaristic and integrative theories) in Estonia change with firm age?	With an increase in firm age, the likelihood that a firm fails due to external reasons alone increases. The likelihood of failing due to internal reasons alone or by both internal and external reasons is not affected by firm age. See pages 50–51 and 55 in Study 4.

Source: compiled by the author using the results in the Studies.

Study 2 showed that with an increase in age, young firms are characterized by a smaller number of different failure processes. Namely, the 3- and 4-year-old firms are characterized by four different processes, but 5- and 6-year-old firms by two different processes. Moreover, when all three types of processes (i.e. acute, gradual and chronic failure) were present in the case of 3- and 4-year-old firms, then in the case of 5- and 6-year-old firms only gradual failure processes were detected. This finding connects with the liability of adolescence theory. Namely, adolescent firms³² can have enough initial resources like capital (Henderson 1999) and establish relationships with different stakeholders like clients and creditors (Brüderl and Schüssler 1990); therefore, witnessing a “honeymoon period” (Fichman and Levinthal 1991). The finding itself is also logical, as young firms normally cannot sustain a lengthy period of negative profitability. Therefore, also taking into account the findings about old firms, it can be postulated that liabilities of adolescence and obsolescence are mainly characterized by gradual failure processes, whereas the liability of newness can be characterized by different failure processes – acute, gradual and chronic failure processes.

³² The 5- and 6-year-old firms in Study 2.

Study 4 (see page 51) showed that firm age is interconnected with the likelihood to fail due to external reasons alone. Therefore, for old experienced firms the main reason for failure is some unforeseen development in the external environment. This interconnects with Aldrich and Auster (1986: 171), who postulate that with aging, firms are “developing attachments and dependencies that constrain their action”. A similarly interesting finding is the fact that there is no interconnection between firm age and the likelihood to fail due to internal reasons alone, or internal and external reasons combined (see page 51 in Study 4). The interconnections of firm age and failure causes have been additionally commented on in Study 4.

RQ5. Do failure processes vary between exporting and non-exporting firms?

The interconnection of failure processes and firm export behaviour has so far not been studied. Studies 2 and 3 outlined that exporting and non-exporting firms do not follow different failure processes (see Table 15).

Table 15. Results of RSQs under RQ5

RQ5. Do failure processes vary between exporting and non-exporting firms?	Result
<u>Study 2</u>	
RSQ5.2.1. Do the extracted failure processes differ between young European manufacturing micro firms (grouped as 3-, 4-, 5- and 6-year-old firms) engaged in exporting and not engaged in exporting?	No for all age groups of <u>young firms</u> . For the specific results across all age groups of young firms see pages 1978–1980 in Study 2.
<u>Study 3</u>	
RSQ5.3.1. Do extracted failure processes (based on two different study designs applying financial variables) differ between old (at least 10-year-old) European manufacturing firms engaged in exporting and not engaged in exporting?	No in the case of both study designs. See pages 72 and 75 in Study 3 for both study designs applied.

Source: compiled by the author using the results in the Studies.

Exporting firms have been noted as having higher survival possibilities than non-exporters, which besides diversification of target markets could be explained by their higher productivity compared to non-exporting firms (Bernard and Wagner 1997, Wagner 2012). In turn, in the case of profitability, Wagner (2012: 253) concluded in a thorough literature review that “results differ widely across studies” and “a big picture has not emerged”. This thesis indicates that exporting and non-exporting firms that become bankrupt are not associated with some specific failure processes. Therefore, it is possible to hypothesize that for exporters and non-exporters becoming bankrupt, pre-failure

performance does not differ. Still, in Studies 2 and 3 a simple measure to portray internationalization was applied. Namely, whether a firm during the pre-failure period had been exporting at least for one year. Therefore, in future studies more elaborate measures of firm exporting behaviour should be applied.

4.2. Practical implications

The results of the thesis offer several practical implications for managers of firms, people involved in crediting or credit scoring, trustees, judges and policy makers. As different target groups can benefit from many of the implications, they will be presented as a list, in many cases without specifically denoting the target group(s). The specific implications have also been presented in each Study and here they will mainly be brought out in a consolidated form.

1. In general, bankruptcy models could be implemented in the case of young and old manufacturing firms. Gradual failure processes dominate in the case of all firm groups applied, which make the prediction of bankruptcy possible. Namely, in the case of the gradual failure process, the step-by-step decline in the values of financial ratios (i.e. profitability, liquidity, solidity and productivity ratios) can be followed and many of them obtain poor values already two years before bankruptcy declaration. This implication is of course limited by the fact that it is also important to know how the healthy firms perform, which was not studied in this thesis.
2. The thesis outlines the shares of the main failure processes (based on financial variables) and the breakdown of those processes across countries. This provides important input information for bankruptcy prediction model builders, as it outlines which variables and how exactly can signal potential future problems. Further, the prevalence of different failure processes across countries could reduce the possibility of successfully applying models specific to one country in another country. The question of the rationality of the creation of simple (e.g. logistic regression based) international bankruptcy prediction models can also arise when the financial variables applied in the prediction models behave differently across the countries included.
3. In many groups of firms, negative equity is an important pre-failure issue. Such firms evidently do not comply with the requirements set in law (namely, the requirement that assets should exceed debt), thus better monitoring of such firms by state institutions could either avoid failures or reduce their negative consequences. As in the case of some failure processes, equity is negative for multiple pre-failure years, and firms are functioning with negative profitability and still involve additional debt, the question of whether such firms should have been liquidated before might arise during the insolvency proceedings.
4. In many groups of young firms, they function with a very high leverage already from the beginning of their lifetime. This could point to the fact,

that equity capital is not easily accessible. In order to reduce the failure risk of newly founded firms, policy measures could be introduced or improved to provide firms with start-up capital.

5. In Estonia, the probability of failure due only to external causes increases with firm age and is the most frequent cause for old firms. Therefore, avoiding specific external developments having a crucial impact on firm faith is especially topical for older firms. Therefore, managers of older firms could specifically map and monitor external risks as having potentially high impact on firm financial performance. For instance, the high dependence on single or low numbers of customers could be avoided, and in the case of credit sales, more guarantees could be requested or a plan of action could be established for potential changes in government regulations.
6. In Estonia, the probabilities of failure due to internal causes alone or internal and external causes are high for small firms. Further, the probability of failing due to internal causes alone reduces with firm size. Therefore, small firms would benefit from more business consultancy during the earlier stages of their development. This could potentially point to the necessity of improving policy measures for small business consultancy or providing more widespread access to them, especially as small firms might not have resources to outsource them.

4.3. Limitations of the thesis

As common to research in the field of social science, this thesis is also not free from limitations. Here the limitations will be brought out as a list in random order, and so the position of specific limitations does not reflect their importance.

1. Throughout this thesis, firm failure has been defined as bankruptcy (i.e. permanent insolvency declared at court). Such restriction of the definition enables comparability across different countries and makes it very clear to which population of firms the results of the thesis are applicable. Still, such a restriction leaves undisclosed the extent to which the results of the thesis are applicable to the other types of failure. Furthermore, for the empirical analysis it is not known whether firms have either gone through reorganization, the bankruptcy petition submission has been delayed or firms have renegotiated debt before declaring bankruptcy.
2. In some of the Studies here, the sample size has not been large (i.e. Study 1) and not spanned multiple countries (i.e. Study 4). These limitations can have at least some effect on how generalizable the results are. On the positive side, Study 4 uses the largest dataset among well-known studies detecting failure causes (see Chapter 1.2.2), which in fact are all also single-country studies. In addition, the sample size in Study 1 (70 firms from both, Finland and Estonia) is similar to those in Hambrick and D'Aveni (1988), D'Aveni (1989), Laitinen (1991), Moulton et al. (1996),

and Crutzen and van Caillie (2010), and therefore, it meets the previous standard in similar studies rather well.

3. As already elaborated in Chapter 2, court judgements as a source of bankruptcy causes, especially in a very detailed form, have limitations. Therefore, this limitation in turn hampers the use of a very detailed taxonomy. The study of failure causes also suffers from a classical limitation that is common to all causality studies. Namely, how to detect the actual cause of an event without errors. Therefore, the results of the research sub-questions seeking to explain failure causes should not be considered as “the truth, the whole truth and nothing but the truth”, but instead “failure causes presented by trustees”.
4. This thesis is strongly exploratory in nature. This is to some extent connected to the fact that the available literature about failure processes is scant and fragmented. Therefore, the focus in the thesis has been set on empirically studying major research gaps in the available literature. The thesis does not specifically seek to develop a novel theory and test it afterwards. Still, several research gaps and the study designs directed to fulfil them in this thesis are well motivated with the available theoretical knowledge.

4.4. Future research directions

This thesis consolidates only the first efforts to offer an international perspective on the taxonomy of failure processes. The thesis author would like to state some valuable avenues of research that could be focused on in the future. As with the limitations, the list of future research directions will be presented in a random order.

1. It would be beneficial to study failure processes over a larger geographical span, as this thesis includes only European Union countries, and even not all of them. For instance, it would be interesting to study, how firms fail in different countries on American and Asian continents.
2. An important question not disclosed in this thesis is “why” the failure processes (extracted based on financial variables) differ across countries. Namely, for instance what causes a specific failure process to dominate in one country and be a rarity in another. Obviously, everything concerning causality is a very difficult research task to fulfil, and would probably demand a whole separate thesis.
3. In the thesis, the Studies (as almost all literature in the area) actually use lengthy intervals between points of time (i.e. one year intervals as consecutive annual reports are being used) or failure causes coded to describe the whole pre-failure period. Future studies seeking novelties would benefit from data focusing on shorter time intervals (e.g. monthly data).
4. The modelling of failure processes would benefit from a larger variety of financial variables, as through Amadeus only balance sheets and income

- statements were available. Although some cash flows can be outlined based on balance sheet and income statement information, future studies would benefit from the availability of cash flow statement information.
5. An important area of research to develop is the manager (with his or her different characteristics) and the decision-making process in the failure process. Indeed, this domain has received considerable attention in various streams of literature, but the context of a micro firm makes it possible to look into a specific situation, namely the case of a single manager responsible for all the firm's activities. This facilitates the use of a large set of variables, as there is only one certain person responsible for the mistakes made in the business process.
 6. Failure processes is a topic not developed as a mainstream area in other streams of literature like internationalization. Therefore, such areas would benefit from similar studies. In fact, the thesis author is involved in a lengthy project named "A holistic process perspective of export patterns: theory development and empirical evidence" from year 2016. One of the objectives of the project is to focus on failure in exporting, and therefore, the knowledge obtained when writing the thesis can very well be tested in another avenue of research.

4.5. Conclusion of the thesis

The objective of the thesis was to model firm failure processes using financial and non-financial variables. The objective was achieved by setting 5 research questions and 18 research sub-questions, which were all addressed via empirical analysis. First, this thesis outlined different failure processes based on financial variables for similar old or young firms, but also for carefully matched firms from different countries. Therefore, in various domains of detecting firm failure processes, this thesis conducted pilot analyses. The thesis showed that in different countries, firms can follow various failure processes.

Firm failure processes are different for firms in different size and age categories. This aspect was proven by applying both failure processes extracted using financial variables and failure causes. With growth in age, the number of different failure processes firms are subject to reduces, and the failure processes symbolizing gradual failure start to dominate. Unlike in past studies, old firms are not characterized by processes resembling either acute or chronic failure. Firm failure processes extracted based on financial variables do not associate differently with exporting and non-exporting firms.

While firms most commonly bankrupt in Estonia because of the combination of internal and external causes, providing support for the integrative theory of failure causes, such a finding does not apply in the case of all sizes and ages of firms. Growth in firm size significantly increases the likelihood of failing due to internal and external causes combined, but in turn, decreases the likelihood of failing due to internal reasons alone. A growth in firm age increases the likelihood of failing due to external reasons alone.

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APPENDIXES

APPENDIX 1. RESULTS OF HYPOTHESES TESTING IN STUDIES

<u>Study / Hypothesis</u>	<u>Result of hypothesis testing</u>
<u>Study 1 (Laitinen and Lukason 2014)</u>	
<i>Firm failure processes are different between Finland and Estonia</i>	<i>Accepted</i>
<u>Study 2 (Lukason, Laitinen, Suvas 2016)</u>	
<i>Bankrupted young manufacturing micro firms go through different failure processes</i>	<i>Accepted</i>
<i>The number of firm failure processes varies with firms' age</i>	<i>Accepted</i>
<i>Statistically significant association is present between identified failure processes and firms' country of origin</i>	<i>Accepted in three age groups and rejected in one age group</i>
<i>Statistically significant association is present between identified failure processes and firms' engagement in exporting</i>	<i>Rejected</i>
<u>Study 3 (Lukason and Laitinen 2016)</u>	
<i>Different failure processes exist for old manufacturing firms</i>	<i>Accepted</i>
<i>Old manufacturing firms in different countries are characterized by different failure processes</i>	<i>Accepted</i>
<i>Old manufacturing firms in different size categories are characterized by different failure processes</i>	<i>Accepted</i>
<i>Old exporting and non-exporting manufacturing firms are characterized by different failure processes</i>	<i>Rejected</i>
<u>Study 4 (Lukason and Hoffman 2015)</u>	
<i>Based on the deterministic perspective, external factors are the most frequent cause of bankruptcy.</i>	<i>Rejected</i>
<i>Based on the voluntaristic perspective, internal factors are the most frequent cause of bankruptcy.</i>	<i>Rejected</i>
<i>Based on the interactionistic perspective, simultaneously occurring external and internal factors are the most frequent cause of bankruptcy.</i>	<i>Accepted</i>
<i>The larger the firm, the more likely it is to fail primarily due to the presence of both internal and external causes.</i>	<i>Accepted</i>
<i>The smaller the firm, the more likely it is to fail due to the presence internal causes.</i>	<i>Accepted</i>
<i>Firm failure only due to external causes is not affected by size.</i>	<i>Accepted</i>
<i>Firm failure due to the presence of both internal and external causes is not affected by age.</i>	<i>Accepted</i>
<i>The younger the firm, the more likely it is to fail due to the presence of internal causes.</i>	<i>Rejected</i>
<i>The older the firm, the more likely it is to fail due to the presence of external causes.</i>	<i>Accepted</i>

Source: compiled by the author based on the Studies. See further: Study 1: 813, 818-827; Study 2: 1967-1970, 1975-1980; Study 3: 311-313, 318; Study 4: 46-48, 51.

APPENDIX 2. PROPOSITIONS FROM STUDIES FOR RESEARCH SUB-QUESTIONS

RSQ	Propositions in Studies
RSQ1.1.1.	Different failure processes exist
RSQ1.1.2.	Different failure processes exist
RSQ1.1.3.	No proposition set, purely exploratory
RSQ1.1.4.	No proposition set, purely exploratory
RSQ1.2.1.	Different failure processes exist
RSQ1.3.1.	Different failure processes exist
RSQ1.4.1.	Each of the three theoretical streams proposes its dominance
RSQ2.1.1.	Processes differ between Finland and Estonia
RSQ2.1.2.	Processes differ between Finland and Estonia
RSQ2.1.3.	Processes differ between Finland and Estonia
RSQ2.2.1.	Failure processes differ through countries
RSQ2.3.1.	Failure processes differ through countries
RSQ3.3.1.	Failure processes differ through size groups
RSQ3.4.1.	With firm size increase, the likelihood of failing because of internal reasons reduces, internal&external reasons increases and external reasons are not affected
RSQ4.2.1.	The number of failure processes varies with firms' age
RSQ4.4.1.	With firm age increase, the likelihood of failing because of internal reasons reduces, external reasons increases and internal&external reasons are not affected
RSQ5.2.1.	Failure processes differ through exporting and non-exporting firms
RSQ5.3.1.	Failure processes differ through exporting and non-exporting firms

Source: compiled by the author based on the Studies. See further: Study 1: 813; Study 2: 1967-1970; Study 3: 311-313; Study 4: 46-48.

Note: Appendix 2 presents propositions for all RSQs. These propositions exactly replicate the hypotheses set in the Studies (see also Appendix 1). The motivation for each proposition can be followed in the specific Studies.

SUMMARY IN ESTONIAN

Ettevõtete ebaõnnestumise protsesse iseloomustavad tunnused rahvusvahelises kontekstis

Töö aktuaalsus

Ettevõtteid tekib ja lõpetab tegevuse pidevalt, mistõttu on ettevõtete ebaõnnestumise protsesside uurimine ajatu uurimisvaldkond, mille piiritlemisel on oluline, kuidas ebaõnnestumist defineerida. Kui ebaõnnestumise mõiste kitsendada pankrotiga, siis selle uurimine on kiirelt arenenud alates 1960. aastatest. Alates varasematest olulisematest teadustöödest (näiteks Beaver 1966, Altman 1968) on väga paljud uuringud käsitlenud pankroti prognoosimist, kuid mõned teised ebaõnnestumise aspektid (näiteks miks ettevõtted ebaõnnestuvad ja kuidas see kajastub ettevõtete finantsnäitajates) on oluliselt vähem tähelepanu pälvinud.

Dissertatsiooni peamine uudsus seisneb ettevõtete ebaõnnestumise protsesside väheuuritud aspektide käsitlemisel, milledeks on näiteks ebaõnnestumise protsesside rahvusvaheline võrdlus ning nende muutumine seoses ettevõtete vanuse ja suurusega. Täpsemalt on töö olulist panust ebaõnnestumise protsesse käsitlevasse teaduskirjandusse kirjeldatud alapunktides „Kirjanduse ülevaade ja uurimislüngad“ ning „Töö peamised tulemused“.

Töö eesmärk ning uurimisülesanded

Dissertatsiooni eesmärgiks on luua rahvusvahelises kontekstis täiendavat teadmust ettevõtete ebaõnnestumise protsesse iseloomustavate tunnuste kohta, kasutades selleks finants- ja mittefinantsnäitajaid³³. Ebaõnnestumise protsessina käsitletakse dissertatsioonis pankrotini (st. kohtu poolt välja kuulutatud püsiva maksejõuetuseni) viivat teekonda, mille puhul vaadeldakse nii küsimusi „miks“ (ebaõnnestumise põhjuseid) kui ka „kuidas“ (finantsnäitajate muutumist ebaõnnestumise protsessis). Teekonna all on töös mõeldud kas ettevõtte kogu eluiga või teatud arvu järjestikusi aastaid enne pankroti väljakuulutamist.

Töö eesmärgi saavutamiseks on püstitatud järgnevad uurimisülesanded:

1. Sünteesida teaduskirjandusest ettevõtte ebaõnnestumise ja ebaõnnestumise protsessi mõisteid.
2. Sünteesida ettevõtete ebaõnnestumise protsessese käsitleva teaduskirjanduse teoreetilisi aluseid, uurimismetodoloogiaid ning tulemusi, pöörates täiendavalt tähelepanu põhjustele ja finantsnäitajatele ebaõnnestumise protsessis.

³³ Finantsnäitajad on töös peamiselt finantssuhtarvud ning bilansi ja kasumiaruande kirjete muudud. Mittefinantsnäitajad on ebaõnnestumise põhjused.

3. Tuua varasema teaduskirjanduse põhjal välja uurimislüngad.
4. Tuginedes varasemale ebaõnnestumise protsesse käsitletud teaduskirjandusele, vastava kirjanduse põhjal tuvastatud uurimislünkadele ning autori poolt avaldatud teadusartiklitele, sõnastada (alam-)uurimisküsimused.
5. Valida (alam-)uurimisküsimustele vastamiseks sobiv uurimismetodoloogia.
6. Esitada dissertatsiooni osaks olevad autori poolt varem avaldatud teadusartiklid, leidmaks vastused (alam-)uurimisküsimustele ning täitmaks tuvastatud uurimislüngad.
7. Summeerida ja diskuteerida (alam-)uurimisküsimustele leitud vastuseid ja esitada töö põhinevad praktilised soovitusel, töö piirangud ning ettepanekud edasisteks uuringuteks.

Töö struktuur ja töö osaks olevad teadusartiklid

Töö põhineb järgneval neljal avaldatud teadusartiklil:

1. Laitinen, E.K., **Lukason, O.** (2014) Do firm failure processes differ across countries: evidence from Finland and Estonia. *Journal of Business Economics and Management*, Vol. 15, No. 5, pp. 810–832. (**Artikkel 1**)
2. **Lukason, O.**, Laitinen, E.K., Suvas, A. (2016) Failure processes of young manufacturing micro firms in Europe. *Management Decision*, Vol. 54, No. 8, 1966–1985. (**Artikkel 2**)
3. **Lukason, O.**, Laitinen, E.K. (2016) Failure processes of old manufacturing firms in different European countries. *Investment Management and Financial Innovations*, Vol. 13, No. 2, 310–321. (**Artikkel 3**)
4. **Lukason, O.**, Hoffman, R.C. (2015) Firm failure causes: a population level study. *Problems and Perspectives in Management*, Vol. 13, No. 1, pp. 45–55. (**Artikkel 4**)

Töö koosneb sissejuhatausest ning neljast peatükist. Esimeses peatükis käsitletakse varasemat teemakohast teaduskirjandust ning tuuakse ära (alam-)uurimisküsimused. Alapunkt 1.1 keskendub ebaõnnestumise, püsiva maksejõuetuse ning pankroti mõistetele. Alapunkt 1.2 käsitleb ettevõtete ebaõnnestumise protsesse ning jaguneb kolmeks osaks. Alapunkt 1.2.1 käsitleb ebaõnnestumise protsessi mõistet ning varasemaid ebaõnnestumise protsesse tuvastanud teadustöid. Alapunkt 1.2.2 käsitleb spetsiifiliselt ebaõnnestumise põhjuseid ning alapunkt 1.2.3 finantsnäitajate muutumist ebaõnnestumise protsessis. Alapunktis 1.3 tuuakse ära (alam-)uurimisküsimused ning nende seosed uuringute ning uurimislünkadega. Peatükis 2 kirjeldatakse töös kasutatavaid andmeid ja meetodeid. Peatükk 3 koosneb töö osaks olevatest varem avaldatud teadusartiklitest. Viimane peatükk 4 jaguneb neljaks osaks. Alapunktis 4.1 esitatakse kõigi (alam-)uurimisküsimuste vastused ning diskuteeritakse tulemusi olemasoleva teaduskirjanduse taustal. Alapunktides 4.2, 4.3, 4.4 ja 4.5 esitatakse tööst tulenevad praktilised soovitusel, töö piirangud, ettepanekud tulevasteks uuringuteks ning töö koondkokkuvõte.

Kirjanduse ülevaade ning uurimislüngad

Käesolevas osas on toodud ettevõtete ebaõnnestumise alase kirjanduse analüüsi peamised tulemused, mille põhjal on sõnastatud uurimislüngad. Ettevõtte ebaõnnestumist on defineeritud väga erinevalt (Watson and Everett 1999, Pretorius 2009), kuid majandusarvestuse ja rahanduse valdkonna empiirilistes töödes kasutatakse ebaõnnestumiste uurimiseks ennekõike pankrotistunud ettevõtete andmeid (Balcaen ja Ooghe 2006). Pankrotistunud ettevõtete andmete kasutamise kasuks räägivad mitmed aspektid: 1) pankrotistunud ettevõtete puhul saab kindlalt öelda, et ettevõtte on ebaõnnestunud (äriprotsessis pole suudetud tagada seda, et ettevõtte oleks maksevõimeline); 2) ettevõtete pankrottide kohta on võimalik hankida informatsiooni kujul, kus on toodud ära vastava sündmuse kuupäev; 3) muude ebaõnnestumise definitsioonide korral on informatsiooni hankimine raskendatud (näiteks ettevõtte nõutava tulunormi kohta on võimalik informatsiooni hankida peamiselt küsitluste vahendusel); 4) muude ebaõnnestumise definitsioonide korral (näiteks ettevõtte kahjumlikkus või nõutava tulunormi mittaavutamise) võib ettevõtte staatus ajas muutuda; 5) pankrotistunud ettevõtteid on võimalik riikide lõikes võrrelda; 6) erinevad ettevõtte ebaõnnestumise mudeleid esitavad teadustööd käsitlevad pankrotistumist ebaõnnestumise protsessi viimase etapina (näiteks Weitzel ja Jonsson 1989, Ooghe ja de Prijcker 2008, Crutzen ja van Caillie 2008). Maksejõuetusmenetluse alustamiseks kasutatakse enamikes riikides rahavoo testi, millega hinnatakse suutmatust sissenõutavateks muutunud kohustusi tasuda, ning mõnedes riikides ka bilansitesti, tuvastamaks kas varasid on vähem kui kohustusi, kuid nendest kahest testist tuleks kindlasti eelistada esimest (Uhrig-Homburg 2005, The World Bank 2001).

Ebaõnnestumise protsessi on erinevad autorid käsitlenud mõnevõrra erinevalt, kuid kõik käsitlused sarnanevad vähemal või suuremal määral Crutzen ja van Caillie (2008: 301) käsitlusele, kelle poolt koostatud integreeriv ettevõtte ebaõnnestumise protsessi mudel näitas „kõikehõlmavalt ja dünaamiliselt, miks (ebaõnnestumise põhjused) ja kuidas (sündmuste ahel) ettevõtted ebaõnnestuvad“. Ebaõnnestumise protsesside kohta on esitatud mitmeid erinevatest etappidest koosnevaid kontseptuaalseid mudeleid. Näiteks Crutzen ja van Caillie (2008: 302) käsitlesid ebaõnnestumise protsessi koosnevana neljast etapist: 1) ainult ettevõtte siseselt nähtavate ebaõnnestumise põhjuste ilmnemine; 2) väliselt nähtavate ebaõnnestumise sümptomite ilmnemine; 3) hoiatussignaalide ilmnemine; 4) pankrot. Sarnased etapid on ära toodud ka Ooghe ja de Prijcker (2008: 229–233) poolt: 1) esialgsed puudujäägid; 2) negatiivsed signaalid; 3) finantsilised tagajärjed; 4) pankrot.

Ebaõnnestumise protsesside uurimise alguseks saab pidada Argenti (1976) monograafiat, kus tuvastati kolm erinevat ebaõnnestumise protsessi. Argenti (1976) kasutas kolme protsessi identifitseerimiseks põhjuseid, sümptomeid ning ettevõtte üldist seisundit (tervist) kirjeldavaid muutujaid. Argenti (1976) poolt tuvastatud protsessid olid: 1) noor ettevõtte, mida kogu eluaja jooksul iseloomustavad kehvad majandustulemused; 2) ettevõtte, mis oma eluaja jooksul

on üliedukas, kuid millele järgneb kiire ebaõnnestumine; 3) vana ettevõtte, mis ebaõnnestub järk-järgult. Argenti (1976) töös toodud protsessid olid pigem kontseptuaalsed, mitte empiirilisel valideeritud, mistõttu on Argenti (1976) tööd kritiseerinud juba tema kaasaegsed teadlased (näiteks Gold 1977).

Argenti (1976) tööle järgnevad uurimused on küll metodoloogiliselt olnud rohkem põhjendatud, kuid on üksteisest märkimisväärselt erinenud, mida on ka järgnevalt kirjeldatud. Siinkohal esitatud kirjanduse ülevaade põhineb valdkonna olulisemate empiiriliste tööde (Argenti 1976, D'Aveni 1989, Laitinen 1991, Moulton et al. 1996, Ooghe ja de Prijcker 2008, Crutzen ja van Caillie, Wu 2010) analüüsil. Vastavad tööd lahkenvad selles osas, kas käsitletakse ainult „miks“ ettevõtted ebaõnnestuvad, ainult „kuidas“ ettevõtted ebaõnnestuvad või mõlemat korraga. Osad tööd põhinevad juhtumanalüüsidel, teised on aga kasutanud suuremat ettevõtete kogumit, mis küll kõigis ülaltoodud töödes (v.a. Wu 2010) on jäänud alla 100 ettevõtte. Vastavad tööd vaatlevad peamiselt vanade ettevõtete elutsükli viimaseid aastaid. Need tööd, mis on vaadelnud erinevas vanuses ettevõtteid, on tavaliselt kirjeldanud teatud vanusegruppi (näiteks noor või vana ettevõtete) ainult ühe ebaõnnestumise protsessiga. Kui osad ülaltoodud töödest on kvalitatiivsed, siis teistes on protsesside tuvastamiseks kasutatud erinevaid statistilise andmeanalüüsi meetodeid (näiteks faktoranalüüs, klasternalüüs, erinevad masinõppe meetodid). Kõik ülaltoodud tööd on tuvastanud kaks kuni viis erinevat ebaõnnestumise protsessi, kuid nagu eelnevalt nimetatud, on vastavate teadustööde metodoloogia olnud väga erinev.

Varasemaid ettevõtete ebaõnnestumise protsesse tuvastavaid empiirilisi töid iseloomustavad mitmed puudused. Esiteks on töödesse olnud üldjuhul kaasatud väga erinevad ettevõtted (näiteks eri suuruse, vanuse ja tegevusharulise kuuluvusega), mistõttu jääb selgusetuks, kas ja kui palju nimetatud erinevused tuvastatud protsesside sisu mõjutavad (**Uurimislünk 1**). Lisaks on viimases majandusaasta aruandes toodud aruandeperioodi lõpu ja pankroti välja kuulutamise vahele jääv aeg ettevõtete lõikes oluliselt varieerunud. Mõningates kontekstides on ettevõtete ebaõnnestumist väga vähe uuritud, nagu näiteks noored ettevõtted (**Uurimislüngad 2 ja 3**), ebaõnnestumise protsesside muutumine koos ettevõtete suurusega (**Uurimislünk 4**), ebaõnnestumise protsesside võrdlus riikide lõikes (**Uurimislünk 5**) ning eksportivate ja mitte-eksportivate ettevõtete ebaõnnestumise protsesside võrdlemine (**Uurimislünk 6**). Pole põhjalikult uuritud ka seda, kuidas on ettevõtete finantsnäitajaid kasutades tuvastatud ebaõnnestumise protsessid seotud ebaõnnestumise põhjustega (**Uurimislünk 7**).

Teooriad lahkenvad selles osas, mis põhjustab ettevõtte ebaõnnestumise. Varasemad teooriad jagunevad voluntaristlikeks ja deterministlikeks, millest esimene seab esikohale ettevõtte sise- ja teine väliskeskkonnast tulenevad põhjused (Daily 1994, van Witteloostuijn 1998, Mellahi and Wilkinson 2004, Amankwah-Amoah 2016). Hilisemad teooriad tähtsustavad mõlema keskkonna rolli ettevõtte ebaõnnestumises, rõhutades seega integreeritud teooriat (Mellahi and Wilkinson 2004, Amankwah-Amoah 2016), kuigi ekstreemsetes olukor-

dades peetakse võimalikuks ka volutaristliku või deterministliku teooria kehtivust (Mellahi and Wilkinson 2004). Ettevõtete ebaõnnestumise põhjuseid on ennekõike uuritud staatiliselt (Crutzen ja van Caillie 2008), st. põhjuseid ei paigutata ajateljele, vaid tuvastatakse lihtsalt teatud põhjuse (mitte-)olemasolu. Spetsiifiliselt pankroti põhjuseid tuvastavaid empiirilisi uuringuid on vähe (Altman ja Narayanan 1997) ning need uuringud on erinenud nii metodoloogia kui ka tulemuste osas. Osad uuringud on leidnud, et sisemised ja välimised põhjused on sama olulised (Baldwin et al. 1997), kuid teised on tuvastanud sisemiste põhjuste suurema olulisuse (Hall 1992, Gaskill et al. 1993). Nimetatud uuringute puuduseks on see, et enamik neist ei käsitle põhjuste omavahelisi seoseid. Vastavates uuringutes on kasutatud nii pankrotihalduritelt kui ka ettevõtete juhtidelt või omanikelt pärinevat informatsiooni ebaõnnestumise põhjuste kohta. Samas pole siiani selget vastust, milline on ülaltoodud teooriate paikapidavus ettevõtete üldkogumis ning millised on nende seosed ettevõtete suuruse ja vanusega (**Uurimislüngad 8 ja 9**).

Ettevõtete finantsnäitajate muutumise kohta ebaõnnestumise protsessis on koostatud mitmeid kontseptuaalseid mudeleid. Sarnased mudelid on välja pakunud Laitinen (2005) ning Ooghe ja de Prijcker (2008), kelle seisukohalt algab ebaõnnestumine ebapiisava kasumi (või äritegevuse rahavoo) teenimisest, viies ettevõtte likviidsuse vähenemiseni, misjärel suurendavad ettevõtted kohustusi, jõudes seetõttu omakorda olukorrani, kus kohustusi ei suudeta enam täita.

Ebaõnnestumise protsesside modelleerimiseks finantsnäitajaid kasutanud tööst on kõige põhjalikum Laitinen (1991) töö, kus esitati sarnaste investeerimisprojektide teoreetiline mudel, millesse oli kaasatud kuus finantsnäitajat: 1) varade kasumlikkust (rentaablust) väljendav suhtarv; 2) müügitulu ja varade suhtarv; 3) kohustuste ja varade suhtarv; 4) käibevara ja lühiajaliste kohustuste suhtarv; 5) traditsioonilise rahavoo (st. puhaskasumi ja amortisatsiooni summa) suhe müügitulusse; 6) varade kasvumäär. Vastavaid finantsnäitajaid faktoranalüüsis kasutades tuvastas Laitinen (1991) kolm erinevat ebaõnnestumise protsessi: 1) pikaajaliselt halbade finantsnäitajatega ettevõtte (st. krooniline ebaõnnestuja); 2) järk-järguline ebaõnnestuja ehk järjest kehvemate finantsnäitajatega ettevõtte; 3) väga kiiresti ebaõnnestuv ettevõtte, mille pankrotile eelneva aasta finantsnäitajad ei pruugi üldse probleemidele viidata (st. akuutne ebaõnnestuja). Sarnasele tulemusele ebaõnnestumise tüüpide osas on jõudnud ka D'Aveni (1989). D'Aveni (1989) ja Laitinen (1991) töödes on ülaltoodud kolme ebaõnnestumise protsessi erinevused kõige paremini jälgitavad rentaablusnäitaja vahendusel. Vastavates töödes olid eelpoolnimetatud ebaõnnestumise tüüpide osakaalud järgnevad: 1) krooniline ebaõnnestuja – 51% D'Aveni (1989) ja 33% Laitinen (1991), 2) järk-järguline ebaõnnestuja – 39% D'Aveni (1989) ja 28% Laitinen (1991), 3) akuutne ebaõnnestuja – 10% D'Aveni (1989) ja 40% Laitinen (1991). Samas on mainitud autorite töödes kasutatud valimid olnud väga väikesed, mistõttu tekib küsimus, kas riikideüleses suures andmekogumis on kõik kolm protsessi esindatud ning nende osakaalud sarnased eelnevates töödes leitud.

Kuna Laitinen (1991) mudel sisaldab ainult kuut finantsnäitajat, siis on seda mudelit võimalik täiustada, lisades sellesse täiendavaid olulisi muutujaid (**Uurimislünk 10**). Näiteks lisades mudelisse müügitulu muudu, kulude muudu ning kohustuste muudu, mida on kirjanduses ebaõnnestumise protsessi seisukohalt oluliseks peetud (Beaver 1966, Ooghe ja de Prijcker 2008). Lisaks on võimalik mudelis lühi- ja pikaajalist maksevõimet vaadelda lähtudes Laitinen (1995) uuringust nii staatilises kui ka dünaamilises kontekstis. Seetõttu on töös ebaõnnestumise protsessi modellemiseks välja toodud täiustatud mudel, mis sisaldab lisaks Laitinen (1991) töös ära toodud muutujatele ka eelnimetatud täiendusi.

Kirjanduse ülevaate põhjal tuvastatud uurimislünkade täielik loetelu on järgnev:

1. Kas sarnaste ettevõtete puhul eksisteerivad erinevad ebaõnnestumise protsessid (Uurimislünk 1)?
2. Kas noorte ettevõtte puhul eksisteerivad erinevad ebaõnnestumise protsessid (Uurimislünk 2) ning kuidas need protsessid muutuvad koos ettevõtte vanusega (Uurimislünk 3)?
3. Kuidas ebaõnnestumise protsessid muutuvad koos ettevõtte suurusega (Uurimislünk 4)?
4. Kas eri riikides läbivad ettevõtted erinevaid ebaõnnestumise protsesse (Uurimislünk 5)?
5. Kas eksportivad ja mitte-eksportivad ettevõtted läbivad erinevaid ebaõnnestumise protsesse (Uurimislünk 6)?
6. Kuidas finantsnäitajate põhjal tuvastatud ebaõnnestumise protsessid on seotud ebaõnnestumise põhjustega (Uurimislünk 7)?
7. Kuidas on voluntaristlik, deterministlik ning integreeritud teooria seotud ettevõtete vanuse (Uurimislünk 8) ja suurusega (Uurimislünk 9)?
8. Millised on ebaõnnestumise protsessid, kui nende tuvastamiseks kasutada varasemate uuringutega võrreldes suuremat hulka finantsnäitajaid (Uurimislünk 10)?

Uurimisküsimused

Kirjanduse ülevaate, uurimislünkade ning avaldatud artiklite põhjal on töös ära toodud viis uurimisküsimust, mis omakorda jagunevad kaheksateistkümneks alam-uurimisküsimuseks. Töös püstitatud uurimisküsimused on järgnevad:

1. Kas erinevad ebaõnnestumise protsessid on olemas?
2. Kas ebaõnnestumise protsessid erinevad riikide lõikes?
3. Kas ebaõnnestumise protsessid muutuvad koos ettevõtete suurusega?
4. Kas ebaõnnestumise protsessid muutuvad koos ettevõtete vanusega?
5. Kas ebaõnnestumise protsessid erinevad eksportivate ja mitte-eksportivate ettevõtete lõikes?

Uurimisküsimuste, avaldatud artiklite ning uurimislünkade vahelised seosed on ära toodud järgnevas tabelis 1³⁴.

Tabel 1. Töö uurimisküsimuste, artiklite ning uurimislünkade vahelised seosed

Uurimisküsimus (UK)	Artikkel, milles UK käsitletud leiab	UK all käsitletavat uurimislüngad
UK 1. Kas erinevad ebaõnnestumise protsessid on olemas?	Artikkel 1, Artikkel 2, Artikkel 3, Artikkel 4	Uurimislünk 1, Uurimislünk 2, Uurimislünk 7, Uurimislünk 10
UK 2. Kas ebaõnnestumise protsessid erinevad riikide lõikes?	Artikkel 1, Artikkel 2, Artikkel 3	Uurimislünk 5
UK 3. Kas ebaõnnestumise protsessid muutuvad koos ettevõtete suurusega?	Artikkel 3, Artikkel 4	Uurimislünk 4, Uurimislünk 9
UK 4. Kas ebaõnnestumise protsessid muutuvad koos ettevõtete vanusega?	Artikkel 2, Artikkel 4	Uurimislünk 3, Uurimislünk 8
UK 5. Kas ebaõnnestumise protsessid erinevad eksportivate ja mitte-eksportivate ettevõtete lõikes?	Artikkel 2, Artikkel 3	Uurimislünk 6

Allikas: autori koostatud.

Töö andmed ja meetodid

Töö osaks olevad varem avaldatud teadusartiklid põhinevad kõik empiirilisel analüüsil, mille kokkuvõtte on toodud tabelis 2. Artiklis 2 ja 3 on kasutatud Amadeusi andmebaasist pärinevaid erinevate Euroopa riikide ettevõtete finantsandmeid ning ebaõnnestumise protsessid on tuvastatud faktor- ja klasteranalüüsi kasutades. Artikkel 1 põhineb 70 Soome ja 70 Eesti ettevõtete nii finantsandmetel kui ka ebaõnnestumise põhjustel. Kahe riigi ettevõtte on kokku sobitatud (ing. k. *matched*), st. igale Soome ettevõttele on otsitud tegevusala, suuruse ja pankroti aja alusel võrdluseks sarnane Eesti ettevõtte. Artikkel 4 põhineb ainult Eesti ettevõtete andmetel ning ebaõnnestumise põhjustel, mis pärinevad kohtulahenditest.

Finantsnäitajatest on kasutatud nelja liiki suhtarve (lüh- ja pikaajalise maksevõime, rentaabluuse ning efektiivsuse suhtarvud³⁵), bilansi- ja kasumi-aruandekirjete muutusid ning ettevõtte suuruse näitajaid, viimati nimetatuid küll ainult Artiklis 1.

³⁴ Eestikeelse kokkuvõtte tabelite numeratsioon algab uuesti numbrist 1, st. ei jätkata ingliskeelsete tabelite numeratsiooni.

³⁵ Suhtarvurühmade ingliskeelsed nimed on: *liquidity, solidity, profitability, activity/efficiency*.

Tabel 2. Töös kasutatud andmed ja meetodid artiklite lõikes

Artikkel (ja andmete liik)	Andekogumi suurus ning kasutatud finantsnäitajate perioodid ja arv	Kasutatud statistilise andmeanalüüsi meetodid
Artikkel 1 (finantsnäitajad ning ebaõnnestumise põhjused)	70 Soome ja 70 Eesti ettevõtet. 10 erinevat finantsnäitajat 2 ebaõnnestumisele eelneva perioodi kohta.	Statistilised testid, korrelatsioonanalüüs, logistiline regressioonanalüüs, faktoranalüüs.
Artikkel 2 (ainult finantsnäitajad)	1216 Euroopa mikrotööstusettevõtet, mille eluea pikkus on olnud kas 3, 4, 5 või 6 aastat. 11 erinevat finantsnäitajat 1–4 ebaõnnestumisele eelneva perioodi kohta.	Statistilised testid, faktoranalüüs, klasteranalüüs.
Artikkel 3 (ainult finantsnäitajad)	1235 Euroopa tööstusettevõtet, mille eluea pikkus on olnud vähemalt 10 aastat ning mis kuuluvad erinevatesse suurusegruppidesse. Sõltuvalt analüüsi püstitusest 6 või 11 erinevat finantsnäitajat 5 ebaõnnestumisele eelneva perioodi kohta.	Statistilised testid, faktoranalüüs, klasteranalüüs.
Artikkel 4 (ainult ebaõnnestumise põhjused)	Finantsandmeid pole kasutatud.	Statistilised testid, multinomiaalne logistiline regressioonanalüüs.

Allikas: autori koostatud.

Töö peamised tulemused

Töö peamisi tulemusi on järgnevalt kommenteeritud uurimisküsimuste kaupa.

Uurimisküsimus 1. Kas erinevad ebaõnnestumise protsessid on olemas?

Kõik neli artiklit näitasid, et erinevad ebaõnnestumise protsessid on olemas. Artiklis 1 tuvastati Eesti ettevõtete osas kuus ja Soome ettevõtete osas viis erinevat ebaõnnestumise protsessi. Kuna Artikkel 1 sisaldas firmasid erinevatest sektoritest, siis Artiklitega 2 ja 3 võrreldavuse huvides on oluline rõhutada, et mõlema riigi tööstusettevõtteid iseloomustasid peamiselt kaks erinevat ebaõnnestumise protsessi. Eesti ettevõtete näitel finantsnäitajad kasutades tuvastatud ebaõnnestumise protsessid ei olnud seotud spetsiifiliste ebaõnnestumiste põhjustega, kuid Soomes olid viiest põhjusest kaks seotud konkreetsete protsessidega. Artiklites 2 ja 3 tuvastatud ebaõnnestumise protsessid on koondatud tabelisse 3.

Tabel 3. Artiklites 2 ja 3 tuvastatud ebaõnnestumise protsessid (EP)

Ettevõtete grupp	Protsesside arv	Akuutne EP	Järk-järguline EP	Krooniline EP
3 aastat vanad	4	2 protsessi (19,4% ja 14,8%)	1 protsess (59,4%)	1 protsess (6,4%)
4 aastat vanad	4	1 protsess (17,9%)	2 protsessi (31,3% ja 37,3%)	1 protsess (13,5%)
5 aastat vanad	2	Puuduvad	2 protsessi (45,0% ja 55,0%)	Puuduvad
6 aastat vanad	2	Puuduvad	2 protsessi (36,2% ja 63,8%)	Puuduvad
Vanad (vähemalt 10 aastat; muutujate komplekt 1)	2	Puuduvad	2 protsessi (36,0% ja 64,0%)	Puuduvad
Vanad (vähemalt 10 aastat; muutujate komplekt 2)	2	Puuduvad	2 protsessi (56,5% ja 43,5%)	Puuduvad

Allikas: autori koostatud. Märkus: sulgudes on toodud vastava protsessi osakaal.

Tabelist 3 on näha, et kõigis vanusegruppides domineerivad järk-järgulise ebaõnnestumise protsessid ning enamikes vanusegruppides akuutset ning kroonilist ebaõnnestumise protsessi esindatud ei ole. Selline tulemus vastandub selgelt varasemates töödes (D'Aveni 1989, Laitinen 1991) leitudle. Järk-järguliste protsesside puhul oli peaaegu kõigil juhtudel jälgitav kasutatud finantsuhtarvude väärtuste järk-järguline halvenemine pankrotile eelnevate aastate jooksul. Ebaõnnestumise põhjuste osas leiti töös, et 43% ettevõtetest ebaõnnestub sise- ja väliskeskkonna põhjuste koosmõjus, mistõttu leidis integreeritud teooria domineerimine kinnitust. Samas on ainult sisekeskkonnast ning ainult väliskeskkonnast tulenevate põhjuste tõttu ebaõnnestumine sage, vastavalt 31% ja 26%, mistõttu integreeritud teooria ei ole ebaõnnestumiste seletamisel siiski ülekaalukalt tähtsaim, nagu väideti Mellahi ja Wilkinson (2004) poolt.

Uurimisküsimus 2. Kas ebaõnnestumise protsessid erinevad riikide lõikes?

Artiklis 1 näidati Eesti ja Soome ettevõtete pankrotieelsete finantsnäitajate võrdlemisel statistiliste testide ning logistilise regressioonanalüüsiga, et ebaõnnestunud ettevõtete finantsnäitajad on kahe riigi lõikes väga erinevad. Samas ebaõnnestumise põhjuste osas kahe riigi lõikes nii suuri erinevusi ei esinenud. Kuigi ettevõtted olid analüüsis spetsiaalselt valitud paarid, siis iseloomustavad Soome ja Eesti ettevõtteid väga erinevad ebaõnnestumise

protsessid. Artiklis 2 ja 3 tuvastatud protsessid olid riikide lõikes väga erineva osakaaluga, mida on näidatud tabelis 4.

Tabel 4. Erinevate protsesside minimaalsed ja maksimaalsed osakaalud eri riikides.

Ettevõtete grupp	Min (%)	Max (%)	Min (%)	Max (%)	Min (%)	Max (%)	Min (%)	Max (%)
3 aastat vanad	Protsess 3.1		Protsess 3.2		Protsess 3.3		Protsess 3.4	
	10	28	42	65	6	32	3	15
4 aastat vanad	Protsess 4.1		Protsess 4.2		Protsess 4.3		Protsess 4.4	
	10	54	5	30	10	20	8	60
Ettevõtete grupp	Min (%)		Max (%)		Min (%)		Max (%)	
5 aastat vanad	Protsess 5.1				Protsess 5.2			
	30		51		49		70	
6 aastat vanad	Protsess 6.1				Protsess 6.2			
	10		75		25		90	
Vanad (vähemalt 10 aastat vanad; muutujate komplekt 1)	Protsess 1.1				Protsess 1.2			
	6		71		29		94	
Vanad (vähemalt 10 aastat vanad; muutujate komplekt 2)	Protsess 2.1				Protsess 2.2			
	33		74		26		67	

Allikas: autori koostatud.

Märkus: Min ja Max tähendavad vastavalt vaadeldava protsessi minimaalselt ja maksimaalselt osakaalu analüüsi kaasatud riikides. Tabelis toodud protsesside numbrid pärinevad töö osaks olevatest teadusartiklitest.

Uurimisküsimus 3. Kas ebaõnnestumise protsessid muutuvad koos ettevõtete suurusega?

Uurimisküsimust 3 käsitleti Artiklites 3 ja 4. Artiklis 3 selgus, et ebaõnnestumise protsessid võivad ettevõtete suuruse gruppide lõikes erineda. Väikesemaid ettevõtteid iseloomustavad rohkem sellised ebaõnnestumise protsessid, kus finantssuhtarvude väärtuste halvenemine on võrreldes suuremaid ettevõtteid iseloomustavate protsessidega kiirem.

Artikkel 4 näitas, et ebaõnnestumine ainult sisekeskkonna põhjuste tõttu väheneb koos ettevõtte suuruse kasvuga. Samas sise- ja väliskeskkonna põhjuste koosmõju tõttu ebaõnnestumise puhul eksisteerib vastupidine seos, st. vastava põhjuse esinemistõenäosus kasvab koos ettevõtte suurusega. Ainult väliskeskkonnast tingitud põhjuste tõttu ebaõnnestumise ja ettevõtte suuruse vahel puudub statistiliselt oluline seos.

Uurimisküsimus 4. Kas ebaõnnestumise protsessid muutuvad koos ettevõtete vanusega?

Uurimisküsimust 4 käsitleti otseselt ainult Artiklites 2 ja 4, kuigi teatud ealisi üldistusi on võimalik teha ka Artikleid 2 ja 3 koos vaadeldes. Kolme tüüpi ebaõnnestumise protsessid on iseloomulikud ainult väga noortele (3 ja 4 aasta pikkuse elueaga) ettevõtetele. Ettevõtete vanuse kasvades (5 ja 6 aasta pikkuse elueaga ettevõtted ning üle 10 aasta pikkuse elueaga ettevõtted) esinevad ainult järk-järgulise ebaõnnestumise protsessid. Seetõttu võib öelda, et ettevõtete sünnijärgsete probleemide teooria (ing. k. *liability of newness theory*) on kirjeldatud mitmete erinevate ebaõnnestumise protsessi tüüpidega, kuid noorukiea probleemide teooria (ing. k. *liability of adolescence theory*) ning vananemise probleemide teooria (ing. k. *liability of obsolescence theory*) on seotud ainult järk-järgulise ebaõnnestumise protsessidega.

Artikkel 4 näitas, et ettevõtte vanuse kasvades suureneb tõenäosus ebaõnnestuda ainult väliskeskkonnast tulenevate põhjuste tõttu. Ainult sisekeskkonna põhjuste ning sise- ja väliskeskkonna põhjuste koosmõju tõttu ebaõnnestumise ning ettevõtte vanuse vahel puudub statistiliselt oluline seos.

Uurimisküsimus 5. Kas ebaõnnestumise protsessid erinevad eksportivate ja mitte-eksportivate ettevõtete lõikes?

Eksportivate ja mitte-eksportivate ettevõtete ning ebaõnnestumise protsesside vahelisi seoseid vaadeldi ainult Artiklites 2 ja 3, mille jaoks olid ettevõtete ekspordiantmed kättesaadavad. Mõlemad artiklid näitasid, et eksportivate ja mitte-eksportivate ettevõtete lõikes pole ebaõnnestumise protsessid erinevad. Seetõttu võib öelda, et kuigi eksportivate ja mitte-eksportivate ettevõtete finantsnäitajate võrdluses on tuvastatud palju erinevusi (vaata Wagner 2012), nende ebaõnnestumine ei erine.

Järgnevalt on kokkuvõtlikult esitatud töö peamine teaduslik uudsus. Võrreldes paljude varasemate töödega (näiteks D'Aveni 1989, Laitinen 1991, Laitinen et al. 2014) on analüüsi kaasatud ettevõtted omavahel rohkem võrreldavad. Näiteks on Artiklis 2 kasutatud ainult tööstussektori noorte mikroettevõtete andmeid, Artiklis 3 tööstussektori vanade (kõik vähemalt 10 aastat vanad) ettevõtete andmeid ning Artiklis 3 omavahel sobitatud (ing. k. *matched*) Eesti ja Soome ettevõtete andmeid. Lisaks on kõigi Artiklitesse 2 ja 3 kaasatud ettevõtete puhul pankroti väljakuulutamise ja pankrotieelse aasta-aruande bilansipäeva vahelise perioodi pikkus 0,75–1,25 aastat. Nimetatud aspektid on tulemuste üldistamise seisukohalt ülimalt olulised. Näiteks kui ebaõnnestumise protsesside modelleerimisel kasutada viimases esitatud majandusaasta aruandes toodud informatsiooni, võib tekkida probleem, et mõne ettevõtte puhul peegeldab aruanne situatsiooni näiteks mõni kuu enne pankroti väljakuulutamist, aga teisel juhul on vastav näitaja näiteks kaks aastat.

Lisaks eelnimetatud uuendustele käsitles töö mitmeid varasemas teaduskirjanduses väga vähe uuritud aspekte. Senini pole piisavalt tähelepanu

pööratud ebaõnnestumise protsesside rahvusvahelisele võrdlemisele ning puudub ka teadmus mõnede ettevõtete tüüpide ebaõnnestumise protsesside kohta. Näiteks on noorte ettevõtete ebaõnnestumist portreeritud ühe spetsiifilise protsessiga (Argenti 1976, Ooghe ja de Prijcker 2008), kuid antud töö näitas, et sellistele ettevõtetele on tegelikult omased mitmed erinevad ebaõnnestumise protsessid. Varasemates töödes otseselt käsitlemata valdkond on ka ebaõnnestumise protsesside seos ettevõtte vanusega. Artiklid 2 ja 3 näitasid, et ettevõtete vanuse kasvades iseloomustab neid väiksem arv erinevaid ebaõnnestumise protsesse. Teaduskirjanduses polnud senini ka vastust, kas eksportivate ja mitte-eksportivate ettevõtete ebaõnnestumise protsessid erinevad. Artiklid 2 ja 3 näitasid, et ebaõnnestumise protsessid eksportivate ning mitte-eksportivate ettevõtete lõikes ei erine. Olulise uuendusena saab välja tuua ka selle, et Artiklis 4 näidati Eesti ettevõtete üldkogumile tuginedes, kuidas selgitavad eri vanuse ja suurusega ettevõtete ebaõnnestumist volutaristlik, deterministlik ning integreeritud teooria. Eelnev on oluline just seetõttu, et teaduskirjanduses (Mellahi ja Wilkinson 2004, Amankwah-Amoah 2016) on aastaid rõhutatud vastava teema empiirilise uurimise vajalikkust.

Töö praktiline tähtsus

Töö tulemuste põhjal on erinevatele sihtgruppidele (nagu näiteks krediidi-analüütikud, krediidiriski mudelite koostajad, pankrotihaldurid, kohtunikud, seadusloojad) võimalik välja tuua mitmeid praktilisi soovitusi, mida on järgnevalt kirjeldatud:

1. Töö tulemused näitasid, et eri riikides võivad domineerida erinevad ebaõnnestumise protsessid. Seetõttu ei pruugi ühe riigi andmete põhjal koostatud pankroti prognoosimise mudelid sobida kasutamiseks teises riigis. Kõrge klassifitseerimistäpsusega universaalsete (riikideüleste) pankroti prognoosimise mudelite koostamine lihtsate meetoditega (näiteks logistilise regressioonanalüüsiga) võib seega osutada keerukaks. Samas on kõige suurema osakaaluga järk-järgulist ebaõnnestumist kirjeldavad protsessid, mistõttu pankroti prognoosimine on võimalik.
2. Enamiku ebaõnnestumise protsesside puhul (nii noorte kui ka vanade ettevõtete lõikes) on omakapital mitu aastat enne pankroti väljakuulutamist negatiivne. Vanemate ettevõtete puhul tekib antud juhul küsimus, kas need ei oleks pidanud juba varem alustama saneerimis- või likvideerimismenetlust. Sellele aspektile saavad tähelepanu pöörata nii pankrotihaldurid pankrotimenetluses kui ka riiklikud äriregistrid ettevõtete omakapitalinõuete vastavuse kontrollil. Noorte ettevõtete puhul on suureks probleemiks vähene omakapital, mis võib viidata vajadusele alustavate ettevõtete starditoetuste süsteemi täiustada.
3. Vanad ettevõtted ebaõnnestuvad kõige sagedamini väliskeskkonna põhjuste tõttu, seega need ettevõtted peaksid ebaõnnestumise vältimiseks just vastavaid riske maandama. Näiteks võiks vältida keskendumist väga väikesele hulga klientidele, vältida liigset (tagatisteta) krediitmüüki (isegi

kauaaegsete koostööpartnerite korral) ning olla kursis oma valdkonda puudutava seadusandluse arengutega.

4. Ainult sisekeskkonnast või nii sise- kui ka väliskeskkonnast korruga tulenevate põhjuste tõttu ebaõnnestumiste osakaal on kõrge just mikro- ja väikeettevõtete hulgas. Siinkohal on võimalik riigil parandada ettevõtlusnõustamise kättesaadavust vastava ettevõtete sihtgrupi hulgas, sest sellistel ettevõtetel puuduvad tavaliselt ressursid spetsiifilise oskusteabe väljastpoolt hankimiseks.

Töö piirangud ning soovitused edasisteks uuringuteks

Töösse lisatud artiklites esineb mitmeid piiranguid, millega tuleb töö tulemuste kasutamisel arvestada ning neid võimalusel tulevastes uuringutes käsitleda:

1. Töös on ebaõnnestunud ettevõtetena käsitletud ainult pankrotistunud ettevõtteid. Seetõttu ei pruugi töö tulemused olla kasutatavad teiste ebaõnnestumise definitsioonide korral.
2. Artiklis 1 oli andmekogum väike (mõlemast riigist 70 ettevõtet) ning Artiklis 4 vaadeldi ainult Eesti ettevõtteid, mistõttu on nende artiklite (rahvusvaheline) üldistusvõime madalam kui Artiklite 2 ja 3 puhul, mis hõlmasid suuremat hulka erinevaid Euroopa riike.
3. Töös kasutatud ebaõnnestumise põhjused pärinevad kohtulahenditest, kuhu need on omakorda lisatud pankrotihalduri poolt esitatud aruannetest. Pankrotihaldurilt pärinevat infot on kasutanud ka varasemad olulised teadustööd (näiteks Baldwin et al. 1997, Thornhill ja Amit 2003). Vastava info kasutamise puuduseks on see, et pankrotihaldurite lõikes võivad põhjuste tuvastamise meetodid varieeruda.
4. Töö on mitmete uurimisküsimuste osas pigem varasemale teaduskirjandusele ja empiirilistele andmetele tuginedes teatud aspekte avastava (ing. k. *exploratory*), mitte spetsiifilist teooriat loova ja seda testiva iseloomuga.

Tööd on võimalik tulevastes uurimistöodes mitmel viisil edasi arendada, nagu näiteks:

1. Analüüsi on võimalik kaasata suurem arv riike. Töö käsitles teatud hulka Euroopa Liidu liikmesriike, kuid sarnast analüüsi oleks andmete olemasolul võimalik läbi viia ka teiste kontinentide riikide näitel.
2. Töös leiti küll vastused küsimustele, miks ja kuidas ettevõtted ebaõnnestuvad, kuid ei uuritud, miks on ebaõnnestumise protsessid riikide lõikes erinevad.
3. Töös kasutatakse sarnaselt varasemale teaduskirjandusele ettevõtete majandusaasta aruannete andmeid, kuid ebaõnnestumise protsessi veel täpsemaks mõistmiseks oleksid vajalikud lühemate ajaperioodide andmed, nagu näiteks ettevõtete maksudeklaratsioonide ja maksuvõlgade andmed kuude kaupa.
4. Amadeuse andmebaas sisaldab ainult ettevõtete bilanssidest ja kasumiaruannetest pärinevaid andmeid, mille põhjal on küll võimalik välja arvutada

erinevaid rahavoogusid, kuid analüüsi rikastaks kindlasti ka rahavoogude aruannete olemasolu.

5. Oluline uurimisvaldkond seisneb ebaõnnestuva ettevõtte juhi otsustusprotsessi lahtimõtestamises. Eriti huvitav on see mikro- või väikeettevõtete kontekstis, kus sageli kõigi juhtimisvaldkondade eest vastutab üks inimene.
6. Pankrotiga kulmineeruv ettevõtete ebaõnnestumine on väga vähe uuritud ettevõtete rahvusvahelistumist käsitlevas kirjanduses, mistõttu on töö autoril võimalik tulevikus neid kahte uurimisvaldkonda siduda. Kuna töö autor on hetkel seotud ekspordimustreid käsitleva teadusprojektiga, siis esimesed sammud on nimetatud valdkonnas praeguseks ka juba tehtud.

CURRICULUM VITAE

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Languages: English, Russian

Work experience:

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2002–2010 Adjunct instructor, Tartu University FEB
2004–... Member of boards and councils in different companies
2003–2007 Member and chairman of council of Tartu University Student Foundation

Academic activities:

1) Supervision:

13 bachelor theses, 28 masters theses

2) Reviewing:

12 bachelor theses, 19 masters theses

3) Lecturing

Have been member of bachelor and masters theses defence commissions, member of bachelor seminar commission and lecturer in 9 different courses.

Main research areas:

Firm failure processes, bankruptcy prediction, reorganization, credit risk assessment, public grants to firms, *spin-off* entrepreneurship.

Social activities:

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2004–... Erinevate äriühingute juhatuse ja nõukogu liige
2003–2007 TÜ Üliõpilaskonna SA nõukogu liige ja nõukogu esimees

Akadeemiline tegevus:

1) Juhendamine

13 bakalaureusetööd, 28 magistritööd

2) Retsenseerimine

12 bakalaureusetööd, 19 magistritööd

3) Õppetöö

Olnud nii bakalaureuse- kui ka magistritööde kaitsmiskomisjoni liige, bakalaureuseseminari komisjoni liige ning olnud õppeaine vastutav läbiviija või andnud üksikuid loenguid 9 erinevas õppeaines nii statsionaarõppes kui ka avatud ülikoolis.

Peamised uurimisvaldkonnad:

Ettevõtete ebaõnnestumise protsessid, pankroti prognoosimine, saneerimine, krediidiriski hindamine, riiklikud toetused ettevõtetele, *spin-off* ettevõtlus.

Ühiskondlik tegevus:

Korp! Rotalia liige. Olen olnud TÜ Üliõpilasesinduse ja selle juhatuse liige, TÜ nõukogu liige, TÜ Majandusteaduskonna nõukogu liige.

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