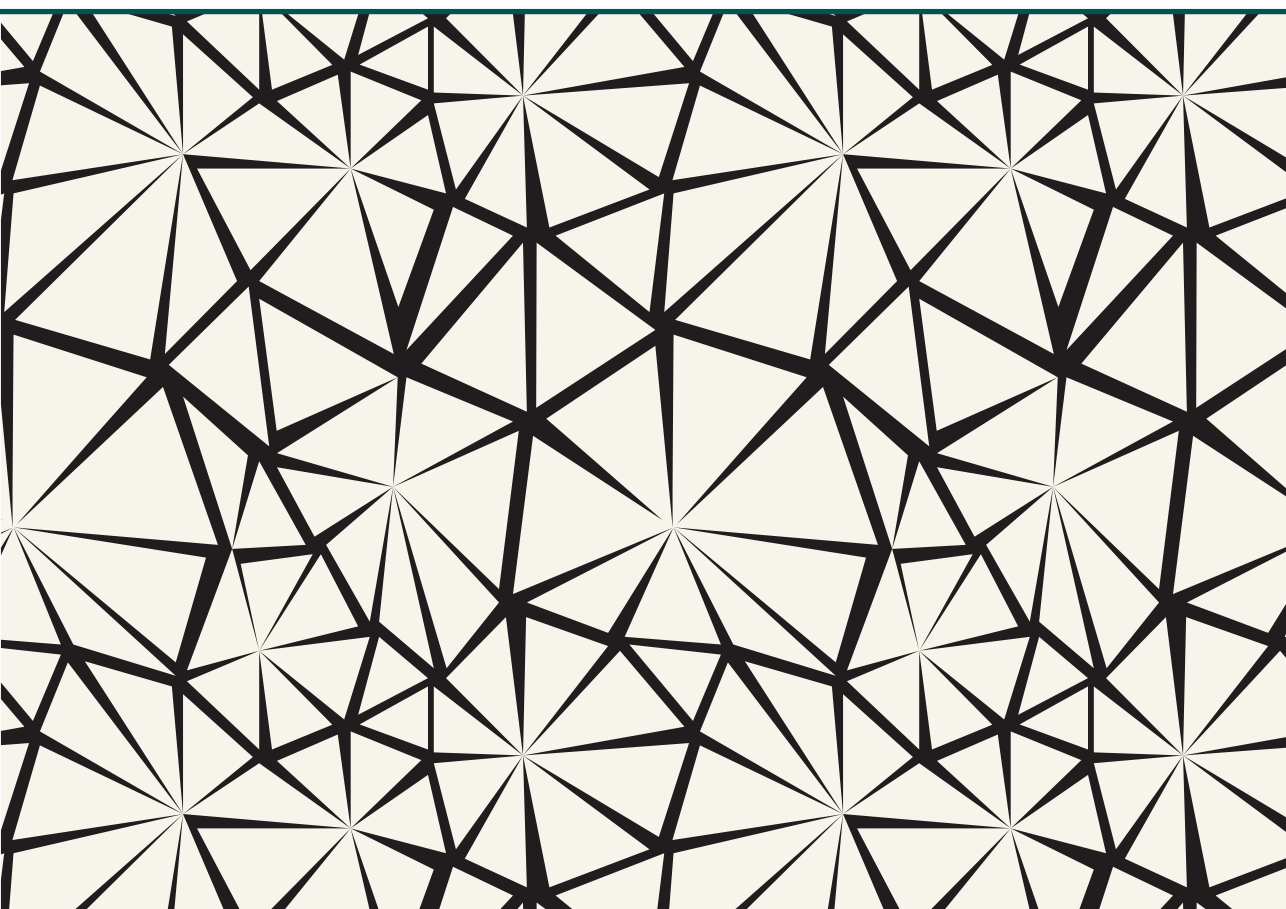RIGA TECHNICAL
UNIVERSITY

**Anita Matisone**

# ACHIEVING SELF-SUSTAINABILITY
# OF VENTURE CAPITAL MARKET IN LATVIA

Summary of the Doctoral Thesis

# RIGA TECHNICAL UNIVERSITY

Faculty of Engineering Economics and Management
Institute of Business Engineering and Management

## Anita Matisone

Doctoral Student of Study Programme "Business Management and Economics"

# ACHIEVING SELF-SUSTAINABILITY OF VENTURE CAPITAL MARKET IN LATVIA

## Summary of the Doctoral Thesis

Scientific supervisor
Professor Dr. oec.
NATAĻJA LĀCE

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# DOCTORAL THESIS PROPOSED TO RIGA TECHNICAL UNIVERSITY FOR THE PROMOTION TO THE SCIENTIFIC DEGREE OF DOCTOR OF SCIENCE

To be granted the scientific degree of Doctor of Science (Ph. D), the present Doctoral Thesis has been submitted for the defence at the open meeting of RTU Promotion Council on February 18, 2022 10:00 online in Zoom.

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DECLARATION OF ACADEMIC INTEGRITY

I hereby declare that the Doctoral Thesis submitted for the review to Riga Technical University for the promotion to the scientific degree of Doctor of Science (Ph. D.) is my own. I confirm that this Doctoral Thesis had not been submitted to any other university for the promotion to a scientific degree.

Anita Matisone _____

Date: _____

The Doctoral Thesis has been written in English. It consists of Introduction, 4 chapters, Conclusions and recommendations, 26 figures, 41 tables, 14 appendixes; the total number of pages is 191, including appendixes. The Bibliography contains 158 titles.

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# INTRODUCTION

## Topicality of the Research

Small and medium-sized enterprises (SMEs) are the backbone of any economy. In Europe, 99 % of all businesses, or around 25 million firms, are SMEs (European Commission, 2010). They employ around 100 million people, and produce more than half of Europe's gross domestic product (GDP).

Governments across the globe, not only in Europe, support SMEs to try to boost their economic competitiveness and prosperity. A common approach is to improve their access to financing. As predicted by Pecking order theory, the most widespread financial instrument used by SMEs is a loan (Association for Financial Markets in Europe, 2019). Nevertheless, it is widely acknowledged by researchers that other financial instruments also are necessary due to differences in the business models, size and age of SMEs.

Companies with stable income, proved track record and assets to pledge as collateral have access to various sources of capital (Andrieu & Groh, 2012) and can choose which is the most appropriate for them. New ventures, however, especially in the high-tech sector, usually lack these features and thus, are often not eligible for typical funding such as bank loans (Cassar, 2004). It is well-known (Brealey, Myers, 2008; Hellmann & Puri, 2002; Lerner et al., 2005) that for such companies equity financing or Venture Capital (VC) is the most advisable financial instrument to use. It is also admitted (Bilbao-Osorio et al., 2018; European Commission, 2010) that as a result of VC investments higher level of R&D, innovation, productivity and employment is achieved.

Although VC is of exceptional importance for new companies with high growth potential and provides wider economic benefits, such investments are widespread only in the United States (Lerner et al., 2005). The development of VC markets elsewhere has been only moderate (Grilli et al., 2018). For example, European VC investments are roughly one eighth of those in the US (European Commission, 2010). Still, there is a considerable difference between VC activity in different European countries. Available VC funding in the United Kingdom is two times higher than the European average and four and more times higher than in the Baltic countries, including Latvia (Invest Europe, 2021), as calculated by the author from the data in 2015–2019.

Therefore, governments in many countries try to foster VC market activity. The European Union (EU) alone (European Court of Auditors, 2019) has several policy documents that support an increase in VC investments (European Commission, 2010), and also over several decades it has contributed a significant amount of money to support VC funds.

There is no consensus on how to cultivate the VC market activity (Hellmann & Thiele, 2019). Numerous studies regarding VC and factors influencing it point to a broad range of drivers. Yet, a comprehensive overview of those factors has yet to be conducted. Another challenge is that most of these studies were conducted in countries with developed and stable economies. There is also little clarity regarding differences between countries with longer VC histories and those with briefer experiences. Moreover, the results of the studies are partly contradictory. Some studies conclude that it is more important to increase the supply of VC (Hellmann & Thiele, 2019), while others favour increasing demand for VC (Harding, 2002). There are also studies that provide evidence that an increase in one side of the market sides leads to an increase in the other side (Bertoni et al., 2017; Cipollone & Giordani, 2019; Gompers & Lerner, 1998). The opposite may also be true – the scarcity of VC supply may be a reason for decreased demand for VC (Bertoni et al., 2017) as entrepreneurs fearing the high competition for VC money will not seek it. Therefore, determining factors and arranging them by country's specific features is the first research question.

To the best of the author's knowledge, the countries that have sought the benefits of VC investments did not or do not have comprehensive policies to develop their VC markets. Instead, they just engaged in sporadic efforts to provide public funding for VC funds or encourage entrepreneurs to use VC.

EU countries may use resources from European Structural Funds (SF) to support their economic development. They have the latitude to determine how the funds are used: as grants, guarantees, loans or VC investments. Starting from the 2007–2013 planning period (Wishlade et al., 2016) there has been a shift from the prevalence of grants to repayable financial instruments and VC as part of them. Many EU countries have allocated part of their available SF money to local VC fund managers. Over the 2007–2020 period, governmental agencies provided EUR 20.4 billion to VC funds in the EU (Invest Europe, 2020) (calculations by the author). In 2020 alone EUR 3.55 billion or 23 % of the newly raised committed capital of European VC funds came from governmental agencies. In Latvia, even more – 77 % of newly raised funds' capital came from public agencies. Public contributions to support VC funds are made not only by each EU member state (mostly from SF resources). There has also been support for VC at the European level from the European Commission (EC).

The amount of public support that VC funds need has been determined based on expert opinions about existing market gaps. The precision of these gap evaluations is debatable (Kraemer-Eis & Lang, 2014), as the actual level of the demand is latent and dependent upon the knowledge of potential entrepreneurs about VC and its suitability for their companies (Harding, 2002). After a gap is assessed, the decision on particular financial instruments to be used and their amount during a particular planning period is taken. The objectives of such programmes are usually to broaden the access of SMEs to finance and to increase employment. Therefore, the number of SMEs supported and jobs created is set as a measurable target. The development of a country's VC market is not the aim of SF or other governmental programmes. Thus, these programmes do not directly set as an objective the development of the VC market, an outcome that would achieve the declared objective of the public funding on a long-term basis.

Researchers have identified another problem (Harding, 2002; Hellmann & Thiele, 2019). Each programme is evaluated in isolation, asking whether its direct targets have been achieved. As a result, neither policymakers nor those administering the programmes are looking at how programmes could complement one another. Furthermore, the accumulation of experience is not included as a desirable metric (Hellmann & Thiele, 2019) for assessing results, nor is a long-term perspective taken while evaluating the programmes.

There is a general understanding among policymakers that sufficient demand for VC is necessary to have successful VC fund operations. Therefore, countries also support the creation of new innovative enterprises and the awareness of entrepreneurs about VC (Owen & Mason, 2019). Still, these activities are only vaguely connected with public inflows into VC funds.

Dependency on public support in many countries (even after more than fifteen years of public support), especially in Latvia with its still substantial proportion of public funding and minor private funding (Matisone & Lace, 2020), could signal about serious deficiencies in the design of the interventions. The effectiveness of the public support from the VC market development perspective is the second research question.

Public finance theory states that government interventions are exceptional measures that may be used if they generate positive externalities to the society as a whole (Hyman, 2010) and do not distort the market. In addition, transaction cost economics emphasises the importance of including implementation costs into the calculation of expected benefits from interventions (Williamson, 2000). As public support should be limited in time measure and its implementations costs should be weighed against benefits, the programmes should try to influence the VC market as a whole, not just its parts. Therefore, the third research question concerns how public support for the VC market could be improved to achieve its self-sustainability.

## Research Questions:

1. What are the factors that promote VC market development?
2. What are the activities of the Latvian government for promoting the development of local VC

market and are they effective?

3. How could public support for VC market development be improved?

**The goal of the Research** is to elucidate the conditions for self-sustainable Venture Capital market development and to elaborate a model for appropriate VC public policies based upon multi-factor impact analysis of measures undertaken by the VC market stakeholders. The model has been developed based on the research on the Latvian market and could be suitable for countries with similar a socio-economic, cultural and political environment and small internal markets.

**The Objectives:**

1. To determine the factors which influence the VC market development and public interventions' effectiveness.
2. To explore the investment patterns of VC funds established in Latvia during 2006–2020, their level of the value adding assistance to the portfolio companies, fundraising ability and activity continuation rate.
3. To analyse the companies supported by VC funds established in Latvia during the period 2006–2020 from the point of ratio of their technology or knowledge-intensity.
4. To explore the practice of implementation of EU and Latvian government programmes for VC investments support to highlight the drawbacks.
5. To elaborate a model for improved VC interventions approaches for achieving long-term impact on VC market self-sustainability.

**The Object of the Research** is the Venture Capital market in Latvia.

**The Subject of the Research** is the factors which ensure achievement of self-sustainability of the Venture Capital market.

## Limitations to the Research

1. VC funds established in Latvia during the three EU Structural Fund planning periods (2004–2006, 2007–2013, 2014–2020) and their portfolio companies were examined. The funds established outside Latvia but partially active in Latvia were not included in the scope of the research. The companies supported by such funds were also not included. This was due to time constraints and the premise that there is no direct impact from the Latvian government activities on foreign VC funds activities.
2. Qualitative research dominates the research. This can be explained by the fact that due to the immature status of the Latvian VC market and the very limited number of its participants, any new entrant or exit substantially distorts quantitative market data. As a result, qualitative analysis is necessary for such a situation.

## Theoretical and Methodological Foundation of the Research

The Thesis is based on the findings of worldwide renowned researchers in the field of VC and public interventions – Baldock, R., Cumming, D., Colombo, M. G., Gompers, P. A., Grilli, L., Groh, A. P., Knockaert, M., Harrison, R., Hellman, T., Lerner, J., Luukkonen, T. and others. Also, studies on the VC issue in Central and Eastern Europe (CEE) by leading authors (Karsai, J, Prohorovs, A.) were used.

The conceptual model was developed from the new institutional economics perspective (Williamson, 1998) focusing on formal and informal institutions' role in the status and development of the VC market. Theory of change as proposed by Wislade et al. to apply for SF programmes evaluation (Wishlade et al., 2016) also was used.

Various sources of information were used to obtain the data:

1. Regarding Latvian government interventions – publicly available information on www.esfondi.lv and www.altum.lv, information requested from ALTUM and the former staff of governmental agen-

cy Latvian Guarantee Agency, scientific articles related to the VC market of Latvia and the Baltic states, different media articles.

2. Information about VC fund managers and their portfolio companies provided by the Latvian Financial and Capital Market Commission https://www.fktk.lv; Invest Europe data base; websites of the Latvian Private Equity and Venture Capital Association and VC fund managers; the database of Latvian companies *firmas.lv*; and interviews and surveys of VC fund managers;

3. Regarding the scientific literature analysis – web search engines *Google Scholar, Web of Science,* and *Exlibris PRIMO.*

## The Research Design

To answer the research questions and reach the research goal, different methods were used, and research was done in several steps outlined by the research objectives.
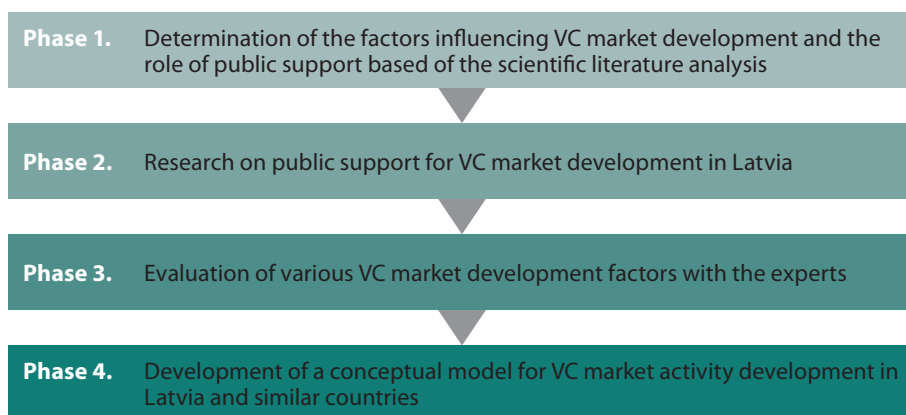
The research schematical design is provided in *Figure 1.*



| Phase 1. | Determination of the factors influencing VC market development and the role of public support based of the scientific literature analysis |
| Phase 2. | Research on public support for VC market development in Latvia |
| Phase 3. | Evaluation of various VC market development factors with the experts |
| Phase 4. | Development of a conceptual model for VC market activity development in Latvia and similar countries |

Fig. 1. Research design (created by the author).

*Phase 1. Determination of the factors influencing the VC market development and the role of public support in it based on theoretical analysis of the scientific literature.*

This research phase consists of the following:

- analysis of scientific literature and the experts' survey to identify the desirable (self-sustainable) VC market characteristics that governments should help to achieve and triangulation of the results;
- qualitative content analysis of scientific literature for identifying the VC supply determinants;
- qualitative content analysis of scientific literature for identifying the VC demand determinants;
- qualitative content analysis of scientific literature for identifying the matching determinants of VCists and entrepreneurs;
- preparation of the combined list of the factors, indicating their impact on a particular market.

During this phase, the first research question **"What are the factors that promote VC market development?"** was answered from the theoretical perspective. The results of the 1st phase provided a list of theoretical characteristics of the VC market participants, local environment and the embedded characteristics of society and a country necessary for successful VC market development.

*Phase 2. Research on public support for VC market development in Latvia.*

During this phase, public support for VC market in Latvia, VC funds established as result of it and portfolio companies of the funds were researched. Particular attention was paid to examining the existence of the theoretical characteristics of the VC market participants necessary for further VC market

development that were discovered during Phase 1. The research Phase 2 consisted of the following:

- research on the EU and Latvian government programmes for VC market support;
- research on the VC funds established in Latvia during 2006–2020;
- research on companies supported by the VC funds established in Latvia during 2006–2020.

The second research question "What are the activities of the governments for helping local VC markets to develop and what are the results of them?" was answered during this phase.

*Phase 3. Evaluation of various VC market development factors with the experts.*
During this phase:

- the list of the factors promoting VC market development obtained during the 1st phase was adjusted for Latvia and countries with similar socio-economic, cultural and political environment and small internal markets using the results of the 2nd phase;
- on the basis of the adjusted list of factors the questionnaire for the survey of experts in Baltic VC market was developed;
- the survey of experts in Baltic VC market was done and the list of the factors with substantial impact on VC market development in countries with immature VC markets was elaborated.

*Phase 4. market Development of a conceptual model for self-sustainable VC development in Latvia*
During this phase:

- the importance-performance matrix analysis was carried out, identifying the most important factors for which the government should provide public support to increase their beneficial effects on the market;
- the conceptual model for VC market activity development in Latvia was elaborated.

During this phase research question 3 "How public support for VC market development could be improved?" was answered.

## Research Methods

The pragmatic mixed methods approach (Patton, 1990) was used during the study. The dominance of the qualitative research is justified by unavailability of longitudinal and systematic data regarding the countries with immature VC markets and that as a result of limited number of such markets' participants, any new entrant or significant exit substantially distort the market data. As per the theory, qualitative research is recommended to account for real-world contextual conditions (Yin, 2016), which was important in studying the factors in countries with specific features. The qualitative research corroborated with secondary data also is widely used by reputable VC market development experts such as Lerner (2015), Harding (2002), Migendt et al. (2017), Baldock (2015) and in other studies related to the countries with immature VC markets (Owen & Mason, 2019).

Data collection methods.

- Interviews:
  - semi-structured interviews with VC fund managers active in Latvia in 2018 (March 2018) exploring characteristics of the VC fund managers, their value-added activities for portfolio companies and reasons for unsuccessful investments;
  - interviews with VCF management companies active in Latvia in 2019 (Summer 2019) regarding the factors influencing the choice of financial instruments in VC deals;
  - interviews with VCF management companies active in Latvia in 2020 (June 2020) devoted to establishing limiting factors for the VC managers operations.
- Surveys:
  - survey of the experts in Baltic VC market issues with semi-structured questionnaire regarding the importance of the various VC market development factors in countries with immature VC markets (such as Latvia, for example) (May – June 2021);

- survey of the experts in Baltic VC market issues regarding self-sustainable VC market characteristics (September – October 2021).

Qualitative data analysis methods:
- qualitative content analysis of the scientific literature regarding the factors influencing VC market supply, demand and VCists and entrepreneurs matching;
- inductivism and generalization approaches used for evaluation of VC fund managers;
- triangulation of the literature content analysis outcomes with the findings of the empirical part of the research.

Quantitative data analysis methods:
- quantitative assessment of evaluations of the importance of the factors by Likert scale;
- quantitative data processing (total values, proportion, mean values, standard deviation, correlation, rotated component matrix) with Excel formulas and Statistical Package for the Social Sciences 26.

## Scientific Novelty

1. Elaboration of the characteristics of the self-sustainable VC market, which should be achieved with the help of government support programmes.
2. Assessment of the current state of the VC market in Latvia in the context of self-sustainability achievement:
   a) assessment of the market's ability for further surviving without public funding;
   b) assessment of the ability of the market in providing funding and strong nonfinancial support for the riskiest companies (in the earliest stages of their development and high-tech ventures);
   c) assessment of the balance between demand and supply and conditions for creating a pipeline of investible businesses.
3. Identification and Assessment of the factors influencing the VC market self-sustainability in Latvia and countries with similar socioeconomic, cultural and political environments and small internal markets.
4. Elaboration of the model for improved VC market support measures for achieving long-term impact on VC market self-sustainability.

## Practical Value

The proposed conceptual model and the results of the importance-performance matrix analysis are tools for further VC interventions design and implementation, allowing them besides direct effect (providing funding for SMEs) to gradually catalyse the VC market self-sustainability.

## Hypothesis

The public support for the development of self-sustainable VC market should be provided as a comprehensive policy taking into account impact of all factors influencing the VC market development.

## Theses for Defence

**1.** The features of a self-sustainable VC market (a status which governments should help the market to reach) are:
   a) a balance exists between the demand for such capital and its supply;
   b) the market is capable of financing the riskiest companies, i.e. those in the earliest stages of their development and high-tech ventures without tangible assets for collateral and stable income, and it provides to them strong support;
   c) there is a pipeline of sufficiently good quality investible businesses for VCFs;

d)  the market has reached a critical mass for further organic growth without public support.

**2.** The existing approach of public support for VC, which consists mostly of measures boosting the supply with public funding while not paying enough attention to the other factors that influence the market, is incorrect.

**3.** The conceptual model of the VC market self-sustainability development built upon the analyses conducted ensures that all factors influencing the market and their interdependence are encompassed while designing and evaluating public policies for the VC market development.

## The Approbation and Practical Use of Research Results

The research results were discussed at international scientific conferences in Latvia, Lithuania, the USA, and Korea and were reflected in relevant scientific publications. The comments and suggestions received at the conferences and in peer reviews of the articles were taken into account and the appropriate changes in the research were done.

The model and the list of impactful factors will be proposed to be used as practical tools for next ex-ante and post-ante evaluations of the SF programmes related to VC instruments and other governmental programmes aimed to develop capital markets.

## Scientific Publications

The results of the research have been reflected in 7 articles and conference papers. All articles are indexed in SCOPUS.

1. Matisone, A., Lace, N., & Danilchenko, A. V. (2018). How do Venture Capital Funds support value addition to portfolio companies? Case of Latvia. In WMSCI 2018-22nd World Multi-Conference on Systemics, Cybernetics and Informatics, Proceedings (pp. 19–24).
2. Matisone, A., & Lace, N. (2019, March). Entrepreneurs' and Venture Capitalists' openness for co-operation: barriers and drivers. In Proceedings of the 10th International Multi-Conference on Complexity, Informatics and Cybernetics, Orlando, FL, USA (pp. 12–15).
3. Matisone, A., & Lace, N. (2019). Where do Venture Capitalists invest? Case of Latvia. Intellectual Economics, 13(1), 9–21.
4. Matisone, A.; Lace, N. (2020). Factors Influencing Latvian Venture Capitalists' Choice of Financial Instruments. Proceedings of the 11th International Multi-Conference on Complexity, Informatics and Cybernetics: IMCIC 2020.
5. Matisone, A., & Lace, N. (2020). The Impact of Public Interventions on Self-Sustainable Venture Capital Market Development in Latvia from the Perspective of VC Fund Managers. Journal of Open Innovation: Technology, Market, and Complexity, 6(3), 53.
6. Matisone, A.; Lace, N.(2021) Venture Capital supply determinants in undeveloped markets. Complexity, Informatics and Cybernetics: IMCIC 2021, 4, 77.
7. Matisone, A.; Lace, N. (2021). Effective Venture Capital Market Development Concept" Journal of Open Innovation: Technology, Market, and Complexity, 7(4), 218.

## Participation in projects:

The last part of the thesis and 2 articles were elaborated within the European Social Fund project SAM 8.2.2. "Strengthening the academic staff of Riga Technical University in the fields of strategic specialization".

The results of the research have been presented at the following **international scientific conferences:**
1. Scientific Conference on Economics and Entrepreneurship SCEE'2017. Report: Venture Capital in Latvia.
2. WMSCI 2018 – 22nd World Multi-Conference on Systemics, Cybernetics and Informatics (2018).

Report: How do Venture Capital Funds support value addition to portfolio companies? Case of Latvia.

3. Scientific Conference on Economics and Entrepreneurship SCEE '2018. Report: Factors Influencing the Possibility of Commencement Cooperation between Venture Capitalists and Entrepreneurs. Case of the CEE.

4. The 10th International Multi-Conference on Complexity, Informatics and Cybernetics. Report: Entrepreneurs' and Venture Capitalists' openness for cooperation: barriers and drivers.

5. International Scientific Conference "Whither our Economies'19". Mykolas Romeris University, Lithuania. Report: Where do Venture Capitalists invest? Case of Latvia.

6. International Scientific Conference on Economics and Entrepreneurship SCEE`2019. Report: Equity type choice for financing entrepreneurs in Latvia.

7. 11th International Multi-Conference on Complexity, Informatics and Cybernetics: IMCIC 2020. Report: Factors Influencing Latvian Venture Capitalists' Choice of Financial Instruments.

8. Riga Technical University 61st International Scientific Online Conference "Scientific Conference on Economics and Entrepreneurship", SCEE'2020. October 2020. Report: Equity Gap in Funding for High Growth Businesses in Latvia.

9. 12th International Multi-Conference on Complexity, Informatics and Cybernetics: IMCIC 2021. March 2021. Report: Venture Capital Supply Determinants in Undeveloped Markets.

10. Society of Open Innovation: Technology, Market, and Complexity & Riga Technical University 2021 Conference. Report: Effective Venture Capital Market Development Concept.

11. Riga Technical University 62nd International Scientific Online Conference "Scientific Conference on Economics and Entrepreneurship", SCEE'2021. October 2021. Report: Achieving Self-sustainability of Venture Capital Market in Latvia.

## Contents of the Thesis

Chapter 1 – **"Self-sustainable Venture Capital Market Development Concept"** – explores the theoretical aspects of the VC market status, factors influencing its development, and the government's role in building up the market. The characteristics of the desirable VC market status that governments should help achieve are elaborated from the literature analysis and from the experts' survey and triangulation of the results. The results of the qualitative content analysis of the scientific literature for identifying VC supply, demand and matching determinants of VCists and entrepreneurs are described in the second part of the chapter. The last part of the chapter (section 1.3.) presents the composite list of the factors for supply, demand and matching obtained from the literature and conceptual model of the VC market development.

Chapter 2 – **"Assessment of the Latvian Venture Capital Market Self-sustainability"** – deals with an analysis of Latvian VC managers and their portfolio companies from the point of their characteristics necessary to achieve the self-sustainability of the market and the factors influencing it. The chapter is based on the results of the study on VC funds established in Latvia during 2006–2020 and their portfolio companies. The chapter also presents findings on the different limiting factors for VC funds activities in Latvia.

Chapter 3 – **"Public Interventions in Venture Capital Market"** – explores the second research question: "What are the activities of governments for helping local VC markets to develop and what are the results of them?" The theoretical aspects of the question are answered on the basis of the literature analysis. The practical application of the public interventions is explored in the context of the Latvian government policies.

Chapter 4 – **"Self-sustainable Venture Capital Market Development Model for Latvia"** – describes the process of creation and validation of the conceptual model for the VC market development. The first section of the chapter explains the logic and results of the VC market experts' survey regarding the VC market development determinants and the ability of a government to influence them. The list of impactful factors which government can influence is provided. The importance-performance matrix analysis allows one to see which factors are most important and where beneficial governmental influence is missing. The model based on the analysis of the scientific literature (Chapter 1) is elaborated.

# 1. SELF-SUSTAINABLE VENTURE CAPITAL MARKET DEVELOPMENT CONCEPT

*The chapter comprises 39 pages and includes 7 tables and 6 figures.*

There are numerous studies regarding VC and factors influencing it. Most of these studies were conducted in countries with developed and stable economies. A comprehensive overview of the studies is absent. Also, the analysis of differences between countries with longer VC history and those with shorter is missing. Therefore, the aim of Chapter 1 is as follows:

1. To define the features of self-sustainable VC market (a status which governments should help the market to reach).
2. To define the factors influencing VC activity based on the existing studies and differentiate, if appropriate, between the factors related to developed VC markets and immature ones;

The chapter is organized as follows: Section 1.1. introduces the theoretical aspects of the VC market status and government's role in building up the market. The characteristics of the desirable VC market status that governments should help achieve are elaborated from the literature analysis, the experts' survey and triangulation of the results. Section 1.2 describes the results of content analysis of the literature regarding the factors influencing VC market development and the role of public support. The last section of the chapter presents the composite list of the factors for supply, demand and matching between Venture capitalists and entrepreneurs delivered from the literature and conceptual model of the VC market development.

## 1.1. Venture Capital market, its self-sustainability and maturity

What is venture capital? Invest Europe, the association representing VC at the European level defines it as "a type of private equity focused on companies... with innovative ideas for a product or service." The British Private Equity & Venture Capital Association's definition emphasizes the critical feature of VC target companies – their high growth potential (Boocock & Woods, 1997). Some sources use the term private equity to refer to both private equity (PE) and VC, while others use the term venture capital to refer to both: VC and PE. The difference between VC and PE is in the stages of companies they finance. VC funds (VCFs) invest in companies in the first stages of their development. In turn, PE funds focus on later stages when companies have stabilised their operations and are looking for a way to develop further or provide capital to buy out the companies. The term VC in the studies usually has a close meaning to the above-mentioned. It excludes the PE stages related to relatively mature companies (rescue/turnaround, buyout and growth). Even though there is a lot in common between PE and VC, decision and control mechanisms in new companies and developed ones are different (Wright and Robbie, 1998). Therefore, the study will concern only the VC which receives substantially larger public support than PE.

The stages of VC widely accepted by VC industry players and most of the researchers (authors' observations and interviews) are: seed, start-up and later-stage financing.

Companies with stable income, proved track record and assets pledge to have access to various sources of capital (Andrieu & Groh, 2012). Still, new ventures, especially high-tech and/or with high growth potential, usually lack these features and often are not eligible for typical funding such as bank loans (Cassar, 2004). It is well-known (Hellmann & Puri, 2002; Lerner et al., 2005) that for such companies VC is the most appropriate financial instrument to use. It is also admitted that as a result of VC investments, higher level of R&D, innovation (Pinkow & Iversen, 2020), productivity and employment (Aulakh & Thorpe, 2011; Bilbao-Osorio et al., 2018; Lerner, 2010) is achieved.

The main features differentiating VC from other external sources of capital are:

1. VCs provide equity or quasi-equity investments (Wright and Robbie, 1998). Such types of exter-

nal capital are very convenient for companies without stable income sufficient for credit repayments and no tangible assets as collaterals for loans. Offsetting this is partial loss of ownership (Tavares-Gärtner et al., 2018) and sole control over the company.

2. VCs are active investors (Andrieu & Groh, 2012). In addition to their investments, they bring knowledge, expertise, a network and other benefits, often called added value to their portfolio companies (Busenitz et al., 2004).

3. VCs invest in companies with high risk (where they can lose their entire investment). In return for taking high risks VCs expect to have high returns from their investments (Cherif & Gazdar, 2011; Gompers & Lerner, 1998; Manigart et al., 2002);

4. VCs are limited term equity investors. The typical holding period for their investments is 5-8 years (Cherif & Gazdar, 2011). The return from investments is usually received by selling a stake to strategic or next stage financiers, an IPO or management buyout (Cherif & Gazdar, 2011; Cumming & MacIntosh, 2003).

Despite rarely disputed VC beneficial effects, it is widespread only in the US (Lerner et al., 2005). VC market's development elsewhere is only moderate (Grilli et al., 2018). Therefore, governments in many countries try to foster the VC market activity. The European Union (EU) alone has many policy documents regarding VC (European Commission, 2020) and it also over several decades has contributed a significant amount of money to support VC funds (European Court of Auditors, 2019). Public finance theory states that government interventions are exceptional measures that may be used if they generate positive externalities to society (Hyman, 2010) and do not distort the market (Lerner et al., 2005). In addition, transaction cost economics emphasizes the importance to include the costs of implementation in expected benefit calculus from the interventions (Williamson, 2000). Dependency on public support in many countries, even after long-term public support (Matisone & Lace, 2020b), could signal about severe deficiencies in the design of interventions.

To characterize desirable VC market status, the following terms are used in the literature: effective, self-sustaining, vibrant, viable, works as optimal finance escalator and sufficient pipeline, robust, active, mature. From the literature analysis features of the self-sustainable VC market (a status which governments should help the market to reach) were aggregated. The features are:

1) there is balance of demand for such capital and supply;
2) the market is capable of financing the riskiest companies: those in the earliest stages of their development and high-tech ventures (without tangible assets for collateral and stable income), and it provides strong support for them;
3) there is a sufficiently good quality pipeline of investible businesses for VCFs;
4) the market has reached critical mass for further organic growth without public support.

Further in the study the author will use the term self-sustaining VC market, meaning a market with all four above mentioned features. The preference to this term is done because other terms characterise the capabilities of the market notwithstanding their dependency on public support. Self-sustaining VC market is a market having all these capabilities but without necessity for further public support for its activity (Lerner et al., 2005).

The findings of the literature analysis regarding the market status that governments should help to achieve were discussed with the experts of the Latvian VC market. The composition of the experts' group, the process of obtaining the responses and the responses are provided in Appendix 1 of the Thesis. Table 1.1 shows the outcomes of the triangulation carried out to integrate the literature analysis findings and experts' opinions.

Table 1.1

**Triangulation of the findings of the literature analysis and experts' responses regarding self-sustainable market characteristics (created by the author)**

| No. | Features of self-sustainable VC market |
|---|---|
| 1 | **There is a balance of demand for such capital and supply.** With a balance of the demand and supply in the VC market the following peculiarities are meant:<br>a) balance not only in general but also for each of VC financing stages;<br>b) the demand and supply have to be with qualities necessary for VC financing, i.e.<br>  – supply being provided by professional VC managers working in accordance with the industry standards and having experience;<br>  – and demand<br>    ○ coming from entrepreneurs with high growth potential ideas and willing to accept partnership with VC funds;<br>    ○ providing possibilities for VC fund managers to choose between numerous investing possibilities (typical rate for mature VC markets of accepted and refused VC applicants is necessary). |
| 2 | **The market is capable of financing the riskiest companies**: those in the earliest stages of their development and high-tech ventures (without tangible assets for collateral and stable income), and it provides strong support for them. |
| 3 | **There is a sufficiently good quality pipeline of investible businesses in all VC stages.** |
| 4 | **The local VC market has reached critical mass for further organic growth without public support.** Some public support for the companies in the earliest stages probably will be necessary forever. |

*How to reach a self-sustainable VC market status?* There are a lot of studies regarding the development of VC market. They suggest that typical approach of providing VC managers with public funding is not sufficient to develop a VC market. The VC market status depends on a vast set of determinants. Very frequently measured factors are M&A activity; innovation level; investor protection level; labour regulation; bribery and corruption level; tax burden; unemployment rate; export level; GDP growth; VC ecosystem development, including business angels' activity; worldwide trends, including economic shocks and leading industries (Groh & Wallmeroth, 2016; Jeng & Wells, 2000). The latest trend is acknowledging that cultural features prevailing in the region and, as a result, formal and informal institutions' characteristics are important determinants of VC market development  (Grilli et al., 2018; Li & Zahra, 2012).

The determinants identified in the studies could be grouped into three major groups: 1) factors influencing VC supply; 2) factors influencing VC demand; 3) factors influencing VC market activity in total. There are disagreements between authors boosting which side of the market (supply or demand) is more important for its development. Some authors conclude (Harding, 2002; Romain & Bruno van Pottelsberghe de la Potterie, 2004) that VC market development policies have been most effective in countries which acted through demand side measures. At the same time, others (Hellmann & Thiele, 2019) provide evidence suggesting that the supply side support is more appropriate. A relieving message comes from the studies that found that an increase in any of the market sides leads to an increase in the other side (Bertoni et al., 2017; Cipollone & Giordani, 2019; Gompers & Lerner, 1998). Still, researchers acknowledged that government VC support schemes for a particular side of the market could not be viewed in isolation (Baldock & Mason, 2015; Wilson & Silva, 2014) and there is necessity to create complementary policies.

Another way to group the factors is by their relevance to a particular group of countries. There is agreement between authors (Groh & Wallmeroth, 2016; Matisone & Lace, 2019) that drivers of the VC activity could be different in the countries with different development stages. Also, determinants can vary between VC stages (Jeng & Wells, 2000). In addition, the studies indicate that the factors are in-

terdependent (Grilli et al., 2018; Groh & Wallmeroth, 2016). As a result, VC activity varies in seemingly very similar countries (Groh & Wallmeroth, 2016).

In order to have a comprehensive list of the factors influencing VC market the author did a content analysis of the studies researching the VC market. The different dimensions of how VC market determinants were explored in previous studies were taken into account in designing the process of the content analysis. Therefore, the content analysis was done in three steps exploring the factors influencing 1) the VC supply, 2) VC demand, and 3) VC market activity (measured as VC investments). Also, where possible, differentiation by the countries' groups was done. The results of the content analysis are provided in the next section.

## 1.2. Factors influencing Venture Capital market development

### 1.2.1. Factors influencing VC supply

The 1st content analysis of the literature aimed to develop a comprehensive framework of the VC supply determinants taking into account differences of the countries, the interconnectedness of the factors, and a time necessary to achieve changes in these factors. To determine the factors influencing the VC supply, a content analysis of the literature was conducted. Web of Science was used to find relevant studies. The search terms were: venture capital and supply. Due to the rapidly evolving VC industry and the fact that all studies were taking into account previous research, the search scope was limited to the latest studies (2016–2020) and the studies cited in them. The Web of Science search tool found 64 articles. After acquainting with them and the articles cited in them, 34 articles were recognised as covering the research topic, and they were used for content analysis.

During content analysis, 29 categories were developed. An analysis of codes and categories identified in different by maturity of VC industry of the regions was also done. The selection of countries belonging to the mature VC industry was made based on the results of previous research (Grilli et al., 2018; Lerner, 2010; Lerner et al., 2005). As countries with mature VC industry the US, UK and Germany were considered. Theoretical studies were considered as studies from the countries with mature VC industries because of the proportion of VC located in these countries (Invest Europe, 2020).

Thirteen of the factors were found in the studies concerning unmatured markets. Lack of other categories could be explained by the fact that unmatured markets are studied less and that theoretical studies were counted as studies from the matured markets.

The factors were grouped into three metagroups. The metagroups were formed based on an analogy with Williamson (1998) levels of institutions (governing informal rules and placement of the region (Embedded factors), the rules set by formal institutions and environment created (Environment) and actors of the market (VC market players).

The factors belonging to metagroup "VC market players" are: 1S – VC firm's experience; 2S – Number of VC firms in a market; 3S – Investment returns; 5S – Foreign VC investments; 6S – Co-investment/syndication possibilities; 18S – The number of early-stage innovative entrepreneurs seeking for VC; 19S – Successful entrepreneurs from prior generations; 17S – Base of investors in VC funds.

Factors belonging to metagroup "Environment" are: 4S – Policy for investments in VC funds; 8S – Domestic ecosystem; 9S – Technical/research university density and student rate; 10S – Transaction costs; 11S – Limitations of VC funds; 12S – Legal environment; 14S – Exit possibilities; 15S – Macroeconomic conditions; 16S – Technology innovations; 17S – Alternative investments for LPs opportunities; 20S – Alternative initial public offering (IPO) and listing regulation for SMEs; 21S – Possibility to get additional financing for next rounds/further growth; 22S – Governmental policies and regulations for particular kind of investments; 23S – Demand for new products; 24S – Governmental funding; 25S – Governmental programmes encouraging investors; 26S – Public support for early stage; 28S – Capital

market development.

The factors belonging to metagroup "Embedded factors" are: 7S – Proximity to core economic regions; 13S – Local custom for VC; 29S – Informal or intangible institutions.

The results of studies suggest that through the interdependencies, the exposure of a particular factor could be increased or decreased. The results also show that the supply and demand of VC exhibit interdependence. Therefore, the content analysis of the literature regarding factors influencing VC demand also was done. The results of it are described in the next section.

## 1.1.2. Factors influencing VC demand

The 2nd qualitative content analysis of the literature aimed to establish the VC demand determinants taking into account, if possible, differences of the countries, the interconnectedness of the factors. Web of Science was used to find relevant studies. The search terms were: venture capital and demand. Due to the rapidly evolving VC market and the fact that all studies were taking into account previous research, the search scope was limited to the latest studies (2016–2020) and the studies cited in them. The Web of Science search tool found 91 articles. After acquainting with them and the articles cited in them, 41 articles were recognised as covering the research topic, and they were used for content analysis.

Twenty-nine factors influencing the VC demand were identified from the studies. An attempt to analyse the codes and categories identified in different by maturity of VC industry regions was done. The selection of countries having mature VC industry was made based on the results of previous research (Grilli et al., 2018; Lerner, 2010; Lerner et al., 2005). As countries with mature VC industry the US, UK and Germany were considered. Still, because many studies researched several countries (some of them having mature VC markets, some not), clear division of some determinants by regions was impossible.

The factors were grouped into three metagroups. The metagroups, the same as for the supply content analysis, were formed based on an analogy with the Williamson (1998) levels of institutions (governing informal rules and placement of the region (Embedded factors), rules set by formal institutions and environment created (Environment), and actors of the market (VC market players).

The factors belonging to metagroup "VC market players" are: 15D – Local availability of VC; 17D – Characteristics of prospective VC investors; 20D – Business angels' development.

The factors belonging to metagroup "Environment" are: 1D – Encouraging entrepreneurship; 2D – Capital market development; 3D – Government subsidies/incentives for RD/specific technologies; 4D – Domestic ecosystem; 7D – Legal norms; 9D – Demand for particular products/technologies; 10D – Macroeconomic conditions; 14D – Similarity between domestic and foreign policy incentives; 16D – Encouraging/supporting technology transfer of researchers; 19D – Government business support measures in general; 21D – Other capital availability; 23D – Local universities; 25D – Infrastructure; 26D – Outsourcing public services; 27D – Local success stories; 28D – Local major industries; 29D – Research facilities.

The factors belonging to metagroup "Embedded factors" are: 5D – Entrepreneurial risk tolerance; 6D – Awareness about VC; 8D – Proximity to core economic regions/partners; 11D – Diversity of human and social capital; 12D – Informal or intangible institutions; 13D – Formal institutions; 18D – Readiness to partner; 22D – Entrepreneurs' preferences of particular funding; 24D – Local human capital.

## 1.2.3. Factors influencing the matching between Venture capitalists and entrepreneurs

The VC market supply and demand side should match each other not only in numbers of available and requested funding in general, but also in the willingness of particular VC providers and particular entrepreneurs to cooperate. Deals happen as a result of successful matching between particular VCFs and entrepreneurs. The studies reveal that VCs constantly state that deal flow (Prohorov, 2013) and quality (Petty & Gruber, 2009) could be higher, but entrepreneurs complain about problems in attracting capital (Prohorovs et al., 2018). Also, instead of financing the earliest stages of the development, Venture Capitalists (VCists) predominantly invest in the later stages and provide mezzanine loans instead of

equity investments. Does it mean that the number of firms/ideas qualifying for VC is low, especially for the earliest stages or are VCs not seeing the potential of entrepreneurs and/or not finding them?

Therefore, as the last step to answer the research question "What are the factors that promote VC market development?", the qualitative literature content analysis regarding factors influencing the matching between Venture capitalists and entrepreneurs was done. Web of Science was used to find appropriate studies. The search terms were: entrepreneur's opinion; VC; entrepreneur's openness; VC and willingness to partner. Additionally, the studies cited in the selected articles were inspected. After preliminary acquainting with the studies selected by the Web of Science search tools, 39 articles were recognised to be covering the topic of the research and they were used for content analysis.

During the content analysis, 52 codes were identified. From the codes, 11 categories were developed. During the analysis, difference in the intensity of codes identified in the studies from countries with mature VC industries and others was revealed. Therefore, an analysis of codes and categories by region was also done. Theoretical studies were considered as studies from countries with mature VC industries because of the proportion of VC in these countries (Invest Europe, 2020).

The analysis revealed that there is a substantial difference between the significance of factors in countries with mature VC industries and Central and Eastern Europe (CEE). The results of the analysis by region (presented in Figure 1.1) suggest that the lack of awareness about VC, both in general and in detail, is the main factor in CEE preventing entrepreneurs from approaching VCs. This has not been found to be the case outside the region. In countries with mature VC industry the leading factors discouraging cooperation are the same as in the total factor analysis: "VCs' characteristics" followed by "Communication between VCs and entrepreneurs".
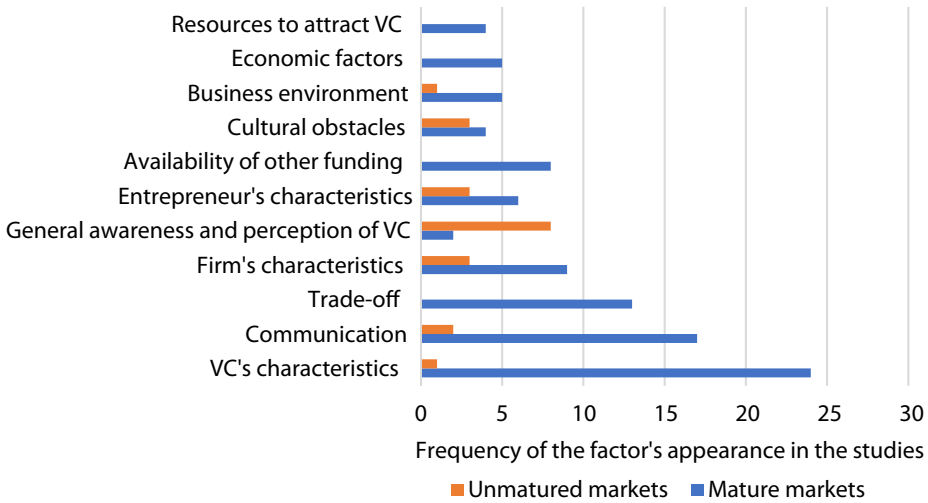


**Fig. 1.1.** The factors importance by region (created by the author)

The factors can be divided into 3 metagroups: 1) external factors; 2) internal factors; 3) process-related factors. External factors are those where parties (VCs and entrepreneurs) cannot make any changes to the process. The factors are: business environment; economic factors in a particular country; availability of alternative funding; and country-specific cultural obstacles. Internal factors are those to which the parties can make changes. The characteristics of the firm, entrepreneur and VCs belong to this metagroup. Process-related factors are: General awareness and perception of VC; Communication; Trade-off; and Resources necessary. The parties can make partial changes to the impact of these factors. Figure 1.2 visually presents the relationships between metagroups and the factors they consist of.
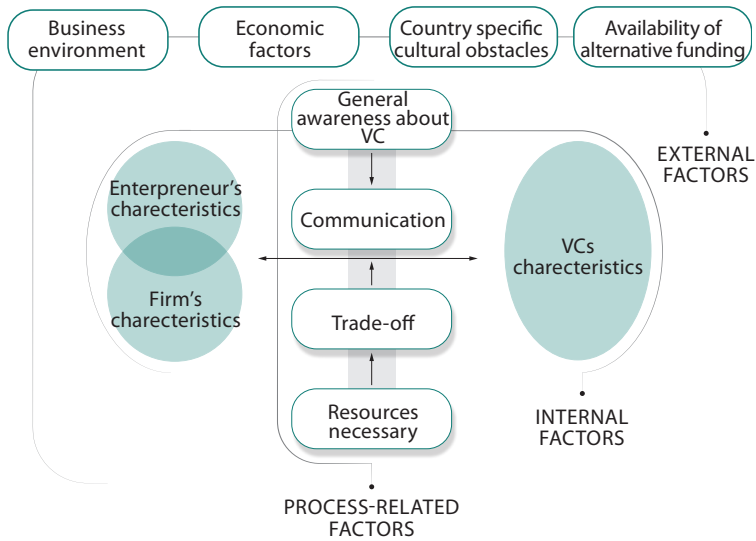
**Fig. 1.2.** Correlation between metagroups and factors (created by the author)

The results suggest that factors form an interdependent system where changes in a particular factor's weight can lead to changes in another and back. The metagroups developed by the author allow greater understanding of who can influence which factors: in the case of external factors, governments are responsible or should take responsibility; internal factors are those upon which the parties can act; and the parties and governments can both have an impact on process-related factors. The results highlight that the actions to improve one factor without assessing its interrelation with others may not have the intended results.

## 1.3. Conceptual model of a self-sustainable VC market development

The qualitative literature content analyses results (described in Sections 1.2.1, 1.2.2 and 1.2.3) show that numerous factors and their interdependence influence the VC market. During the analyses, separate categories regarding each of the VC market side's (supply, demand and matching between the supply and demand) determinants were developed. Some of the categories appeared in two or all of the three content analyses. As the last step of developing a comprehensive VC market determinants list, the author combined the factors for supply, demand and matching. Some of the factors for one market side was part of another factor for another market side. For example, "Proximity from core economic regions" for the supply and "Proximity from core economic regions/partners" for the demand. The latter is a bigger category, including aspects (proximity from the key partners) that are not part of the appropriate category for the supply. Therefore, two separate categories "Proximity from core economic regions" and "Proximity from key partners" were developed. The same was done in other similar situations when categories for different market sides did not match completely. In total, fifty-five factors were developed in the last step. The factors (Column 2) and their impact on different market sides (Column 3) are listed in Table 1.2.

Table 1.2

**VC market determinants influence on a particular side of the market (created by the author)**

| Factors' groups | | Factors | Impact on |
|---|---|---|---|
| VC capital providers | 1 | Number of VC firms in a market | Supply, demand, matching |
| | 2 | VC firm's experience | Supply, matching |
| | 3 | Added value from VC | Matching |
| | 4 | Local availability of VC | Demand, matching |
| | 5 | Investment returns | Supply, matching |
| | 6 | Characteristics of VC investors (their private or public ownership and governance, and their reputation) | Demand, matching |
| | 7 | Co-investment/syndication possibilities | Supply |
| | 8 | Local custom for VC (networking, contractual staging, trust) | Supply, matching |
| | 9 | Local success stories | Demand, matching |
| LPs in VC funds | 10 | Base of investors in VC funds | Supply |
| | 11 | Successful entrepreneurs from prior generations (experience and wealth) | Supply |
| Legal environment | 12 | General legal environment (Securities law, Corporate law, tax policy, bankruptcy, labor market regulation) | Supply, demand, matching |
| | 13 | For LPs – policy for investments in VC funds/anticipated changes (tax credits, limits/restrictions for institutional investors) | Supply |
| | 14 | For VC funds – limitations of VC fund (size for the investment, focus, remaining life span of the fund, risk profile) | Supply |
| | 15 | Government policies and regulations for particular kind of investments (i.e. cleantech, sustainability) | Supply, demand |
| | 16 | For entrepreneurs – legal system | Demand |
| Entrepreneurs | 17 | The number of early-stage innovative entrepreneurs seeking for VC | Supply |
| | 18 | Awareness about VC | Demand, matching |
| | 19 | Readiness to partner | Demand, matching |
| | 20 | Entrepreneurs' preferences of particular funding | Demand, matching |
| | 21 | Entrepreneurial risk tolerance | Demand, matching |
| Geographical/ crossborder characteristics | 22 | Proximity to core economic regions | Demand, supply |
| | 23 | Prohimity to key partners | Demand |
| | 24 | Similarity between domestic and foreign policy incentives | Demand |
| | 25 | Foreign VC investments | Supply |

Table 1.2 Continued

| Factors' groups | | Factors | Impact on |
|---|---|---|---|
| Goverment policies | 26 | Government funding | Supply |
| | 27 | Government programmes encouraging more investors into the market (public/private coinvestment funds) | Supply |
| | 28 | Public support for early stage | Supply, demand, matching |
| | 29 | Encouraging entrepreneurship in general | Demand |
| | 30 | Government subsidy/incentives for RD/specific technologies | Demand |
| | 31 | Encoraging/supporting technology transfer of researchers | Demand |
| | 32 | Goverment business support measures in general | Demand |
| | 33 | Outsourcing public services | Demand |
| | 34 | Alternative IPO and listing regulation for SMEs with less stringent standards | Supply |
| Macroeconomic conditions | 35 | Macroeconomic conditions | Demand, supply, matching |
| Infrastructure | 36 | Domestic ecosystem | Demand, Supply, Matching |
| | 37 | Locally available resources/infrastructure | Demand |
| | 38 | Local major industries | Demand |
| | 39 | Research facilities | Demand |
| | 40 | Local universities | Demand |
| Capital market | 41 | Capital market development | Demand, supply |
| | 42 | Business angel development | Demand |
| | 43 | Other capital availability | Demand, matching |
| | 44 | Transaction costs | Supply, matching |
| | 45 | Possibility to get additional financing for next rounds/further growth | Supply |
| | 46 | Alternative investment for LPs opportunities | Supply |
| | | Table 1.2 Continued | |
| | 47 | Exit possibilities | Supply |
| Human and social capital | 48 | Diversity of human and social capital | Demand |
| | 49 | Informal or intangible institutions | Demand, Supply, Matching |
| | 50 | Formal institutions | Demand |
| | 51 | Local human capital | Demand |
| | 52 | Technical/research university density and student rate | Supply |
| Environment for innovation | 53 | Technology innovations | Supply, matching |
| | 54 | Demand for new products | Supply, matching |
| | 55 | Demand for particular products/technologies | Demand, matching |

The factors in Table 1.2 are grouped in groups (Column 1) by their common traits. Still, previously introduced division in three metagroups (VC market players, Environment, Embedded factors) is kept by different colouring of the appropriate factors. Green colour is for the factors belonging to metagroup "VC market players", Grey – for the factors belonging to metagroup "Environment", red – for the factors belonging to metagroup "Embedded factors".

To visually describe how a local VC market should be developed, a conceptual model for developing VC market was created – Figure 1.3. It displays: 1) the interplay between factors influencing VC market (discovered from the literature analysis); 2) the market features where balance is necessary not only in general, but also for each of VC financing stages, and balance is reached not only by corresponding numbers between supply and demand but also by matching between particular VC funds and entre-preneurs.
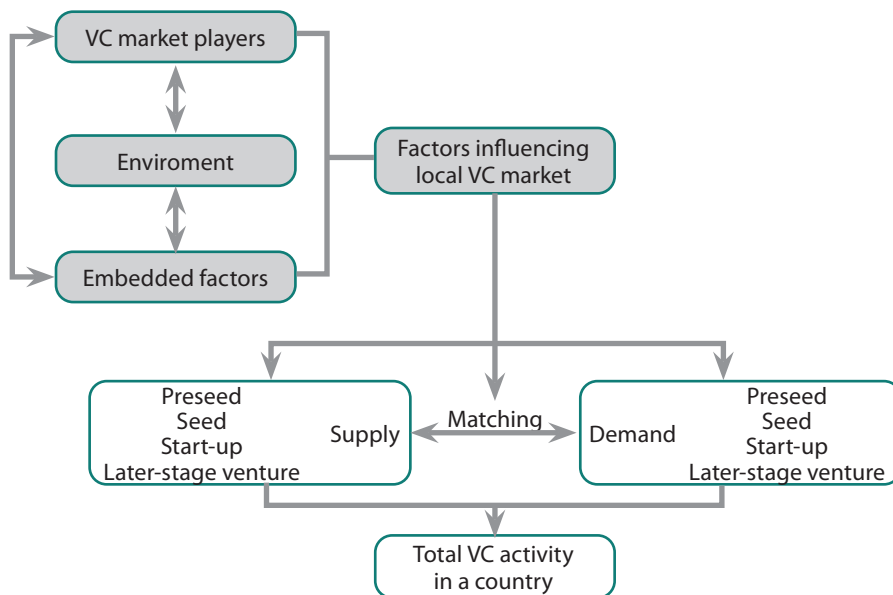


Fig. 1.3. Conceptual model for developing a local VC market (created by the author)

The existing design of public support for VC does not resemble the structure of the conceptual model. It consists mostly of measures providing funding for VC funds while not paying enough attention to the other factors that influence the market. The studies suggest that the returns from publicly co-financed funds are lower than those of private funds. Other limitations to publicly co-financed funds also exist (Luukkonen & Maunula, 2007). Once policymakers recognise this ineffectiveness, a possible outcome is a halt in public funding for the development of the VC industry. To avoid this risk, a better approach needs to be put forward. The conceptual model of the VC market development provides directions on how the self-sustainability of the VC market should be reached and is necessary for a correct assessment of the results from previous public support.

During the content analyses a distinction between factors found in mature and developing VC markets was made. Still, as the immature markets are less studied, the factors not found in them in the reviewed studies were not excluded from the composite list of factors. After studying the specific traits of the Latvian VC market (as example of VC market in an early development stage) and its participants (in the Chapter 2), the list of factors and the conceptual model will be complemented accordingly.

# 2. ASSESSMENT OF THE LATVIAN VC MARKET SELF-SUSTAINABILITY

*The chapter comprises 34 pages and includes 4 tables and 7 figures.*

This chapter deals with an analysis of Latvian VC managers and their portfolio companies from the point of their characteristics necessary to achieve the self-sustainability of the market and the factors influencing it.

## 2.1. Supply dependency on public support

VC and PE were unknown in Latvia until the early 1990s. After Latvia regained independence, VC financing started to become available through entities established outside of the country which were supported by international financial institutions. VC did not become popular, as there was no understanding of its benefits and there was also no experience with it in the country. Because of that, and the scarcity of appropriate funding until 2004, there was only one local VC firm operating in Latvia – Balt-Cap (Avots et al., 2013).

The emergence of regional VC funds started in 2004 when funding from EU Structural funds became available. So far there have been six publicly financed programs for VC and PE funds in Latvia (Table 2.1). The fourth program covers the whole Baltic region and is devoted primarily to PE funds. Other programmes aimed to provide funding for VC, but there were few deviations (e.g. Eko Investors).

Table 2.1

### Public VC/PE programmes in Latvia (created by the author)

| No. /vintage year | Programme | Public Funding | Min private Funding | VC funds |
|---|---|---|---|---|
| 1/2005 | Entrepreneurship and Innovation | EU Structural funds 11.25 MEUR; Government of Latvia 3.75 MEUR | 34 % | "TechVentures Fondu Vadības Kompānija", "EKO Investors", "Zaļās Gaismas Investīcijas" (ZGI Capital) |
| 2/2010 | JEREMIE | EU Structural Funds 21 MEUR; Government of Latvia 7 MEUR | 33 %, except for Imprimatur Seed Fund (0 %) | BaltCap, Imprimatur Seed Fund, Imprimatur Start-up fund |
| 3/2012 | Investment fund for investments in guarantees, credit guarantees, venture capital and financial instruments | EU Structural Funds 30 MEUR; Government of Latvia 10 MEUR | 33 % | ZGI Capital, Imprimatur Capital, Expansion Capital, FlyCap |
| 4/2012 | Baltic Innovation Fund under European Investment Fund | Each of three Baltic States – 26 MEUR, EIF – 52 MEUR. | 50 % | BMP, Baltcap (Private Equity Fund II and Growth Fund), Livonia Partners, Karma Ventures |
| 5/2013 | Soft loans for start-ups | LGA 2 MEUR | 0 % | Imprimatur Capital |
| 6/2017 | Growth and employment | EU Structural Funds 75 MEUR | 10−40 % (rate differs for different kind of funds, in total 30 MEUR) | Expansion Capital, FlyCap, ZGI Capital, Overkill Ventures, BuildIt, Commercialization Reactor |

(Source: Avots et al. (2013) and the author)

The funds established and currently operating in Latvia are running under one of the programmes mentioned above. As to the middle of 2021, there are no local VC funds without public capital. The managers of publicly supported funds have an obligation to attract private investment into the hybrid funds. One of the 2nd and 6th generation fund managers even was not able to raise necessary private share for the fund. Notwithstanding the six public support programmes, Latvian VC fund managers still cannot raise funds without public support. Only one Latvian VC fund manager tried to raise a fund without public support, but it made only one investment before being dissolved.

## 2.2. Capability of the market to finance the riskiest companies

The following issues were studied to assess the capability of the Latvian VC market to finance the riskiest companies:
1) the financial instruments used by funds and their appropriateness for the companies in their earliest stages of the development and high-tech ventures;
2) the level of nonfinancial help provided to the portfolio companies by the funds;
3) innovativeness ratio of the companies supported by VC funds.

### 2.2.1. Financial instruments used by Latvian VC fund managers

Potential targets of VCFs – new firms with high growth potential – usually do not have internal resources for growth. Because of the volatility of cash flow or even absence and other debt contradicting factors, presumably, they are not suitable for traditional loans. These observations lead to a conclusion that probably most appropriate financial instruments for VC portfolio companies would be straight injections in equity. Also, VCFs provide more value-adding assistance to portfolio companies to help them grow in the case of equity investments (Hartmann-Wendels et al., 2011). Nonetheless, VC target companies are also financed with different types of loans. Therefore, the financial instruments used by Latvian VCF managers were studied, and the results are explained in this subsection.

There are four main types of financial instruments used by VCFs to finance their portfolio companies (Hartmann-Wendels et al., 2011): 1) equity investments; 2) quasi-equity investments (mezzanine investments, normal subordinated loans, participating loan, vonvertible loans, also convertible bonds and bonds with warrants; 3) debt or typical loan; 4) different combinations of the above mentioned. These instruments provide different upside/downside protection for an investor (Hartmann-Wendels et al., 2011). Common equity provides unlimited upside potential but no downside protection in case of a firm's bankruptcy. The pay-off to debt is limited to the interest payments and the principal of debt. But debt investor will be in the first line to receive payments from a company's assets in a case of a firm's failure. A mix of these instruments allows differentiating upside/downside potential. Intensity in use of particular financial instruments' type differs between the countries (Breuer et al., 2007; D. J. Cumming, 2005b).

The researchers have found different explanations for the use of particular financial instruments in VC deals. Legal and tax systems have a strong influence on the use of particular financial instruments (Cumming, 2005a; Gilson et al., 2015; Hartmann-Wendels et al., 2011). Also, national cultures (uncertainty avoidance) may explain the different frequency of equity versus debt instruments' use between countries (Kwok & Tadesse, 2006). In addition to country-related factors, the other factors influencing choice of the financial instruments observed in the literature are: 1) factors dependent on VCF managers (GPs), particularly their experience and strategy; 2) factors dependent on investors in VCF (LPs), particularly investors in VCFs risk appetite and conditions of public programs, if funds receive public funding; 3) factors dependent on portfolio companies (particularly, the problem to agree on the portfolio companies' valuation, owners' willingness to maintain control of the business and the stage of portfolio company); 4) market conditions. The proportion of straight equity investments rises with

the business cycle. By contrast, under unfavourable economic conditions, investors tend to use a higher percentage of securities providing more downside protection (Cumming, 2005a; Hartmann-Wendels et al., 2011).

To understand financial instruments' patterns of Latvian VCFs, the investments of all Latvian VCFs (in total 5) established in the frame of the European Union's 2007–2013 programming period were examined. Their investment period started in 2010 and finished in 2017. There were no other VCFs with Latvian jurisdiction at that time.

Latvian VCFs' managers within the analysed programm made 199 investments in portfolio companies in total amount of EUR 68 509 747. 16.58 % of total investments were pure equity, 21.11 % were quasi-equity, 30.15 % were loan and 32.16 % – mix of equity and quasi-equity. As results show, there were no dominant financial instruments in total (Fig. 2.1). Mezzanine loan and convertible loan investments were grouped as quasi-equity.
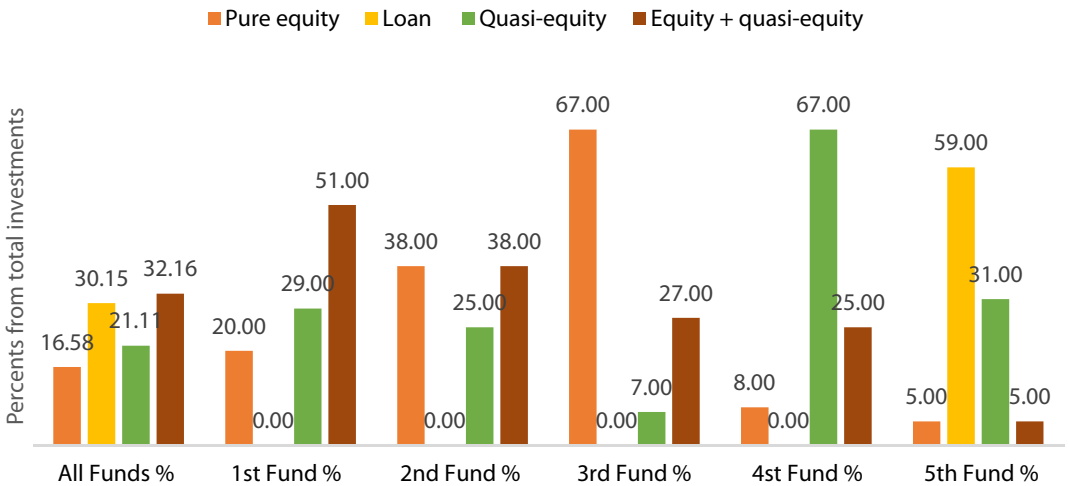


**Fig. 2.1.** Financial instruments used by Latvian VCFs in % (created by the author)

The analysis of financial instruments used by Latvian VC fund managers reveals that most of them are not appropriate for companies in the earliest stages of their development (without stable income and with unproven business ideas). Like in Canada and Germany (Cumming, 2005b; Hartmann-Wendels et al., 2011), there is no one prevalent financial instrument used by VCists in Latvia. But Latvian VCists use fewer investments in common equity than their counterparts in Canada and Germany. The low level of straight equity investments could be partially explained by the limited experience of Latvian VC managers. The study in Germany revealed that experienced investors are considerably more likely to use straight equity. The same observation could be accurate in Latvia, as the most experienced fund manager often uses pure equity investments (66.67 %) while others do not.

Still, the main financial instrument of the fund investing in the early stages was convertible loan – 75.61 % (excluding soft loans for start-ups). This observation is close to the one found in Germany (Hartmann-Wendels et al., 2011), which revealed that start-up firms are less likely to be financed with straight equity and dominance of convertible debt in the early stages.

To determine the factors influencing the choice of financial instruments in VC deals, all Latvian VCF managers were asked to fill the questionnaire. The results are provided in Table 2.2. The Likert scale 1 to 5 was used to rate answers with "1" pointing to a limited impact and "5" – for substantial impact of the factor.

Table 2.2

**Factors influencing the financial instruments' choice, importance (created by the author)**

| Factors' groups | Factors | Fund 1 | Fund 2 | Fund 3 | Fund 4 | Fund 5 | Total |
|---|---|---|---|---|---|---|---|
| Dependent from portfo-lio companies | Valuation problem | 4 | 4 | 5 | 3 | 5 | 4.2 |
| | Owner's willingness to maintain control of the business | 3 | 2 | 3 | 1 | 1 | 2 |
| | The stage of portfolio company | 1 | 4 | 4 | 4 | 4 | 3.4 |
| Dependent from LPs | Willingness to receive predictable cash flow | 1 | 5 | 1 | 4 | 1 | 2.4 |
| | LP's attitude towards QE as less risky | 1 | 4 | 2 | 3 | 1 | 2.2 |
| Dependent from GPs | Experience of fund's managers | 3 | 3 | 1 | 2 | 2 | 2.2 |
| | Fund's strategy | 2 | 5 | 2 | 1 | 2 | 2.4 |
| Conditions of public programs | | 1 | 1 | 2 | 4 | 5 | 2.6 |
| Market conditions | | 3 | 5 | 3 | 3 | 3 | 3.4 |

The results of the questionnaires show that several factors influence the selection of a particular financial instrument in a deal. The most important factors are: 1) inability to agree on valuation of a company between VCF and owners of a company; 2) market conditions; and 3) the stage of a portfolio company. The importance of other factors differs substantially between the VCFs managers.

## 2.2.2. Value added to VC fund portfolio companies

The companies in the earliest stages of their development and with the riskiest (unproven) business ideas usually lack staff and knowledge in management and finances. As a result, the companies in this stage generally need the most assistance or value adding assistance (VAA) from VCFs (Knockaert & Vanacker, 2013). The study on VAA provided by Latvian VCFs to their portfolio companies was done to assess the ability of the Latvian VC market to support the riskiest companies with non-financial help. Results of the study are presented in this section.

Previous studies reveal a different level of non-financial benefits provided by various VC funds. Among the suggested reasons for the divergence are the maturity of the VC market, the size of the fund, the focus stage of the fund, and others. Cultural differences and the institutional framework of the particular country/region also influences the amount of VAA provided by funds. The research in general suggests that the small size of VC funds and dependency on public resources (as is the in case in Latvia) are limiting factors that decrease the amount of time VCF managers devote to their portfolio companies. The study on financial instruments used by Latvian VCFs revealed an additional factor restricting the non-financial impact of VCF managers on their portfolio companies in Latvia. Mezzanine loans, which later stage funds widely use, decrease the motivation as well as the rights of VCF managers to provide value adding assistance to portfolio companies.

To determine the level of VAA provided by Latvian funds and which value adding activities are being provided, all VCF managers established in the European Unions' 2007–2013 programming period were asked to fill a semi-structured questionnaire. An additional objective of a questionnaire was to determine which factors influence the value-adding assistance level. All VCFs provided one of their managers to respond to the questionnaire. The questionnaires were filled in during the personal interviews. Such a method was chosen to have a possibility to explain questions/definitions used if necessary. All the meetings took place in March 2018. To evaluate a degree of a possible bias in answers of VCFs representatives, when possible, their responses were compared with information from other sources.

Two companies have five years of experience in running VC funds, and the currently active fund is

their first one. The other two have 12 and 13 years of experience and had managed other funds before. The average number of employees is 5, including 3 at the partner level. Only one fund manager has a person responsible solely for monitoring portfolio companies and other duties related to accounting and reporting and is not involved in VAA. All employees of the other companies are involved in both monitoring, value adding activities and also other tasks of the companies. Typically, an individual is responsible for around 8 portfolio companies. This number is in line with previous studies suggesting that public VCFs have a larger number of portfolio companies per manager. Still, Latvian managers have more portfolio companies per person than in Finland (Luukkonen & Maunula, 2007) where partners of public VCFs have on average 5 companies under their management and non-partners have 8.

There is a difference between more experienced and younger VCFs concerning the distribution of responsibilities between partner and non-partner employees. In the oldest ones, non-partner level employees have portfolio companies under their personal responsibility. In the youngest ones, non-partner level employees help partners and are not in charge of any portfolio companies. Two of the respondents had relatively little experience in the VC industry (4 and 5 years). The other two had worked in the industry more than 10 years (11 and 14). Previous experience consisted of a few years in consulting (2 respondents), banking (2 respondents), business management (2 respondents), and entrepreneurial activities (2 respondents).

On average the respondents spend slightly more than 50 % of their working time providing VAA to their portfolio companies. The remaining time is divided between administrative issues (e.g. reporting), office work, fundraising, ensuring exits of the portfolio companies, networking and knowledge acquisition. Two respondents monitor their portfolio companies during provision of VAA. Two keep it separate from VAA and estimate that it takes more than 10 % of their time. All respondents consider their involvement in VAA as typical for other employees in the VCF they work for. The only exception is the VCF with the biggest staff, where 2 partners are not full time and therefore are more focused on strategic issues of the company than on particular work with portfolio companies.

VAA provided by different VCFs varies. But there are common features for all Latvian fund managers: they do not execute tasks of their portfolio companies; they are rarely involved in management recruitment and other operational issues. In other words, like a study showed of Finland's VCFs (Luukkonen & Maunula, 2007), their role is rather of an advisor than a person in charge for reaching a portfolio company's goals.

The essential non-financial benefit from Latvian VCFs is their assistance in obtaining additional financing. Help in strategic planning, introductions to potential customers and suppliers and knowledge sharing through access to the VCFs network are next most significant contributions by VCFs to their portfolio companies. Different VAA provided on a particular fund level are presented in Fig. 2.2.
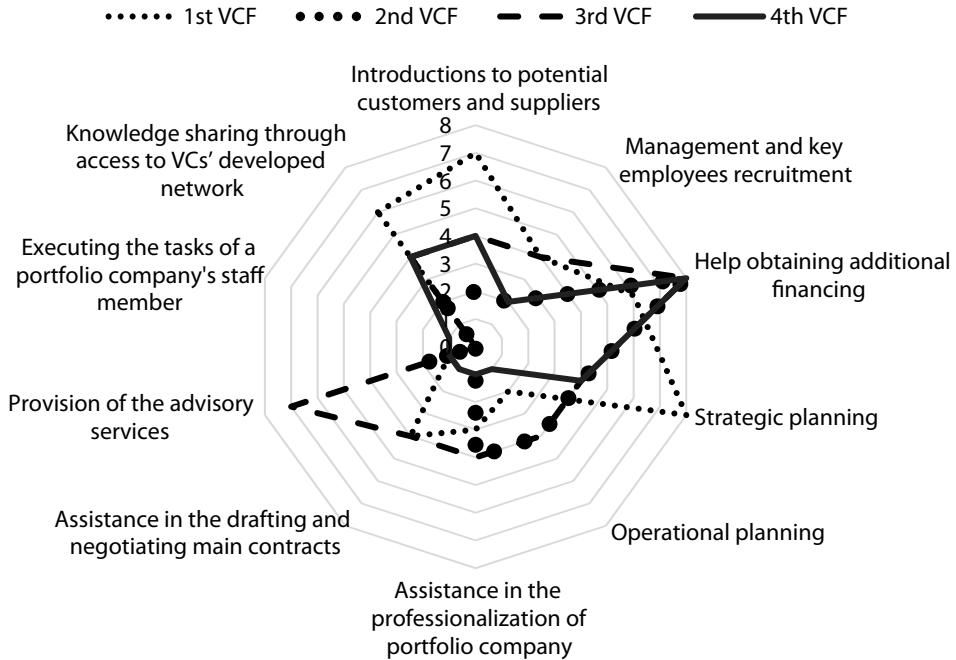
**Fig. 2.2.** VAA provided by Latvian VCFs (created by the author)

There are considerable variations regarding the number of portfolio companies where VCFs admitted to having a passive role (contribution of the capital and monitoring, no VAA). Three of VCFs are passive in portfolio companies which are considered to be lost investments and in very stable companies to whom funds provided a mezzanine loan. The number of such companies varied between 10 % / 23 % and 37 % respectively. The manager of Fund 4 claimed to have no passive role at all, as even in companies severely underperforming, the VCF he represents tries to do the best to have most from liquidation proceeds. Similar differences in attitude regarding "lost" investments (active and passive) were found in previous studies (Elango et al., 1995).

The factors influencing the amount of VAA provided are set out in Table 2.3. Most of them are in line with the findings from previous studies. Still, one factor that was revealed (the willingness of portfolio company to receive the assistance) is novel or at least not as emphasised in previous research.

Table 2.3

### Factors influencing the level of VAA of VCFs in Latvia

| Factors mentioned by VCFs managers | Frequency of factors |
|---|---|
| Experience, knowledge and network of the fund manager | 3 |
| Type of investment | 4 |
| Rights to influence portfolio company | 3 |
| The amount of other fund manager's duties | 4 |
| Current urgent necessities of the portfolio company | 4 |
| Willingness of portfolio company to receive the assistance | 2 |
| Performance of portfolio company | 3 |

In particular, the way the investment is provided influences the level of VAA substantially. All respondents mentioned that time spent with mezzanine loan recipients is less than with other portfolio companies. The reasons are limited rights under the loan agreements to influence these companies and also limited motivation for VCFs to work with them. In the case of equity investment, the aim is to raise the value of the company as high as possible in order to receive the highest possible return. In contrast, with mezzanine loan recipients, VCFs need only to ensure that a company is performing sufficiently well to repay the loan.

The other widespread factor reducing the provision of VAA is the unwillingness (intentional or unintentional) of the portfolio companies to receive assistance from the fund managers. All respondents mentioned that they work more with companies which are asking for some support and are willing to let VCFs be more involved in company operations.

To sum up, the study on VAA by Latvian VCFs confirms the assumption drawn from previous studies that Latvian VCFs do not provide a high level of VAA to their portfolio companies. As per Elando et al. (1995) classification, Latvian VCFs belong to the group of funds providing a medium level of assistance. Still, with slightly more than 10 hours per month per portfolio company, they are near the bottom in this group. They are neither passive investors nor have a hands-on approach.

## 2.2.3. Innovativeness ratio of VC fund portfolio companies

Public perception of the VC is usually associated with assistance to highly innovative firms. Also, research shows that such companies do have benefitted from EU equity programmes even not being expressed target of them (Delapierre et al., 1998; Pavlova & Signore, 2019). Still, there are VC capitalists (VCists) who choose portfolio companies on criteria where innovativeness is not a priority at all (Macmillan et al., 1985).

One of the self-sustainable market features is the capability to finance ventures with innovative, advanced technologies. At their earliest stages of development, there is insufficient data to calculate the probability of such ventures' success accurately and therefore, investments in them are highly risky.

Therefore, this part of the study was devoted to understanding Latvian VCFs, established in the European Unions' 2007–2013 programming period, investment trends from the technology and knowledge intensity point.

The literature suggests that five main factors are influencing VCists' preferences regarding investments in particular industries (Fig. 2.3). Three of them are external: existing clusters; availability of other funding for companies from certain industries in the region of investment; and industries with higher growth potential. Two factors are internal: industry-specific knowledge and experience of VC fund management team and factors driven by LPs profile.
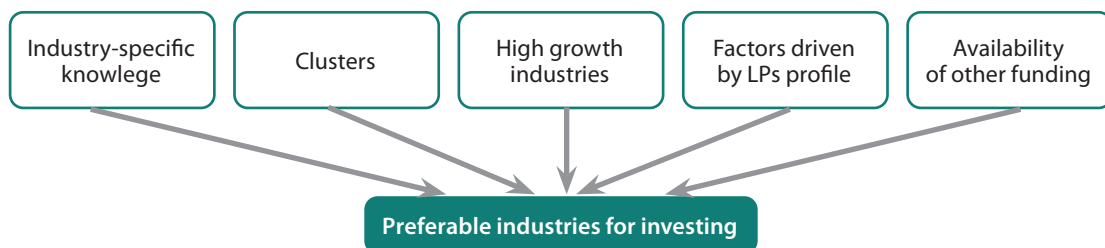


**Fig. 2.3.** Factors influencing the choice of VC funds regarding the investment in a particular industry (created by the author)

Latvian VC funds (established in the frame of the European Union's 2007–2013 programming period) have the same geographical scope – Latvia, and they are working in the same environment. Therefore, they are exposed to the same external factors' influence. All of them have the same main LP – governmental agency and, as a result, are exposed to similar requirements. Only their partners' knowledge

and experience are differentiating them. Latvia as part of CEE has unmatured VC market with thin supply of innovative firms and small funds where the ability to specialize is questionable (Karsai, 2018). Because of that, it can be assumed that portfolios of Latvian VC funds are a mix of companies from different industries and with no high-technology firms' dominance.

To achieve the aim of the study, the investments of all Latvian VC funds (5) established in European Union's 2007–2013 programming period were examined. The funds made 199 investments in total amount of 67.9 MEUR. The standard classification system in EU NACE 2nd revision 3-digit level was used to classify VCFs portfolio companies. To understand to what extent the portfolio companies are technology or knowledge-intensive, the Eurostat classification of industries by their technological intensity and share of tertiary-educated persons was employed.

The analysis shows that the investment patterns of Latvian VC funds differ even on sectoral level (Fig. 2.4). Most of the investments are made into companies belonging to the manufacturing or services sectors. Still, the share of investments in these two sectors differs between funds. For example, the highest share in manufacturing is 54.48 % (the 5th fund), but the lowest is 35.2 % (the 1st fund).
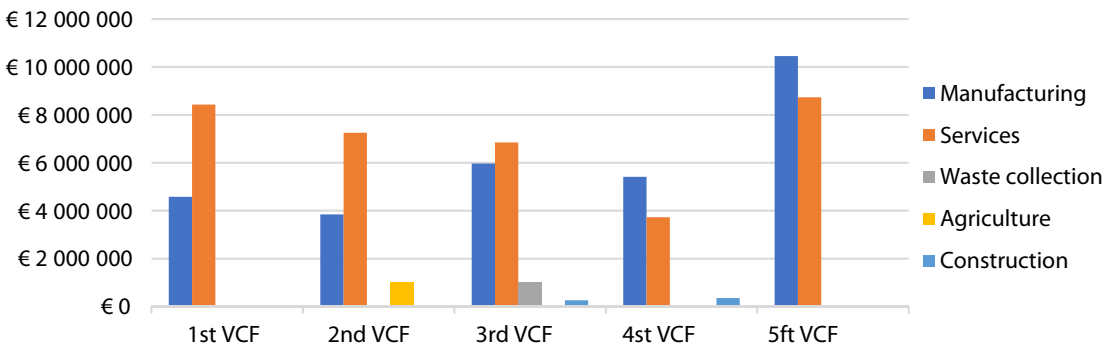


Fig. 2.4. The amount of total investments in particular industry sector by VC funds (created by the author)

However, the difference in investment patterns is much broader when analysis is done by technological intensity and tertiary educated persons employed in the sector. Breakdown by funds in investments in manufacturing is captured in Figure 2.5. The first and 2nd funds invested heavily in high technology – 60.08 % and 52.06 %, respectively. The 3rd and 4th funds invested only 2.35 % and 0.92 % in high technology firms. Their focus was on low technology, where they invested 57.39 % and 54.91 %, respectively. The 5th fund diversification between different manufacturing sectors was close to even.
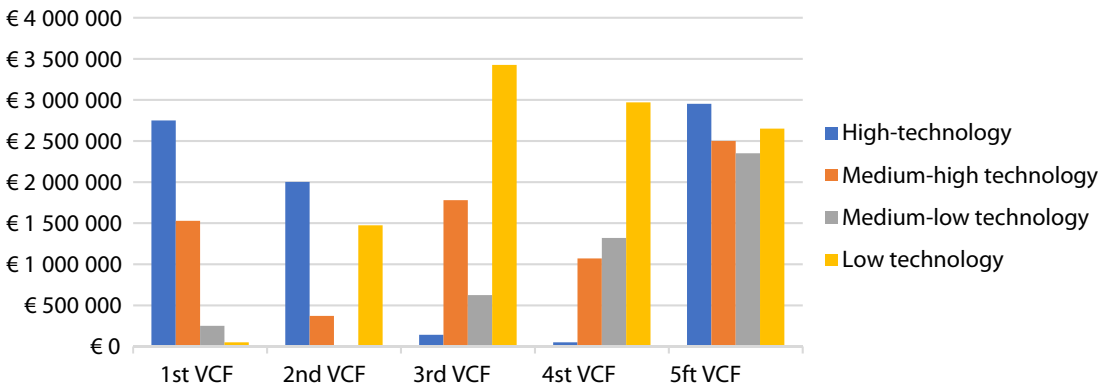


Fig. 2.5. The amount of total investments in manufacturing sectors by VC funds (created by the author)

The investment patterns of the funds in the services sector are presented in Fig. 2.6. The leader in investments in high-tech knowledge-intensive services was the first fund with 89.32 % of its total investments in the services. The 5th fund with 73.99 % followed it. Most of the 2nd, 3rd and 4th funds' investments in the services went to less knowledge-intensive market services (63.17 %, 82.76 %, 63.96 %, respectively).
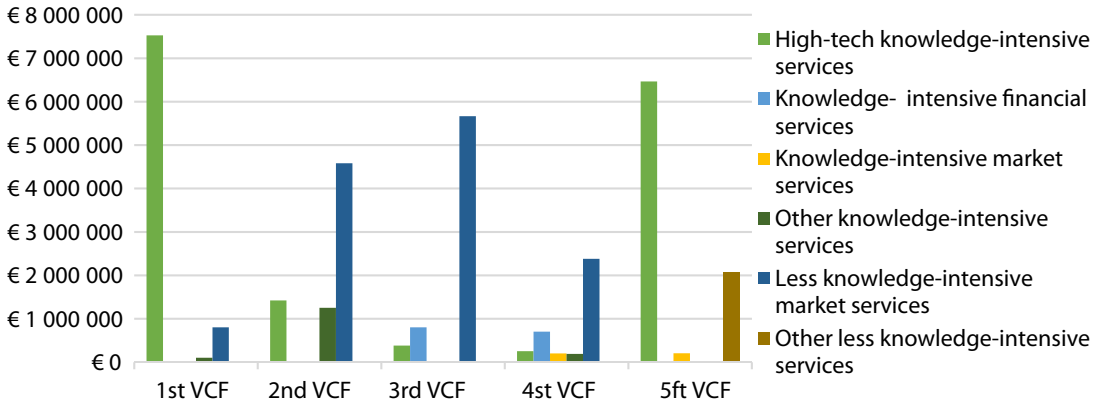


**Fig. 2.6.** The amount of total investments in services sectors by VC funds (created by the author)

To better understand the reasons for the differences in investment patterns, the author compared particular VCF partners' previous experience with the fund investment patterns. The results are presented in Table 2.4.

Table 2.4

**Comparison of VCF management companies' experience and investment patterns (created by the author)**

|  | **Partners' specific experience in a particular industry** | **Investment patterns** |
|---|---|---|
| 1st VCF | None | Most of the investments in high-technology and high-tech knowledge-intensive services |
| 2nd VCF | None | High share in high technology and less knowledge-intensive market services |
| 3rd VCF | Few partners have experience in construction and energy | Most of the investments in low technology and less knowledge-intensive market services |
| 4st VCF | Main partners have broad consulting experience of enterprises in "old economy" sectors | A substantial part of investments in low technology and less knowledge-intensive market services |
| 5th VCF | One of the investment managers in charge has previous experience in mining and forestry products company. Others – no industry-specific experience | The smooth distribution of investments between companies with varying technological intensity in the manufacturing sector and the high share of high-tech and knowledge-intensive services in the services sector's investments |

Data in Table 2.3 shows that funds with the partners with networks/experience in industries with lower R&D intensity invested mainly in these industries. The funds without such partners primarily invested in high technology or knowledge-intensive companies.

During the study, additional observation was done: the fund managers focused on low technology

and less knowledge-intensive market services were able to close quicker their 1st round of fundraising for the next fund. The fund, which heavily invested in high-technology and high-tech knowledge-intensive services, was not able to finish fundraising. Still, the fundraising ability depends on many other obstacles besides investment riskiness profile (Zider, 1998).

From the innovativeness ratio point, the analysis of the VCFs portfolio companies shows that Latvian VC funds' portfolios are a mix of companies from different industries and with no high technology firms' dominance. Investment patterns of different Latvian VC funds' managers vary substantially. Industry-related knowledge and experience accumulated in a particular fund management team presumably explain the variances in the patterns.

# 3. PUBLIC SUPPORT TO VC MARKET IN LATVIA

*The chapter comprises 18 pages and includes 7 tables.*
This section presents the results of a study on the impact of EU Structural Funds on the development of a self-sustainable venture capital market in Latvia. Also, other Latvian government activities beneficial for VC market were evaluated.

## 3.1. Assessment of the public support for Latvian VC market

The EU Structural Funds (SF) became available for Latvia from 2004, when the country became a member of the EU. Latvia has so far participated in three SF planning periods (2004–2006, 2007–2013, 2014–2020) and has deployed part of its available SF in financial instruments, including VC, in all of them. During 2006–2020, 158 MEUR of public finances (European and LV governmental funds) were available for VC investments in Latvia. As a result, 294 VC investments in SMEs (as of March 2020) were made by publicly co-financed funds. Still, the broader influence of the public interventions on self-sustainable VC market development is questioned, as no privately financed VC funds were raised in Latvia during the period.

### Comparison of the VC programmes over 2004–2006, 2007–2013, 2014–2020 planning periods

In Latvia, like many other CEE countries (Karsai, 2018), public funding was provided to the so-called hybrid funds managed by private VC managers. The managers were selected via tenders. The structure for providing public support for VC was the same in all planning periods. Table 3.1 explains the structure of VC funds, their managers, and portfolio companies.

Table 3.1

**Structure of the provision of public VC support in Latvia**

| Type of a fund | Owners of a fund (limited partners) | Manager of a fund | Selection of a manager | Fund portfolio companies |
|---|---|---|---|---|
| Hybrid fund | 1. Government agency responsible for VC programme (LGA, later ALTUM) 2. Private investors 3. The manager of a fund | Private VC fund manager | Tender procedure | Private SMEs |

(Designed by the author based on the example of Karsai (2018))

The managers had an obligation to attract private investment into the hybrid funds (with several exceptions mentioned in Table 3.2, Column 3). Table 3.2 provides an overview of all the VC programmes

implemented in Latvia. The latest programme (2014–2020 planning period) has not been finished yet.

Table 3.2

**Public VC interventions in Latvia (created by the author)**

| Planning period / programme | Public funding | Required private funding | VC funds | Allowed stages | Max investment in one company | Geography | Number of investments |
|---|---|---|---|---|---|---|---|
| **2004–2006** Entrepreneurship and Innovation | 15 MEUR | 30 % | 3 VC funds | Start-up Later-stage Growth | EUR 146 350 1st round Total investment – EUR 487 830 | Latvia | 28 |
| **2007–2013** JEREMIE | 28 MEUR | 33 %, except for seed fund – 0 | 3 VC funds | Seed (1 fund) Start-up (1 fund) Growth (1 fund) | Seed – EUR 50 000, additional investment allowed in total – EUR 200 000 Start-up – EUR 1 000 000 Growth – EUR 3 000 000 | Latvia | 199 |
| **2007–2013** Investment fund for investments in guarantees, credit guarantees, venture capital and financial instruments | 40 MEUR | 33 %, later lowered to 5 % | 3 VC funds | Later-stage Growth | 1.5 MEUR | Latvia | |
| **2014–2020** Growth and employment | 75 MEUR | 0 – pre-seed funds, 10 % – seed, 25 % – start-up, 40% – growth | 3 pre-seed funds with acceleration programmes, 4 seed funds, 1 start-up fund, 2 growth funds | Pre-seed Seed Start-up Growth | 50 000 EUR – pre-seed 250 000 EUR – seed 2.1 MEUR – start-up 3.75 MEUR – growth | Latvia – for pre-seed stage. For other stages – at least 75 % in Latvia | 67 up to 03.2020 |

Data in Column 2 column of Table 3.2 indicates that the amount of public resources has increased in each subsequent period. However, the increases are not substantial if the support is divided by the number of years during which the particular amount was available for investments (Table 3.3). Also, gaps between programmes (when no public funding for VC was available) are visible in Table 3.3. As a result, Latvian VC managers were not able to make any investments in 2009 and 2017.

Table 3.3

**Average public support available for VC investments in SMEs per year (created by the author)**

| Years | 2007–2008 | 2009 | 2010–2012 | 2013–2016 | 2017 | 2018 | 2019–2021 | 2022–2023 |
|---|---|---|---|---|---|---|---|---|
| Source | 2004–2006 SF planning period | | 2007–2013 JEREMIE | 2007–2013 JEREMIE + SF planning period | | 2014–2020 SF planning period | 2014–2020 SF planning period | 2014–2020 SF planning period |
| MEUR available per year | 7.5 MEUR | 0 | 4 MEUR | 14 MEUR | 0 | 3.75 MEUR | 15.75 MEUR | 12 MEUR |

The requirements for the amount of private capital to be attracted fluctuated over the planning periods. The stages of the companies' life cycle in which investments were permitted were also broadened. During the 2004–2006 period, investments were limited to companies that had at least a fully developed product or service (start-up). During the 2007–2013 period, one seed fund was established for companies before they start mass production/distribution to complete research, product definition or product design, market tests or prototypes. For the 2014–2020 period, the range of funds was broadened with three pre-seed funds and acceleration programmes to develop a business idea from scratch. The maximum allowed investment in one company also increased over time. Starting from € 487,830, it grew to € 3 million during the 2007–2013 programme period and to €3.75 million in the 2014–2020 period for later and growth stage companies. The geographic area for investments was broadened only during the current period: up to 25 % of all investments were permitted in companies with their main operations place outside Latvia, but still in the EU.

In conclusion, the primary goal of SF programmes was attained – investments in 294 SMEs were made. To reach the goal of the SF programmes, their design was improved with each subsequent planning period: widening the scope of companies suitable for investments (stages and geographic catchment area); increasing the allowed amount of investment into each company; increasing the volume of the funds; increasing the total amount of public support during a programme; adjusting the necessary share of private funding to the economic situation and ex-ante and post-ante evaluations.

## The activity continuation rate and fundraising ability of VC fund managers

During the 2004–2006 planning period, the first generation of professional VC fund managers emerged in Latvia in response to the opportunity to manage publicly-supported hybrid VC funds. With each subsequent planning period, new managers emerged. To understand how public support helped the development of professional VC managers in Latvia, the author calculated the activity continuation rate of newly established managers during each planning period. Table 3.4 provides the results.

Table 3.4

**Continuation rate of the VC fund managers' activities (created by the author)**

| Continuation rate | Managers from 2004–2006 planning period | Managers from 2007–2013 planning period |
|---|---|---|
| Continuation rate of the same VC fund manager activity | 33 % | 80 % |
| Continuation rate including involvement in other VC fund manager establishment | 67 % | |
| Continuation rate including involvement in Latvian VC ecosystem | 100 % | 100 % |

The continuation rate of VC fund managers established in response to SF programmes activity is

high. From the first-generation managers one is still active, but the staff of the others was involved in the establishment of the next generations of fund managers. All of the second-generation fund managers are active.

A study (Ewens & Rhodes-Kropf, 2015) looking at the performance of VC firms found that the success of VC investments is more attributable to individual partners rather than a VC firm. This implies that retention of individuals within the sector is as important as the continuation of firms, and the data presented in Table 3.4 indicates that this has indeed been the case in Latvia. The emergence of a clutch VC firms and fund managers in Latvia is a positive outcome of SF programmes with the potential to be a driver for VC market development. Nevertheless, Latvian VC fund managers are still not able to raise funds without public support.

## 3.3. Assessment of other governmental activities promoting VC market operations

Lerner (2010) pointed out that instead of a narrow policy of providing VC funds a government should focus on creating conditions for the industry to prosper. The authors compiled the Latvian government's activities, or lack of them, in this area in Table 3.5.

Table 3.5

**Latvian governmental activities to promote VC market**

|  | 2004–2006 planning period | 2007–2013 planning period | 2014–2020 planning period |
|---|---|---|---|
| Common policy for VC market development | No | No | No |
| Tax initiatives supporting VC investments | No | No | Law on Aid for the Activities of Start-up Companies |
| Other for VC beneficial programmes | No | Business Angel network, Stock market for SME. Suspended due to the financial crisis | Stock market for SME. Decreasing of reporting obligations towards Financial Commission and fees. |

(Compiled by the author from data in the sources in Appendix 8 and information on lvca.lv)

The SF programmes in 2004–2006 did not take into account the necessary overlapping with other activities to get the best possible outcome. In 2007–2013, several activities from which the venture capital market could have benefited had been planned (Business Angel network, stock market for SME). Due to the 2008 financial crisis, these activities were suspended. Several activities carried out during this period under the programme of promoting entrepreneurship could be beneficial in the future for the VC market. However, most of these activities were directed at supporting regions and not companies with high growth potential. Furthermore, assessments of the influence of programmes upon one another was not being conducted and not taken into account when programmes were designed.

# 4. SELF-SUSTAINABLE VC MARKET DEVELOPMENT MODEL FOR LATVIA

*The chapter comprises 27 pages and includes 19 tables and 5 figures.*

## 4.1. Relevance of the VC market drivers in Latvia

The list of the factors (55 in total) from Chapter 1 was complemented with additional factors found after researching Latvian VC market in the Chapters 2 and 3. The list of the factors was used to develop the questionnaire for experts to rate the factors influencing VC market development in the countries with immature VC markets. Minor regrouping of factors was done, and some factors were divided into smaller units after the test trial of the questionnaire. As a result, the final questionnaire contained 73 factors. The factors were grouped as introduced in Chapter 1 into three metagroups and twelve groups of factors.

Thirty-one persons who are influential in Latvian VC market were approached by direct emails with a link to the questionnaire in google drive to be filled in. The experts were chosen based on the example from similar studies (Prohorovs, 2013) and Latvian Private Equity and Venture Capital Association data as being deeply involved in the VC market in Latvia and knowing all significant participants of the market. Twenty-two of the approached persons provided answers of the questionnaire. The survey was carried out in May – June 2021. The aim of collecting the expert opinion was: 1) to understand which factors obtained in the studies are important in countries with immature VC markets and small internal markets (such as Latvia, for example); 2) to assess to what degree the Latvian government is exercising any possibility to influence the factors. The respondents were asked to rate the impact of the factors using the Likert scale (1–5), where "5" indicates a very strong influence and "1" – no influence.

The results of the survey show that all factors (73) obtained from the literature have influence also on the immature VC markets like Latvia. Mean value of the vast majority of the factors is above moderate. The reliability of composite results of the survey is very high – above 0.99 by Cronbach's alpha coefficient (number of items – 365). Further the results of the survey are provided in the box and whisker charts showing the distribution of values into quartiles and highlighting the mean and outliers.

### 4.1.1. Metagroup "VC market players"

The values of the factors' groups belonging to metagroup "VC market players" are presented in Fig. 4.1. There is a separate column for each of the factors' groups. The influence of the factors was evaluated in three dimensions: the supply, demand, and total market activity (measured as VC investments). Therefore, there are three separate values for each of the factors' groups.
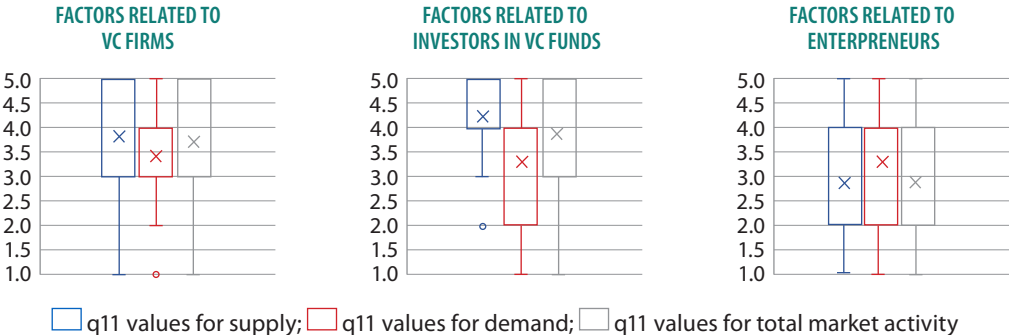


Fig. 4.1. Values of the factors' groups belonging to metagroup "VC market players"

The analysis of the level of factors' groups shows that the characteristics of the VC firms have a more significant influence on supply and total market activity than on demand. Still, mean value for all dimensions (supply, demand and total market activity) is high, and the bottom line of the 1st quartile for all dimensions is above the middle rating. The analysis of the level of particular factors shows that the influence of most of the factors belonging to this group is above the mean or strong. The influence of three factors out of 15 in total is below moderate, still only on one side of the market. For example, the mean value of influence factor "High investment returns" on the demand is 2.79, but this factor is highly rated for influence on supply (4.63) and total market activity (4).

The factors of group "Investors in VC funds" or Limited partners (LPs), like "Factors related to VC firms", have bigger influence on the supply and total market activity than the demand (see Fig. 4.1). The influence on the supply is paramount with bottom line of the 1st quartile above "strong influence" and only one outlier at the level of "little influence". Still, the mean influence even on the demand side is above moderate. The analysis of the factors' level shows that factor "Existence of successful entrepreneurs from prior generations" strongly influences all market sides. The other factors strongly influence the supply side, and have influence that is slightly below moderate on the demand and above the moderate on the total market activity.

The last factors' group belonging to metagroup "VC market players" is "Factors related to the entrepreneurs". Figure 4.1 shows that in line with the previous research, the factors of this group have a bigger influence on the demand side and total market activity than the supply. The total rating of the group would be even higher if not reduced by the values of one factor of this group ("Male gender dominance between entrepreneurs"), which was rated as having little influence on all dimensions. The previous research has documented that VC funds' portfolio companies' selection is gender-biased, where male entrepreneurs have a bigger possibility to attract investments (Alsos & Ljunggren, 2017). Still, the author's survey data does not support this as being valid, at least in the Latvian market. The analysis of the factors' level shows that factor "High number of entrepreneurs seeking for VC" has a strong influence on all market sides. Two factors have little impact on all market sides: "High net worth of entrepreneurs seeking for VC" and previously mentioned – "Male gender dominance between entrepreneurs". The low value of these two factors contradicts some studies that suggest that the high net worth of entrepreneurs is an advantage for receiving investments from VC funds (Coleman, Cotei, & Farhat, 2016). Other factors have a moderate influence on all market sides. An exception is "Awareness of the added value from VC between entrepreneurs/potential entrepreneurs" whose influence on the supply side is below moderate, but on the demand side, the opposite – strong.

## 4.1.2. Metagroup "Environment"

The values of the factors' groups belonging to metagroup "Environment" are presented in Fig. 4.2.



LEGAL ENVIRONMENT　　GOVERNMENT POLICIES　　INFRASTUCTURE

ENVIRONMENT FOR INNOVATION　　RESOURCES　　MACROECONOMIC CONDITIONS

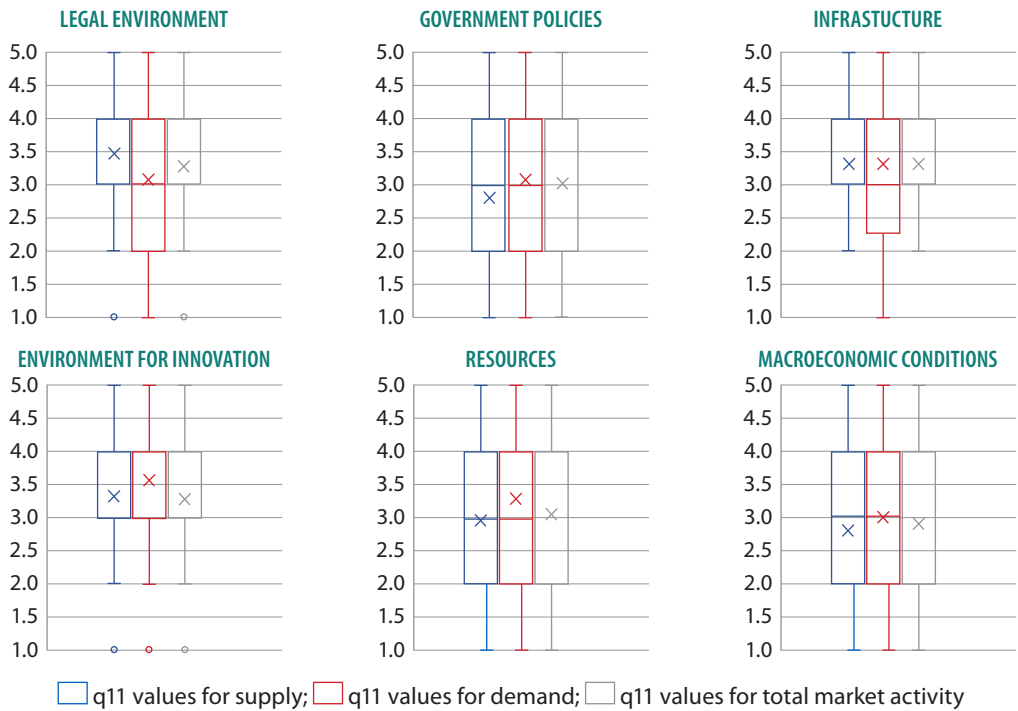☐ q11 values for supply; ☐ q11 values for demand; ☐ q11 values for total market activity

**Fig. 4.2.** Values of the factors' groups belonging to metagroup "Environment"

Figure 4.2 shows that the factors of group "Legal environment" have a bigger influence on the supply side and total market activity than the demand. Still, the mean value for all dimensions (supply, demand and total market activity) is above moderate. The analysis of the "Legal environment" group on the factors' level reveals that most of the factors related to that group have moderate or above moderate impact. The factors "Internationally harmonized and stable regulation for securities, bankruptcy, labour and tax" and "Broad limits for VC funds" strongly influence the supply side. Several factors have a below moderate influence on the demand side. Reduced labour regulation has a below moderate influence on the demand and total market activity.

The impact of group "Government policies" is very similar for all dimensions – with equal quartiles, median, min and max values and very similar mean value around "moderate influence". The analysis of the group on the factors' level reveals that the factors of this group in general have a below moderate influence on the supply side of the market. The exception is the provision of public funding for VC funds, which strongly influences the supply side and the market activity in total. On the opposite, on the demand side, provision of the public funding has a below moderate influence, but other factors have higher influence than on the supply side. Unexpectedly, factor "Similarity between domestic and foreign policy" has a below moderate influence on all market sides. The previous research (Hoppmann & Vermeera, 2020) considers a greater similarity between domestic and foreign policy incentives as a driver for cross-border investments, which as per characteristics analysis of VC firms, has high beneficial influence on the market, especially on the supply side.

The mean value of group "Infrastructure" is similar for all dimensions. Still, the 1st quartile's bottom line for the demand is closer to the "little influence" value, but for the supply and total market, it is "moderate influence". The analysis of the group on the factors' level reveals that most factors have sim-

ilar influence on all dimensions. The low rating of factor "Existence of alternative IPO and listing regulations for SMEs with less stringent standards" contradicts the previous research (Liu, Cao, Johan, & Leng, 2019). During interviews with the experts, many of them said that they do not see the local stock exchange as an exit route for the VC funds from their portfolio companies. As a result, the regulation of the local stock exchange is not so important. "High development of ICT industry" has astrong influence on all market sides. "Developed VC ecosystem with consultants and business angels" has a strong influence on the supply and demand and is very close to strong – on market activity. Other factors have moderate or close to moderate influence.

The impact of group "Environment for innovation" is similar for all dimensions – with equal quartiles, median, min and max values and outliers. The mean value also is similar, for all – above moderate with the highest score for the demand. The analysis of the group on the factors' level reveals that most of the factors related to the environment for innovation have moderate influence. Still, "High level of technology innovation" has a strong influence on the demand side and is close to strong on other dimensions. But "High level of state R&D investments" has a below moderate influence on the total market activity. The rating of state R&D investments being not high is unexpected based on previous studies regarding the importance of state R&D investments (Jin & Lee, 2020; Juha & Kari, 2017). The experts explained the relatively low rating of this factor by the fact that sometimes the state with its support for R&D investments is crowding out private investors.

The impact of group "Resources" is similar for all dimensions – with equal quartiles, median, min and max values. The mean value also is similar, around moderate with the highest score for the demand. The analysis of the group on the factors' level reveals that, surprisingly, but the mean value of factor "High diversity of economically active persons (nationality, gender)" is below moderate in all dimensions. Standard deviation is high in all dimensions showing high dispersity of different experts' rankings for this factor. "High student rate" ranking is also below moderate regarding the supply side and market activity. The factor "Availability of technically skilled entrepreneurs and personnel" is regarded as having high influence for the demand side and above moderate for other dimensions.

The impact of group "Macroeconomic conditions" is similar for all dimensions – with equal quartiles, median, min and max values. The mean value also is similar, close or equal to the moderate with the highest score for the demand. The analysis of the group on the factors' level reveals that only "High GDP growth rate" and "High export level" appear to have an important impact. As regards unemployment, which per some authors' opinion (Parker, 2004) could be a reason for starting a business, it does not appear to be important, at least, seriously impacting the VC market in the countries like Latvia. Still, as the relationships between self-employment and unemployment are nonlinear and fraught with complexity (Audretsch et al., 2002), the survey results do not contradict the previous research. Also, high interest rates are not a reason why VC attracts more interest. Even though it could seem that entrepreneurs could be more interested in VC in periods of high interest rates, some studies do not validate such a conclusion (Gompers & Lerner, 1998).

## 4.1.3. Metagroup "Embedded characteristics"

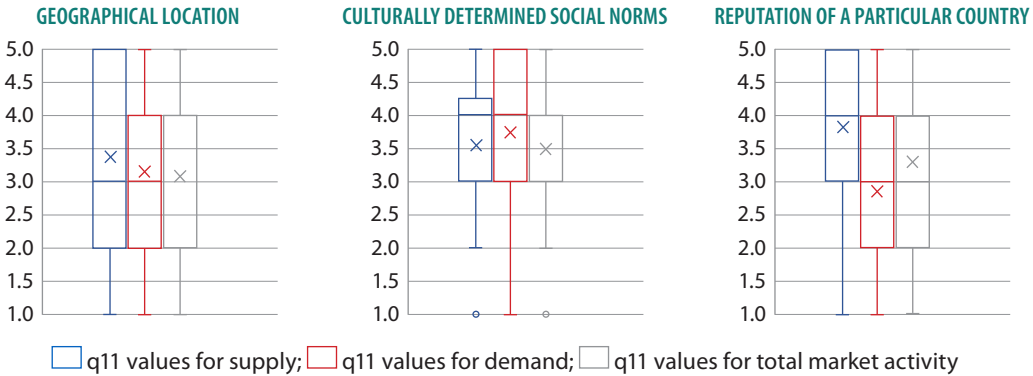The values of the factors belonging to metagroup "Embedded characteristics" are presented in Fig. 4.3.



Fig. 4.3 Values of the factors' groups belonging to metagroup "Embedded characteristics"

The analysis (Fig. 4.3) shows that the mean value of factors' group "Geographical location" for all dimensions (supply, demand and total market activity) is above moderate, with the highest value for the supply. Also, min, max and median values for all dimensions are the same. Still, the supply data are a little bit skewed, and as a result, the 3rd quartile upper line reaches the highest possible rating (extreme influence). At the same time, for the demand and total market activity, it is on the "strong impact" level. The analysis of the group on the factors' level reveals that all factors' mean values fluctuate around moderate values. "Close location of a particular place to the country's core economic regions" has a slightly below moderate influence on the total market activity. During interviews, the experts explained that as Latvia is small, the location of nearly any place could be regarded as close to the core economic regions. Thus, this factor is not so important in small countries like Latvia. The value of factor "Close location to the countries with high VC activity" is closer to strong than moderate for the impact on the supply side.

Factors' group "Culturally determined social norms" has a high impact on all dimensions (supply, demand and total market activity), with the highest value for the demand. The 1st quartile bottom line for all dimensions is on moderate value point. The analysis of the group on the factors' level shows that both factors have above moderate, close to high influence on all market dimensions.

The total impact of group "Reputation of a particular country" is much more profound for supply than for demand and total market activity. The mean value for the supply is 3.8, while for the demand – only 2.8. Still, for total market activity – above moderate – 3.3. The analysis of the group on the factors' level reveals that both factors have close to high impact on the supply side. These factors are not so important for the demand side. Especially, "Lack of restrictions/warnings from international organizations" is rated below moderate from the demand side.

## 4.1.4. The correlation between factors, factors' groups and metagroups

To measure the strength and direction of the associations between factors, the Spearman's correlation test was run. The measurements were done on four levels: 1) on metagroup level; 2) on the group level; 3) on the level of the factors; and also 4) between these levels. The results on the metagroups level indicate a strong statistically significant positive correlation between metagroups "Environment" and "Embedded factors". Also, a positive correlation between metagroups "VC market players" and "Environment" is observed. There is no direct correlation between "VC market players" and "Embedded factors" on the metagroups level. Still, analysis of the data on the factors' group level shows that one

of the groups of metagroup "VC market players" (particularly "Factors related to entrepreneurs") has a statistically significant positive correlation with one of the groups of metagroup "Embedded factors" (particularly "Culturally determined social norms").

On the factors' level, there are significant positive correlations between ample of the factors. Thus, the correlation rank test's results highlight that public support should be provided as a comprehensive policy impacting as much as possible drivers of the VC market and getting a compound effect from their correlation. Providing public support for VC market development only as funding for the VC market is not sufficient. (Factor "Providing public funding for VC funds" has a significant correlation only with nine factors out of all (73) factors' list.) Thus, the possibility of increasing the total impact of governmental activities on the VC market activity from the correlation of other factors is neglected.

## 4.2. Prioritising the VC market drivers for further government support improvement

The analysis of mean values of the factors' impact on Latvian VC market shows that factors of each of the metagroups have influence. Some factors have a bigger influence than others. Still, there are no factors without influence. There is a strong positive correlation between the factors' influence on the different market sides (supply, demand, total market activity). An exception is "Factors related to investors in VC funds", where correlation between supply and demand side, and supply and total market activity has no statistical significance. For factor "Reputation of a particular country", correlation between supply and demand side calculated by the Spearman coefficient is doubtful. The correlations were measured by Spearman and Pearson correlation coefficients to provide robustness of the conclusions. There are no substantial differences in the correlation coefficients obtained by the two methods.

Because of the positive correlation of the factors between all dimensions, the author proposes to estimate the factors' importance based on the highest rating in any of the market dimensions. For example, the mean value of impact of the "Reputation of the particular country" factor for the supply side is 3.79, for the demand side – 2.83 and for total market activity – 3.29. The authors propose to base the total ranking between the factors and factors' influence on the highest rating of the factor in any of the market dimensions - for "Reputation of the particular country" it would be 3.79. In line with that assumption, the authors grouped all factors in the order of importance. The factors with mean value below moderate in all dimensions of the market were excluded from the list. The list is provided in Table 4.4.

Table 4.4

### Factors with substantial impact on the VC market listed in the order of importance within the group

| Metagroup – VC market players | |
| --- | --- |
| **Factors' group – q11 Factors related to VC firms** | |
| q11_12 | High investment returns of VC firms |
| q11_6 | Existence of foreign VC firms in a market |
| q11_1 | High total amount of available capital from VC firms in a market |
| q11_7 | Existence of publicly co-financed VC firms in a market |
| q11_11 | Substantial added value from VC firms |
| q11_2 | High competition between VC firms in a market |
| q11_13 | Successful growth of VC firms' portfolio companies |

Table 4.4 Continued

| q11_8 | Existence of private VC firms in a market |
|---|---|
| q11_3 | Existence of VC firms in all stages in a market |
| q11_5 | Existence of local VC firms in a market |
| q11_10 | Existence of experienced VC firms in a market |
| q11_9 | High reputation of VC firms in a market |
| q11_15 | High risk profile of VC firms (financial instruments used by VC firms; investment strategies) |
| q11_4 | Specialization of VC firms |
| q11_14 | Low risk profile of VC firms (financial instruments used by VC firms; investment strategies) |
| **Factors' group – q12 Factors related to investors in VC funds** | |
| q12_1 | Diversified and robust institutional investor base |
| q12_2 | Existence of successful entrepreneurs from prior generations |
| q12_3 | High experience and capacity in VC investments of governmental agency responsible for public VC investments |
| **Factors' group – q13 Factors related to entrepreneurs** | |
| q13_1 | High number of entrepreneurs seeking for VC |
| q13_3 | Awareness of the added value from VC among entrepreneurs/potential entrepreneurs |
| q13_4 | High risk tolerance and partnership acceptance and trust of entrepreneurs/potential entrepreneurs |
| q13_2 | General awareness of entrepreneurs/potential entrepreneurs about VC |
| q13_7 | Previous experience in entrepreneurship of entrepreneurs/potential entrepreneurs |
| q13_8 | Technical or MBA education of entrepreneurs/potential entrepreneurs |
| **Metagroup – Environment** | |
| **Factors' group – q21 Legal environment** | |
| q21_1 | Internationally harmonized and stable regulation for securities, bankruptcy, labour and tax |
| q21_6 | Broad limits for VC funds (size of the investment; geography; focus; lifespan of the fund; risk profile) |
| q21_4 | Flexible policies regarding risk evaluation and broad limits for investments in VC funds for investors in VC funds |
| q21_5 | Tax application for investors in VC funds not VC funds level |
| q21_8 | Little administrative burden for starting a business |
| q21_7 | Entrepreneur-friendly tax system |
| q21_2 | Reduction in labour regulation |
| q21_9 | Easiness for foreigners to start a business |
| q21_3 | Easiness to hire foreign employees |
| q21_10 | Government policies and regulations beneficial for particular kind of investments (i.e. clean-tech; sustainability) |
| **Factors' group – q22 Government policies** | |
| q22_5 | Providing public funding for VC funds |

Table 4.4 Continued

| q22_1 | Programmes encouraging entrepreneurship |
|-------|------------------------------------------|
| q22_6 | Raising awareness about VC |
| q22_3 | Support for technology transfer and RD |
| q22_2 | Programmes raising awareness about financial instruments |
| | **Factors' group – q23 Infrastructure** |
| q23_2 | High development of ICT industry |
| q23_12 | Developed VC ecosystem with consultants and business angels |
| q23_7 | Absence of other available capital for entrepreneurs |
| q23_6 | Active capital market providing exit possibilities |
| q23_3 | Existence of local business clusters, well developed industries |
| q23_8 | Possibility to get additional funding for next rounds/further growth |
| q23_4 | Existence and availability of research facilities |
| q23_5 | Existence of local technical universities |
| q23_10 | Lack of other high yield investments for investors in VC funds |
| | **Factors' group – q24 Environment for innovation** |
| q24_1 | High level of technology innovation |
| q24_2 | High level of demand for new products |
| q24_3 | High level of demand for particular products/technologies |
| q24_4 | High level of state R&D investments |
| | **Factors' group – q25 Resources** |
| q25_3 | Availability of technically skilled entrepreneurs and personnel |
| q25_4 | Availability of economically competent individuals |
| q25_2 | High student rate |
| | **Factors' group – q26 Macroeconomic conditions** |
| q26_1 | High GDP growth rate |
| q26_2 | High export level |
| | **Metagroup – Embedded characteristics** |
| | **Factors' group – q31 Geographical location** |
| q31_2 | Close location to the countries with high VC activity |
| q31_1 | Close location of a particular place to the country's core economical regions |
| | **Factors' group – q32 Culturally determined social norms** |
| q32_1 | High level of risk and uncertainty toleration |
| q32_2 | Tendency towards cooperation and trust |
| | **Factors' group – q33 Reputation of a particular country** |
| q33_1 | Public image of a particular country |
| q33_2 | Lack of restrictions/warnings from international organizations |

After exclusion of the factors with little impact, there are 63 factors important for the VC market development in Latvia and similar countries. The number and structure of the factors' groups (12) and metagroups (3) are the same as after the Literature analysis (Chapter 1).

The experts were asked to rate also the degree to which the Latvian government is using its possibility to influence each factor. Therefore, it was possible to construct the Importance-performance matrix (Fig. 4.4). The ratings were provided in the range from 1 to 5. The mean value (3) was used to create the line dividing all factors into four quadrants.

Quadrant 1 shows the factors that are not so important for the market development, but the influence of government provided activities is above mean value. The factors in this quadrant are those where there is no necessity for further governmental support from the point of VC market development. Only two factors appeared in this quadrant. Those are: "Well developed public infrastructure" and "Reduction in labour regulation". The appearance of "Well developed public infrastructure" in the list of not so important factors for VC market development is a little bit surprising. It could be partly explained by the high variance of the ratings of the different experts (the differences between min and max values of the factor and standard deviation).

Quadrant 3 shows the factors which have influence below moderate on VC market development and where the government also provides impact on them below moderate. These factors are: "Dominant gender of entrepreneurs/potential entrepreneurs – male"; "High unemployment"; "Outsourcing of public services"; "High interest rates"; "Existence of alternative IPO and listing regulations for SMEs with less stringent standards"; "Similarity between domestic and foreign policy"; "Low transaction costs". Surprisingly, the "Existence of alternative IPO and listing regulations for SMEs with less stringent standards" is between the factors of low importance. The experts, which completed the survey during the personal interviews with the author, explained that local stock exchange is not usually regarded as the place for the VCFs portfolio companies listing. For those companies whose exits are designed through IPO, the foreign stock exchanges are regarded as the destination.

Most of the factors per importance-performance analysis are in the two quadrants where factors with high impact are listed. There are 41 factors in Quadrant 4 where those with a significant impact on the market development but below moderate influence from the government are placed. Thirteen factors with high importance and substantial beneficial influence from the government are in Quadrant 2.
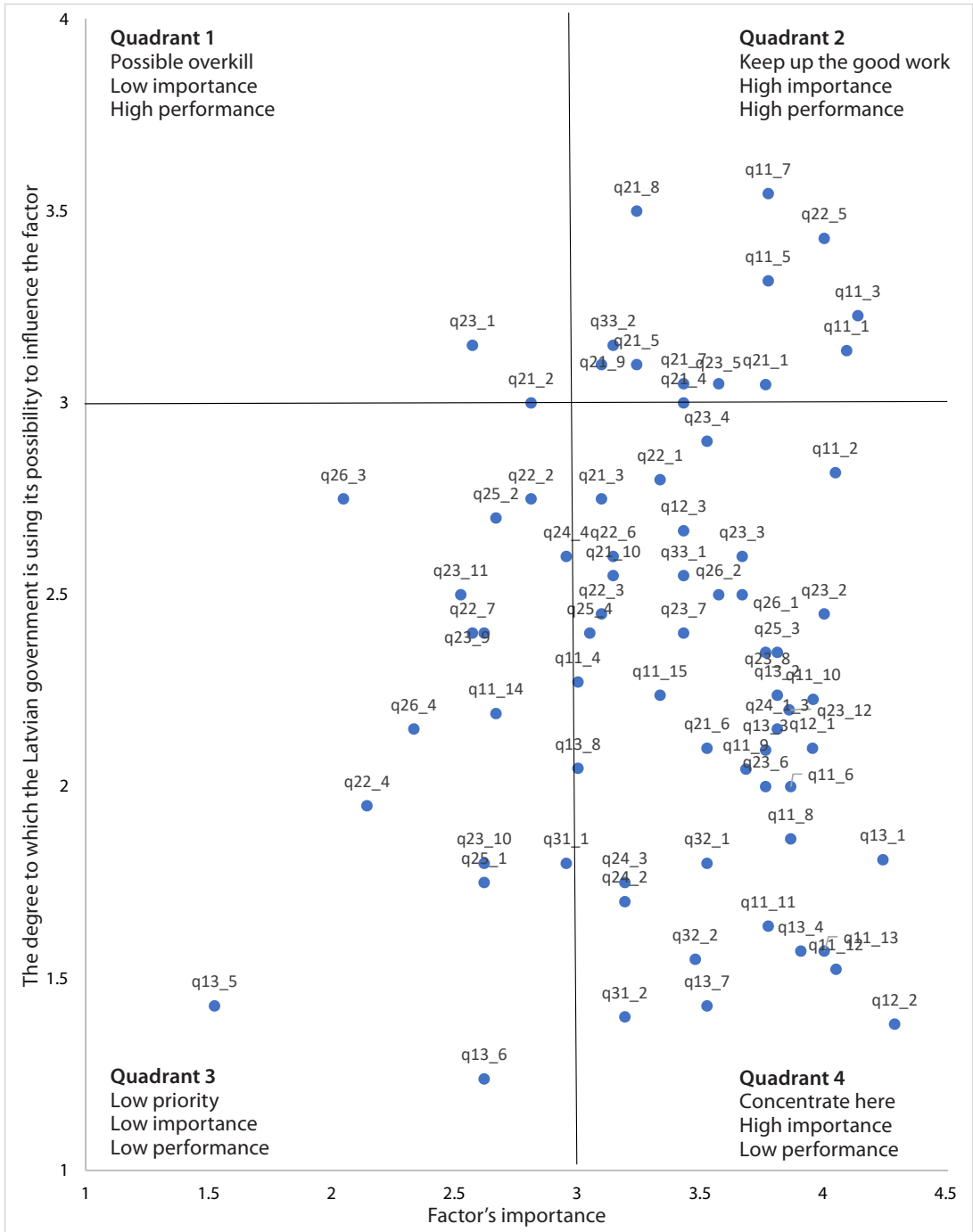
**Fig. 4.4.** The factors importance-performance matrix

## 4.3. Self-sustainable VC market development model for Latvia

The importance-performance analysis and correspondence between the factors allow concluding that the model created based on the literature qualitative content analysis (Chapter 1) is correct in the circumstances of Latvia. Therefore, the public support to develop self-sustainable VC market should be provided on the factors' level and not exceptionally on supply increase with public funding and demand direct stimulation level as it is currently done. The model is provided in Fig. 4.5.
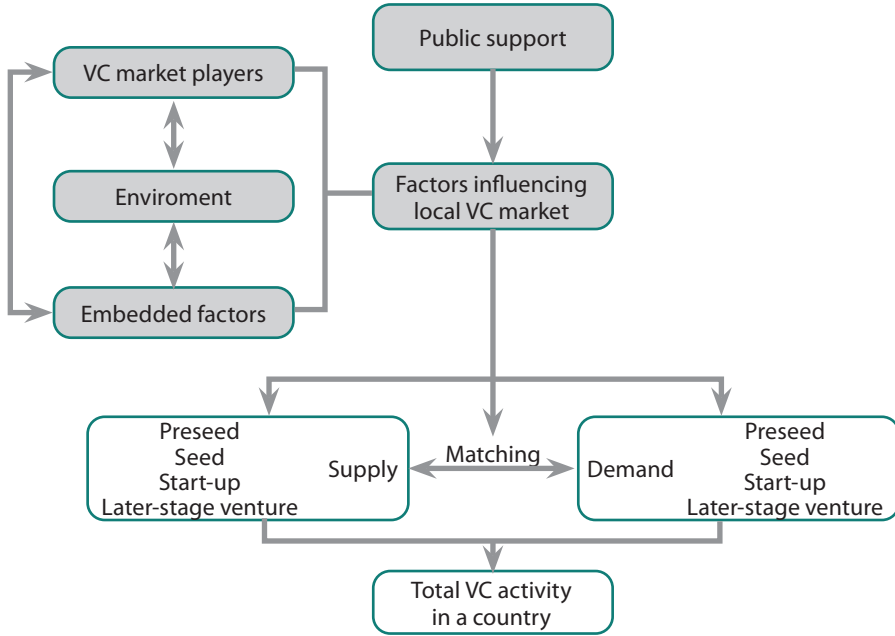


**Fig. 4.5** Self-sustainable VC market development model for Latvia

As public support is limited, from the VC market development point it should concentrate on the factors which per the importance-performance matrix (Fig. 4.4.) are in Quadrants 2 and 4.

# CONCLUSIONS AND RECOMMENDATIONS

1. The features of a self-sustainable VC market (a status which governments should help the market to reach) are: 1) a balance exists between demand for such capital and its supply; 2) the market is capable of financing the riskiest companies, i.e. those in the earliest stages of their development and high-tech ventures without tangible assets for collateral and stable income, and it provides to them strong support; 3) there is a pipeline of sufficiently good quality investible businesses for VCFs; 4) the market has reached critical mass for further organic growth without public support.
2. The results of study show that the Latvian VC market currently lacks all the features of a self-sustainable VC market: 1) there is no balance between demand for such capital and its supply. The supply side depends on public funding which is provided with gaps between SF planning periods; 2) the ratio of early stage (or high-tech) investments to total venture investments is low. From the total amount invested in the services sector according to Eurostat's classification methodology, investments into high-tech knowledge-intensive sectors accounted for 46 % and less knowledge-intensive sectors 44 %. The breakdown of investments in the manufacturing sector is as follows: 26 % into

high-tech firms, 24 % into medium-high technology; 15 % into medium-low technology and 35 % into low technology. Funds investing in early stages are at the highest risk of projects being unable to raise subsequent funds; 3) there is no pipeline of sufficiently good quality investible businesses for VCFs; 4) the market has not reached critical mass for further organic growth without public support. As of mid-2021, no private capital VC funds have been raised in Latvia.

3. A qualitative content analysis of the scientific literature shows that 55 factors influence the development of VC markets. Most of these factors exhibit interdependencies. After exploring the features of the Latvian VC market and test trials of the questionnaire with VC experts, additional factors were identified, taking it up to 73 factors in total.

4. Existing public support for the VC market in Latvia (like in other countries known to the author) is mostly limited to stand-alone measures such as providing public funding for VC funds and increasing demand for VC via sporadic programmes for entrepreneurs. The importance-performance matrix analysis shows that factor "Providing public funding" is only one of many factors with a high impact on VC market development.

5. Government support with public funding for VC funds (influencing the beneficial effect of factor "Providing public funding") alone is not sufficient for the development of a self-sustaining VC market. Nevertheless, it provided an opportunity for local VC fund managers to develop their skills, which is considered as an important factor for VC market development. "Providing public funding" exhibits strong positive correlation with eight other factors. No statistically significant correlation with the other 64 factors was observed, which is an indication of the need for a comprehensive development strategy.

6. Surprisingly, factor "Existence of alternative IPO and listing regulations for SMEs with less stringent standards" was rated to be a factor with a below moderate importance. The experts who completed the survey during personal interviews with the author explained that the local stock exchange is not usually seen as the place to list VCFs portfolio companies. For those companies that investors planned to exit using the IPO method , foreign stock exchanges are preferred for listing.

7. Locally embedded traits, especially governing social norms, substantially impact all VC market players and all market dimensions (supply, demand and total market activity), with the highest value for demand. The results suggest that low risk acceptance by LPs or investors in VCFs and low partnership acceptance by entrepreneurs are substantial barriers to Latvian VC market maturity.

8. Importance-performance matrix analysis placed most factors in the two high-impact quadrants. The government should increase the level of its beneficial influence on the factors in Quadrant 4 (41 factors with high importance and not sufficient influence from the government). The factors with high importance and current substantial beneficial influence from the government are in Quadrant 2 (13 factors). The government should continue to beneficially influence these factors.

9. The results of the study confirm observations gleaned from the literature that self-sustainable VC market development requires a comprehensive approach. Numerous factors and their interdependence influence the status quo of the VC market. All of them should be considered when designing policies for improving any of the market elements. The hypothesis of the Thesis is correct: "Public support for the development of a self-sustainable venture capital market should be provided as a comprehensive policy taking into account the impact of all factors influencing VC market development".

Taking into account the results of the research, the author makes the following **recommendations.**
*For the government and public agencies responsible for VC programmes in Latvia:*

1. To use the self-sustainable VC market development model as a guideline for further VC market development initiatives.

2. An importance-performance matrix analysis should be repeated after several years. Regular analysis would help determine if there have been any substantial changes and, if so, which factors are in the quadrants where further governmental support is necessary.

3. The specific traits of Latvian VC market players (low risk acceptance by LPs or investors in VCFs and low partnership acceptance by entrepreneurs) and the fact that changes in embedded traits happen slowly should be considered when evaluating the results of previous public support programmes for the VC market.

*For non-governmental organisations representing VC market participants:*
1. To enhance the understanding of market participants concerning the numerous factors influencing VC market development.
2. Demand the government adopt a comprehensive approach to VC market development.

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