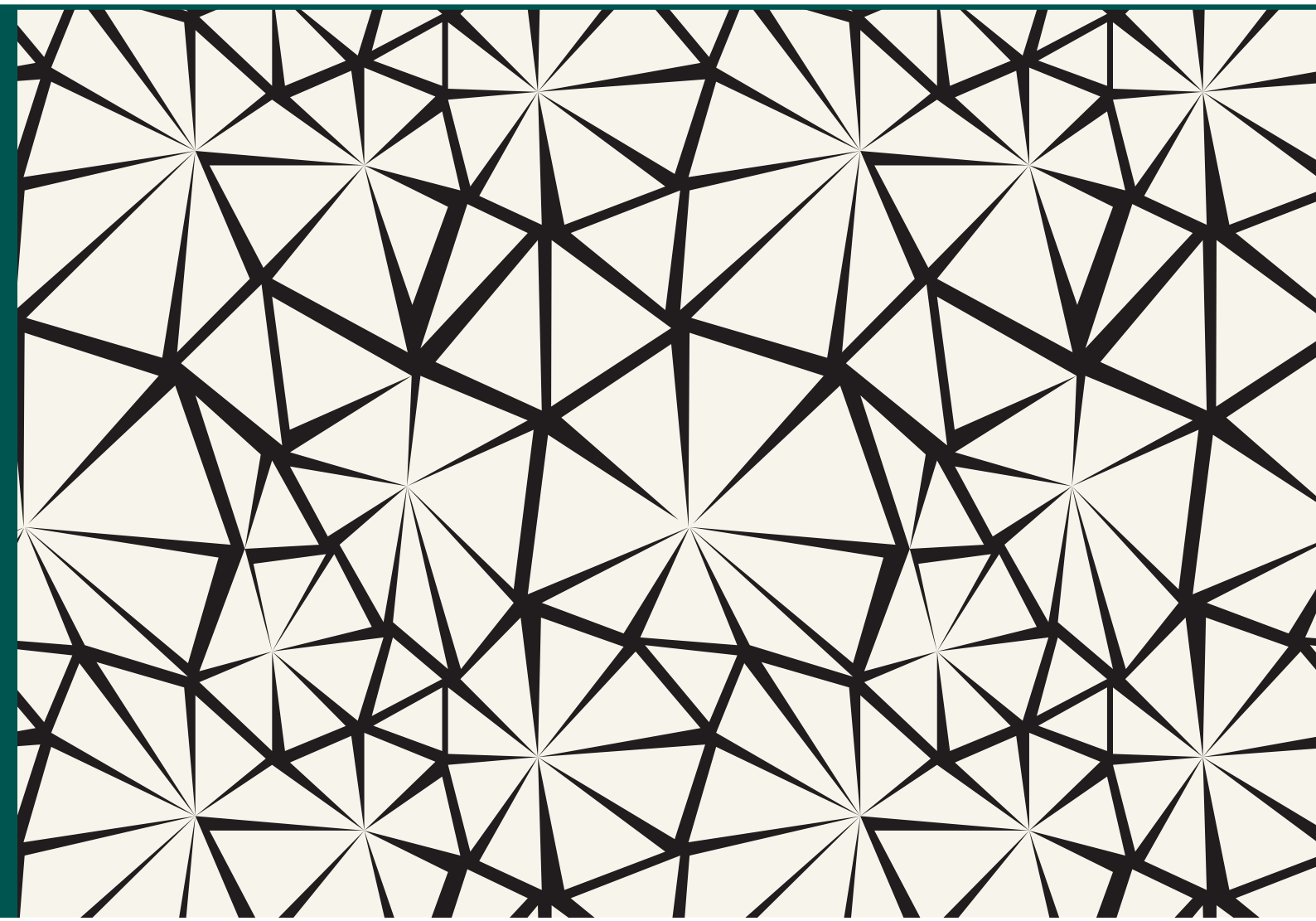
RIGA TECHNICAL UNIVERSITY

Anita Matisone

ACHIEVING SELF-SUSTAINABILITY OF VENTURE CAPITAL MARKET IN LATVIA

Doctoral Thesis



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RIGA TECHNICAL UNIVERSITY
Faculty of Engineering Economics and Management
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ACHIEVING SELF-SUSTAINABILITY OF VENTURE CAPITAL MARKET IN LATVIA

Doctoral Thesis

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Anotācija

Riska kapitāla (Venture Capital) nozīme jauniem, inovatīviem uzņēmumiem ar augstu izaugsmes potenciālu un tā plašāka ietekme uz ekonomiku ir nenoliedzama. Tomēr riska kapitāla tirgus organiska darbība un izaugsme ir novērojama tikai atsevišķās valstīs. Šā iemesla dēļ Eiropas Savienības valstu valdības, tai skaitā Latvijas, cenšas veicināt vietējā riska kapitāla tirgus aktivitāti.

Ne politikas veidotāju, ne arī pētnieku starpā nav vienprātības par to, kā attīstīt riska kapitāla tirgu. Latvijā, tāpat kā citās valstīs, kuras mēģina izmantot riska kapitāla ieguldījumu priekšrocības MVU atbalstam, nav visaptverošas politikas riska kapitāla tirgus attīstībai. Tā vietā tiek veiktas sporādiskas darbības, periodiski nodrošinot publisku finansējumu vietējiem riska kapitāla fondiem vai mudinot uzņēmējus izmantot šādu finansējumu. Valsts atbalsts kādai industrijai ir ārkārtējs un ierobežotā laika periodā pieļaujams pasākums. Neskatoties uz to, publiskais finansējums riska kapitāla fondiem Eiropā tiek nodrošināts jau vairākus gadu desmitus, savukārt Latvijā kopš tās pievienošanās ES.

Tāpēc šī promocijas darba ietvaros veiktā pētījuma mērķis bija noskaidrot nosacījumus organiski augoša vai pašpietiekama riska kapitāla tirgus izveidei un, pamatojoties uz daudzfaktoru ietekmes analīzi uz dažādām riska kapitāla tirgus dimensijām, izstrādāt modeli efektīvākam valsts atbalstam.

Lai sasniegtu mērķi, tika noteikti pašpietiekama riska kapitāla tirgus raksturlielumi, kurus valdībai būtu jāpalīdz tirgum sasniegt. Tāpat tika veikts Latvijas riska kapitāla tirgus pašpietiekamības novērtējums. Pamatojoties uz zinātniskās literatūras analīzi tika identificēti faktori, kas ietekmē riska kapitāla tirgu un katru no tā dimensijām (piedāvājumu, pieprasījumu un kopējo tirgus aktivitāti). Šo faktoru nozīmīgums Latvijā tika noteikts, balstoties uz Latvijas riska kapitāla fondu un to portfeļkompāniju analīzi un ekspertu aptaujas rezultātiem. Darba rezultātā tika izstrādāts pašpietiekama riska kapitāla tirgus attīstības modelis, kuru rekomendējams izmantot, veidojot turpmākas valsts atbalsta programmas riska kapitāla tirgum, kā arī vērtējot to rezultātus.

Promocijas darbs ir uzrakstīts angļu valodā. Tajā ir ievads, četras daļas, secinājumi un rekomendācijas, kā arī bibliogrāfiskais saraksts ar 158 literatūras avotiem. Darbā ir 26 attēli, 41 tabula, 14 pielikumi. Darba apjoms ir 190 lapas, ieskaitot pielikumus.

Abstract

The importance of Venture Capital for young, innovative companies with high growth potential and its wider impact on the economy is undeniable. Only a few countries have managed to achieve a dynamic venture capital market with ability to grow organically, however. For this reason, governments in the European Union, including Latvia, have sought to stimulate domestic Venture Capital market activity.

There is no consensus among policymakers or researchers on how to foster the development of the venture capital market. In Latvia, as in other countries trying to harness venture capital investments to support small and medium-sized enterprises, there is no comprehensive policy to develop the Venture Capital market. Instead, sporadic actions are taken, including periodically allocating public funding for local Venture Capital funds and encouraging entrepreneurs to use such funding. Public support for an industry is an exceptional measure, which is admissible for a limited period of time. Nevertheless, public funding for Venture Capital funds has been provided in Europe for several decades, and in Latvia since its EU accession.

The research carried out for the thesis aimed to identify the conditions necessary to achieve a self-sustaining venture capital market capable of organic growth using a multi-factor analysis of the impact on different sides of Venture Capital market, and then to develop a model for more effective state support.

The characteristics of a self-sustaining venture capital market were identified, which should also be the objectives of government policy. An assessment of the self-sufficiency of the Latvian Venture Capital market was also carried out. Based on an analysis of the scientific literature, the factors affecting the Venture Capital market and each of its dimensions (supply, demand and total market activity) were identified. The importance of these factors in Latvia was determined on the basis of an analysis of Latvian Venture Capital funds, their portfolio companies, and the results of a survey of experts. This was used to elaborate a model for the development of a self-sufficient Venture Capital market, and its use is recommended in the design of future state support programmes for the Venture Capital market, as well as in the evaluation of their results.

The thesis was written in English. It contains an introduction, four chapters, plus a conclusions and recommendations section, as well as a bibliography with 158 references. It contains 26 figures, 41 tables and 14 annexes. The dissertation runs to 190 pages, including annexes.

GLOSSARY OF ABREVIATIONS

CEE - Central and Eastern Europe

EC – European Commission

EIF – European Investment Fund

ERDF – European Regional Development Fund

EU – European Union

IPO - Initial public offering

JEREMIE – Joint European Resources for Micro to Medium Enterprises

LP – limited partner (investor) in Venture Capital funds

PE - Private Equity

SF – European Structural and Investment Funds or commonly called - Structural Funds

SME - small and medium-sized enterprise

VC - Venture Capital

VCF – VC fund

UK – the United Kingdom

US – the United States of America

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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 for around 100 million people, and they produce more than half of Europe's 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 SME's 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, G., & 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 RA, Myers SC, 2008; Hellmann, T., & 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 the exceptional importance of VC for new companies with high growth potential and the wider economic benefits it provides, 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 Baltic countries, including Latvia (Invest Europe, 2021), calculations by the author from data 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 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, P. A., & 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' 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 on 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 targets are set as a number of SME's supported and jobs created. The development of a country's VC market is not an 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 or 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 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, 2020a), could signal about serious deficiencies in the design of the interventions. The effectiveness of the public support from 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 don't 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, 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 practices 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 elaborate a model for appropriate VC public policies based upon multi-factor impact analysis of measures undertaken by VC market stakeholders. The model has been developed based upon 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 VC funds established in Latvia during the period of 2006-2020 investment patterns, the level of the value adding assistance to the portfolio companies, fundraising ability and activity continuation rate.
3. To analyse companies supported by VC funds established in Latvia during the period of 2006-2020 from their technology or knowledge-intensity ratio point.
4. To explore practices 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 the 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. Funds established outside Latvia, but partially active in Latvia were not included in the scope of the research. 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 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 worldwide renowned researchers in the field of VC and public interventions findings, such as 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 and 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, requested information from ALTUM and the former governmental agency's Latvian Guarantee Agency's staff, scientific articles related to Latvian and Baltic States VC market, different media articles;
2. Information about VC Fund managers and their portfolio companies from the Latvian Financial and Capital Market Commission https://www.fktk.lv, Invest Europe data base, Latvian Private Equity and Venture Capital Association, VC Fund managers' websites; Latvian companies' database holder firmas.lv and interviews and surveys with 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 below.

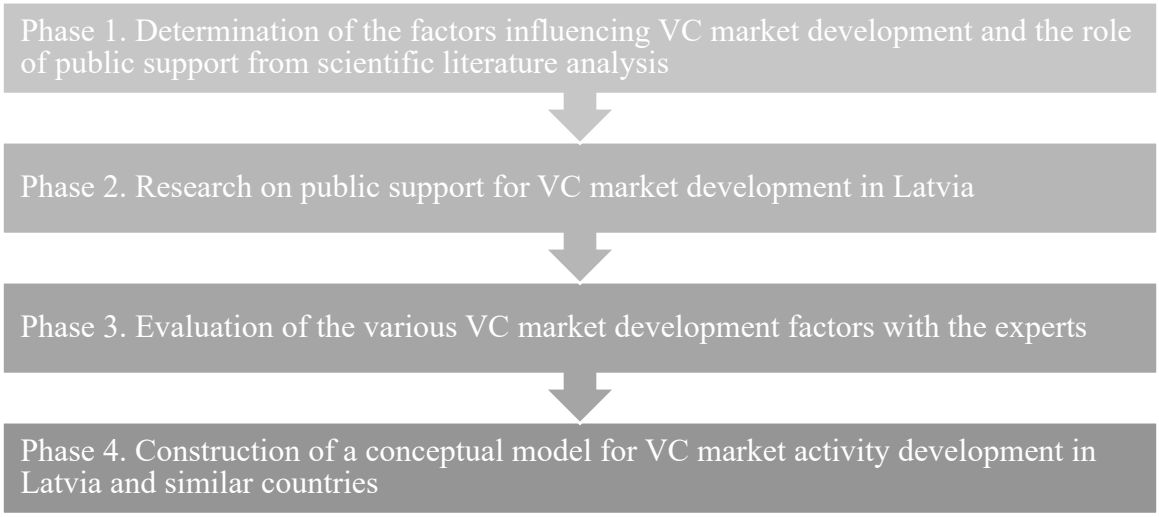

Figure 1. Research design (Created by the author).

Phase 1. Determination of the factors influencing 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 achieve and triangulation of the results;
- qualitative content analysis of scientific literature for identifying VC supply determinants;
- qualitative content analysis of scientific literature for identifying VC demand determinants;
- qualitative content analysis of scientific literature for identifying VCists and entrepreneurs matching determinants
- preparation of the combined list of the factors, indicating their impact on a particular market.

The first research question **"**What are the factors that promote VC market development?" was answered from the theoretical perspective during this phase. The results of the 1st phase provided a list of theoretical characteristics of the VC market participants, local environment and 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 interest was paid to examining the existence of the theoretical characteristics of the VC market participants necessary for further VC market development discovered during the phase 1. The research phase 2 consisted of the following:

- Research of EU and Latvian government programmes for VC market support;
- Research of VC funds established in Latvia during 2006-2020;

- Research of companies supported by VC funds established in Latvia during 2006-2020.

The second research question "What are the practices 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 the various VC market development factors with the experts

During this phase:

- The list of the factors promoting VC market development from the 1st phase was adjusted for Latvia and countries with similar socio-economic, cultural and political environment and small internal markets with help of the results from the 2nd phase;
- On the basis of the adjusted factors list the survey for experts in Baltic VC market was developed;
- Survey of experts in Baltic VC market and the elaborating of the list of the factors with substantial impact on VC market development in countries with immature VC markets.

Phase 4. Constructing a conceptual model for self-sustainable VC market 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 J. (Lerner et al., 2015), Harding R. (Harding, 2002), Migendt M. (Migendt et al., 2017), Baldock (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 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 Venture Capital market, which with the help of government support programmes should be achieved.
2. Assessment of the current state of the Venture Capital 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 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) gradually catalyse VC market self-sustainability.

Hypothesis

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

i) a balance exists between demand for such capital and its supply;

ii) 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 them strong support;

iii) there is a pipeline of sufficiently good quality investible businesses for VCFs;

iv) the market has reached 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 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 during 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 use as practical tools for next ex-ante and post-ante evaluations of 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 cooperation: barriers and drivers. In Proceedings of the 10th International Multi-Conference on Complaxity, 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, Anita; Lace, Natalja (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, Anita; Lace, Natalja Venture Capital supply determinants in undeveloped markets. Complexity, Informatics and Cybernetics: IMCIC 2021, 4, 77.
7. Matisone, Anita; Lace, Natalja (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 under 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.

The Volume and Content of Doctoral Thesis

The Doctoral Thesis consist of introduction, four chapters, conclusions and recommendations and list of references with 158 sources. The thesis is illustrated by 26 figures and 41 tables. The volume of the Thesis is 207 pages, including 14 annexes.

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, 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 VCists and entrepreneurs matching determinants are described in the second part of the chapter. The last part of the chapter presents the composite list of the factors for supply, demand and matching delivered 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 researching 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 practices of the 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 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 VC market development. The first part of the chapter explains the logic and results of the VC market experts survey regarding VC market development determinants and 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 delivered from the scientific literature analysis (Chapter 1) is elaborated based on the results.

1. SELF-SUSTAINABLE VENTURE CAPITAL MARKET DEVELOPMENT CONCEPT

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, analysis of differences between countries with longer VC history and those with shorter is missing. Therefore, the chapter 1 based on the previous studies aims to:

1. define what VC market status which a government should help to achieve is;
2. define the theoretical factors influencing VC activity and differentiate if appropriate, between factors related to developed VC markets and immature ones;

The chapter is organized as follows: the next section (1.1.) introduces the literature review of VC market status characteristics and existing ideas about development of the market. The 1.2 section describes the results of content analysis of the literature regarding the factors influencing VC market development and the role of public support.

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

Companies with stable income, proved track record and assets pledge to have access to various sources of capital (Andrieu, G., & 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 as bank loans (Cassar, 2004). It is well-known (Hellmann, T., & Puri, 2002; Lerner et al., 2005) that for such companies Venture Capital (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.

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 VC market activity. European Union (EU) alone has many policy documents in regards to VC (European Commision, 2020) and also, over several decades has contributed a significant amount of money to support VC funds (European Court of Auditors, 2019).

There is no common opinion on how to cultivate VC investments. The existing research on the VC market activity drivers is contradicting. Some studies conclude that it is more important to increase the supply of the VC (Hellmann & Thiele, 2019). In contrast, others propose to increase demand for the VC (Harding, 2002; Romain & Bruno van Pottelsberghe de la Potterie, 2004). There are also studies that provide evidence that an increase in one of the market sides leads to an increase in the other side (Bertoni et al., 2017; Cipollone & Giordani, 2019). Also, the opposite is 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.

To the best of the authors knowledge, the countries involved in attempts to have benefits from VC investments do not have comprehensive policies to develop VC market. There are just sporadic efforts to provide public funding for VC funds or encourage entrepreneurs to use VC.

The EU countries for their economic development can use resources from European structural funds (SF). A particular country can determine how the funds a country is eligible for will be used: as grants, guarantees, loans or VC investments. Starting from 2007-2013 planning period (Wishlade et al., 2016) there is a shift from grants to repayable financial instruments and VC as part of them. As result, many EU countries within each planning period deploy part of the available money from SF providing inflow 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. Public contributions to support VC funds are made not only by each EU member state (mostly from SF resources). The EU also supports VC funds by centrally managed interventions directly designed and developed by the European Commission (EC).

The amount of necessary public support for VC funds is determined based on ex-ante assessments about existing market gaps. The methodology for assessing market gaps will be described in the next session, but in essence, assessments are done based on expert opinions, and there is no possibility to obtain quantitative data to reflect a silent demand (Harding, 2002) for VC.

The Figure 1.1 explains the process of VC funds public support design and evaluation.

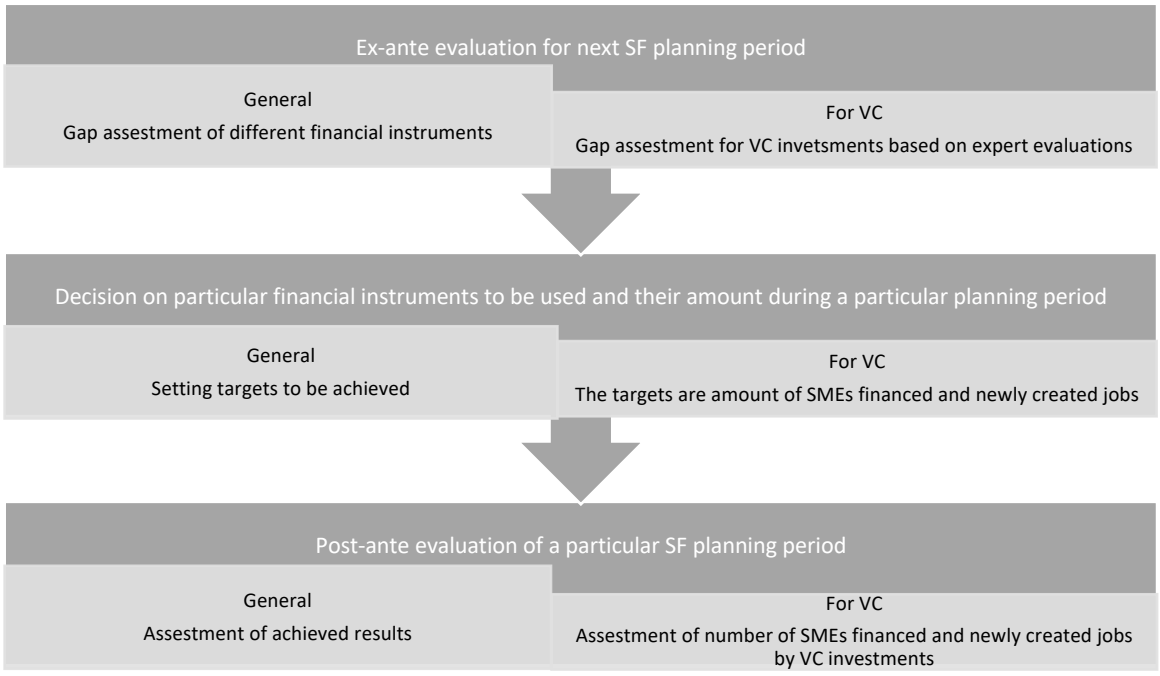

Figure 1.1. VC funds' public support process (The author's compilation).

As explained in Figure 1.1., the target of SF programmes is to broaden SMEs access to finance and support innovation and employment. The development of a country's VC market

is not an aim of SF programmes. As a result, even increasing VC supply with public resources, the SF programmes don't have a deliberative intention to develop VC markets.

The same applies to other entrepreneurship support programmes. Evaluations of them is done at a single programme in isolation level (Harding, 2002; Hellmann & Thiele, 2019) and not designing/ measuring the total impact on the organic growth of the VC market. For example, there is a general understanding between 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 awareness of entrepreneurs about VC (Owen & Mason, 2019), but these activities are vaguely connected with public support for VC supply.

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.

Public finance theory states that government interventions are exceptional measures that may be used if they generate positive externalities to society (Hyman, 2010) and don't 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).

As public support is limited in time measure and it's implementations costs should be weighed against benefits it would be necessary to influence VC market as a whole, not just its parts.

Numerous studies have looked at the development of venture capital markets and their determinants.

What is venture capital? Invest Europe, the association representing VC on 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, G., & Woods, 1997). Some sources use the term private equity to refer to both private equity (PE) and VC, while others use 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 upper mentioned. It excludes PE stages related to relatively mature companies' companies (rescue/turnaround, buyout and growth). Even though there is a lot in common between PE and VC, decision and control mechanisms in young companies and developed ones are different (Wright Robbie, 1998). Therefore the study conducted will concern only 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:

1. Seed: Funding provided before the investee company has started mass production/distribution with the aim to complete research, product definition or product design, also including market tests and creating prototypes. This funding will not be used to start mass production/distribution.

2. Start-up: Funding provided to companies, once the product or service is fully developed, to start mass production/distribution and to cover initial marketing. Companies may be in the process of being set up or may have been in business for a shorter time, but have not sold their product commercially yet. The destination of the capital would be mostly to cover capital expenditures and initial working capital.

3. Later-stage financing: Financing provided for an operating company, which may or may not be profitable. Later-stage venture tends to be financing into companies already backed by VCs.

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

1. VCs provide equity or quasi-equity investments (Wright Robbie, 1998). Such types of external capital is 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, G., & 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) but at the same time have high growth potential. In return for taking high risks VCs expect to have high returns from their investments (Cherif & Gazdar, 2011; Gompers, P. A., & 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; D. J. Cumming & MacIntosh, 2003)

To characterize desirable VC market status several terms are used in the literature (Table 1.1).

Table 1.1

Terms used to describe VC market desirable status (Created by the author)

Term to characterize VC market	Explanation	Authors
Effective	Works efficiently to fund innovative, high growth companies and there is balance of demand for such capital and supply for it	Harding, R. (2002)
Self-sustaining	Has reached critical mass after which the sector could develop on its own without governmental support	Lerner et al (2005); Hellmann, T., & Thiele, V. (2019)
Vibrant/viable	The market activity has reached a tangible portion of country's GDPs	Grilli, L. et al

Robust	Similar to one that exists in the United States	Ibrahim, D. M. (2019)
Works as optimal finance escalator and sufficient pipeline	Providing finance possibilities for all enterprises potentially eligible for VC in any of their development stage, especially for early-stage innovative SMEs and creating a sufficiently good quality pipeline of investible businesses	Baldock R., Mason C. (2015)
Active	VC markets provide strong support for early stage and high-tech ventures which is evidenced by high 'innovation ratios,' defined to be the ratio of early stage (or high-tech) investments to total venture investments	Da Rin et al (2006)
Maturing	Having confidence amongst investors and entrepreneurs about the market and its further development. Having well-managed and successful private VCF managers and base of local institutional investors in VCFs. The market gaps are closed and the market is segmenting to cater for specific demands.	Lerner J. et al (2005)

To conclude, based on existing studies (Table 1.1) the desirable VC market status which governments should help to achieve could be characterized as:

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 in Table 1.1 characterise the capabilities of the market notwithstanding their dependency on public support. Self-sustaining VC market is 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. In general, the experts agreed with characteristics derived from the scientific literature. Still, some of them asked to specify particular issues. Also, some of them emphasized the actions that should be taken or important factors to achieve the self-sustainable market

status. Table 1.2 shows the outcomes of the triangulation carried out to integrate the literature analysis findings and the experts' opinions. The table consists of three columns. The first column captures the results from the literature analysis. The additional peculiarities of the VC market highlighted by the experts are provided in the second column. The actions and factors mentioned by the experts as necessary to achieve the self-sustainable market status were not used for triangulation at this stage of the study. The third column shows how the literature analysis findings and the experts' opinions are integrated.

Table 1.2

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

	Findings of the literature analysis	**Findings of the survey of the experts**	**Results of triangulation**
	1	2	3
	Characteristics of the VC market status that the governments should help to achieve		
1	There is balance of demand for such capital and supply.	In general, experts agreed to this characteristic, but asked to specify that: -The demand should be eligible for VC financing (high growth potential, funding through equity or quasi-equity acceptance); - The demand should provide possibilities for VC fund managers to choose between numerous investing possibilities (the same as in developed VC markets – 1 investment to 400 applicants) - The balance for supply and demand should be in all VC financing stages, especially in pre-seed and seed stages.	There is 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: i) balance not only in general, but also for each of VC financing stages; ii) the demand and supply have to be with qualities necessary for VC financing, meaning: - supply being provided by professional VC managers working in accordance with the industry standards and having experience; - demand: • coming from entrepreneurs with high growth potential ideas and willing to accept

			partnership with VC funds; • should provide 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.	In general, experts agreed to this characteristic, but added: - Healthy innovation ecosystem (science, Technology Transfer, incubation& acceleration, talent import, STEM and general entrepreneurship education) and Business Angels are necessary to have such companies for further financing and development by VC funds; - some public support for innovation ecosystem and companies in the earliest stages probably will be necessary forever.	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	The experts agreed to this characteristic, emphasizing that to have pipeline in all VC stages especially deal-flow for the earliest stages is important.	There is a sufficiently good quality pipeline of investible businesses in all VC stages.

4	The market has reached critical mass for further organic growth without public support.	The experts agreed to this characteristic, emphasizing that: - the VC market tends to be not defined by particular country's boarders, but uses to work on cross boarded mode; - because of the above mentioned for a country it is important that a tendency for more investments to be made in companies established in a particular country (rather than, for example, a US / UK subsidiary in the local market) is observed.	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 measure VC market maturity? The proposal of some authors (Grilli et al., 2018) is to define the market's tangible portion of country's GDPs as a goal. Still, there is no exact amount which could be regarded as sufficient % of GDP. Other authors (Ibrahim, 2019) propose to use VC market in US as a benchmark. Annual VC investment rate by the US local VC funds during latest decades were 0,31% of GDP (Parhankangas, 2012). For comparison, the highest annual average (2015-2019) for VC investments as % of GDP in Europe was in Luxemburg 0,15%, while there were countries with 0,003% of GDP ((Invest Europe, 2020) (authors calculations).

Table 1.3 lists VC market activity's measurements used in the studies and by the market participants.

Table 1.3

VC market activity measurements (Created by the author)

VC market activity measurement	Frequency of use	Authors (non comprehensive list)
Total **amount** of VC investments as a portion of GDP (%)	Most frequent measurement	Armour J. et at. (2006); Grilli L. et al., Groh A.P. et al. (2016), Lerner J. et al. (2005), Romain A. et al. (2004) and others
Total **amount** of VC investments per capita (EUR)	Moderate	Li Y. et al (2012); Gompers et al. (1998); Da Rin et al. (2005) and others

Total **number** of VC investments per capita	Moderate	Li Y. et al (2012); Gompers et al. (1998) and others

There are two different approaches regarding which funds should be included in the statistics. If the measurements are done by the industry statistics approach, then all investments by current country's fund managers notwithstanding the location of the portfolio companies are included (Invest Europe, 2020). By market statistics approach, all VC investments in a particular country's portfolio companies notwithstanding the funds' location are aggregated. As many countries have small internal markets their VC funds tend and even are advised (Matisone & Lace, 2020b) to invest in a broader region as their establishment country. Therefore, when analysing VC supply side development, the industry statistic providing information about local VC fund investments is used often.

The results of the measurements for statistical reasons are compared between countries. Still, there is no opinion about what exact number could be defined as a point where maturity is reached.

How to measure market gap? The gap is measured based on expert opinions (Baldock & Mason, 2015; Harding, 2002). Even in more mature VC markets the gap exists, but for only part of the VC investment stages – the earliest ones (Harding, 2002). Therefore, the gap should be estimated not only as a total number, but also for each VC stage.

No special quantitative technique for measuring the gap is used as a result of difficulties in measuring demand for VC. The reason for it is so-called "silent demand" (Harding, 2002) – the demand which becomes apparent only when VC is available and information about it reaches entrepreneurs.

As part of its Common Provisions Regulation for SF, European Commission had set an obligation for member states to make gap assessments. Still, there are no specific rules on how to do it, just suggestions to use good practices in the field. Three tools advised to use by European Investment Fund (EIF), most experienced and impactful player of European VC market (European Court of Auditors, 2019), are 1) existing data; 2) surveys and stakeholders' interviews and 3) peer analysis (Kraemer-eis & Lang, 2014). By peer analysis is meant the countries or regions that share similar characteristics in its SME base and population and desirably also in industry sectors. From demand perspective all these tools just give a basis for the trials to quantify a financing gap but results can't be seen as robust. As acknowledged by EIF (Kraemer-eis & Lang, 2014), only in regards to the VC supply these tools can provide reasonably robust rankings.

How can a country activate VC market? There are a lot of studies regarding development of VC market. They suggest that typical approach of providing VC managers with public funding is not sufficient to develop VC market. The VC market status depends on 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 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, P. A., & 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 on their relevance to a particular group of countries. There is agreement between authors (Groh & Wallmeroth, 2016; Matisone & Lace, 2019b) that drivers of VC activity could be different in the countries with different development stages. Also, determinants can vary between VC stages (Jeng & Wells, 2000). In addition, studies indicate that the factors are interdependent (Grilli et al., 2018; Groh & Wallmeroth, 2016). As result VC activity varies between 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 VC market. The different dimensions how VC market determinants were explored in previous studies were taken into account in the designing the process of the content analysis. Therefore, the content analysis was done in three steps: i) exploring factors influencing i) VC supply, ii) VC demand and iii) VC market activity (measured as VC investments). Also, where possible differentiation by countries groups was done. The results of the content analysis are provided in the next section 1.2.

1.2. Factors influencing Venture Capital market development

To determine the factors influencing VC market development a content analysis of the literature was conducted. As most of the studies researched a particular side of the market, the analysis was done in three steps. First step was identifying factors influencing VC supply. The search terms were - Venture Capital and Supply. Second step was finding factors influencing VC demand. The search terms were - Venture Capital and Demand. The third step was determining factors influencing the possibility that actual deal between a VC fund and an entrepreneur is happening or match between entrepreneurs and VC funds. The search terms were: entrepreneur opinion and VC; entrepreneur openness and VC and willingness to partner. Separate categories regarding each of the market side determinants were developed during the

content analysis. Some of the categories appeared in two or all three content analysis. As result, combining of the factors for supply, demand and matching was done.

1.2.1. Factors influencing VC supply

The 1st content analysis of the literature aimed to develop a comprehensive framework of 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 rapidly evolving VC industry and all studies taking into account previous research, the search scope was limited to the latest studies (2016-2020) and studies cited in them. Web of Science search tool found 64 articles. After acquittance with them and 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 counted. Theoretical studies were counted as studies from countries with mature VC industries because of the proportion of VC located in these countries (Invest Europe, 2020). All factors are listed in Table 1.4, mentioning the frequency of their appearance in the Web of Science studies.

Table 1.4

The factors influencing VC supply (Created by the author)

No	Categories	Frequency	
		Mature markets	Underdeveloped markets
1S	VC firms experience	4	1
2S	Number of VC firms in a market	2	
3S	Investment returns	5	
4S	Policy for investments in VC funds	3	
5S	Foreign VC investments	2	
6S	Co-investment/ Syndication possibilities	7	1
7S	Proximity from core economic regions	1	
8S	Domestic ecosystem	3	2
9S	Technical/Research university density and student rate	2	
10S	Transaction costs	2	
11S	Limitations of VC funds	1	1

12S	Legal environment	4	1
13S	Local custom for VC	3	
14S	Exit possibilities	4	1
15S	Macroeconomic conditions	4	1
16S	Technology innovations		1
17S	Alternative Investments for LPs opportunities		1
18S	The number of early-stage innovative entrepreneurs seeking for VC	1	2
19S	Successful entrepreneurs from prior generations	3	
20S	Alternative IPO and listing regulation for SMEs	2	3
21S	Possibility to get additional financing for next rounds/further grow	3	
22S	Governmental policies and regulations for particular industries	2	1
23S	Demand for new products	3	
24S	Governmental funding	5	
25S	Governmental programmes encouraging investors	3	1
26S	Public support for early stage	3	
27S	Base of investors in VC funds	1	
28S	Capital market development	2	
29S	Informal or intangible institutions		1

Below are categories delivered from the Content analysis explanation:

1st category - VC firms experience

VC firms experience is measured by the number of prior investments (Hong et al., 2020) of the firm or number of previous funds raised by it (Baldock, 2015). It is assumed that more experienced VC firms have better screening capabilities of the potential portfolio companies, necessary know-how to work with portfolio companies and investors (Antarciuc et al., 2018; Ibrahim, 2019), and as result bigger likelihood of successful investments. Also, as these experienced firms have previous track record, investors can evaluate them and those who have good fund performance and reputation have better fundraising results.

Less developed markets could benefit from experienced foreign VC investors activities in them (Hellmann & Thiele, 2019).

2nd category - Number of VC firms in a market

Small number of VC firms is not favourable situation for a local VC market and it causes several problems. One is lack of competition between VC firms (Hong et al., 2020). Another

problem is related to the fact that VC firms serve for each other as exit route (later stage VC firms acquire portfolio companies from earlier stage firms) (Migendt et al., 2017), but in situation of few VC firms it is not possible. Also, small number of VC firms means that low total amount of VC in a market is available. The thin VC supply may result in a drop for VC because entrepreneurs, will not seek VC in the first place, anticipating high competition for it (Bertoni et al., 2017). As number of entrepreneurs seeking for VC (category 18) is important factor influencing LPs willingness to invest in VCFs, the drop of demand will lead to drop of newly raised VC funds (Bertoni et al., 2017).

3rd category - Investment returns

If expected investment returns from investments in VC funds are high the increase in supply of VC is observed (Hellmann & Thiele, 2019; Hong et al., 2020). The comparison between public market returns and those expected from VC funds is important (Migendt et al., 2017). On opposite, if actual investment returns from VC funds or more specific specific strategy funds have not met expectations the fundraising for VC funds becomes more difficult (Migendt et al., 2017).

4th category - Policy for investments in VC funds

Favourable policy for investments in VC funds leads to more investments in VC funds. Particular examples of such policy for institutional investors are i) increased limits (e.g. for pension funds) to invest in VC (P. Gompers & Lerner, 2001) and ii) favourable rules regarding investments in VCFs in respect of their classification as risky assets (Migendt et al., 2017). For other private investors beneficial tax application to investments in VC funds (e.g. tax credits) could play a role (Hong et al., 2020).

5th category - Foreign VC investments

Foreign VC firms can help to catalyse local VC market (R. T. Harrison et al., 2020). Widely known successful example is Israel Josma case, when VC investments by purposely attracted foreign investors led to striving local VC ecosystem (Hellmann & Thiele, 2019).

6th category - Co-investment/ Syndication possibilities

Co-investments with local funds possibilities are crucial for foreign VC fund investments (R. T. Harrison et al., 2020), as local funds help foreign ones with their local market knowledge and local presence which is necessary for monitoring and nurturing portfolio companies. Also, co-investment and syndication possibilities attract local unexperienced investors (R. Harrison, 2018), providing them with possibilities to decrease risk profile of the investments (SIDDIQUI & MARINOVA, 2019) and allowing to rely on a knowledge of more experienced investors (Hellmann & Thiele, 2019).

7th category - Proximity from core economic regions

It is known that VC is highly concentrated in core economic regions and proximity from them influences the availability of it (R. T. Harrison et al., 2020; Masiak et al., 2020).

8th category - Domestic ecosystem

Stronger domestic VC ecosystem is beneficial for further transactions in the market (R. T. Harrison et al., 2020). It helps market participants with networking possibilities and deeper know-how of VC deals structuring, possibilities for next stage financing (Ibrahim, 2019).

9th category - Technical/Research university density and student rate

Technical universities are source of potential spillovers and also attract young people to a region. Consequently, higher number of companies for VC investments are available in the surrounding regions (Masiak et al., 2020).

10th category - Transaction costs

The transaction costs of investments in VC funds and their investments in companies are relatively high. It is due to the lack of publicly available and easy to compare information about the funds, lack of the track records of their portfolio companies, their unproved business models and consequently information asymmetries, lack of collaterals. Also, there are transaction costs associated with frequent visits and intensive involvement in portfolio companies' affairs.

The choice of the investors to invest in particular object is affected by the transaction costs. To lower transaction costs institutional investors, all other factors similar, tend to invest in larger funds with existing track record and with lower risk exposure (Migendt et al., 2017).

11th category - Limitations of VC funds

Small VCFs size, limitations on the investment geography, size for the investment, remaining life span of the fund etc. are obstacles potentially decreasing funds' ability to generate sufficient mass of investments and as result attractive returns. Several governmental supported VC fund programmes failed because funds were too small and narrowly focused into particular regions (Baldock, 2015).

12th category - Legal environment

Legal environment in general is important for VC investments. Especially, tax application on such investments (Lerner, 2010). Also, bankruptcy, securities and labour regulations (D. Cumming, 2011; Ibrahim, 2019; Migendt et al., 2017) impact VC activity. Institutional investors investments are particularly sensitive to targeted legislation rules to make such investments for them more attractive (Migendt et al., 2017).

13th category - Local custom for VC

VC industry has a set of customs acknowledged as beneficial for its participants' activities. These are i) networking creating, maintaining and exploiting abilities (Hochberg et al., 2018; Ibrahim, 2019); ii) knowledge and use of practices to reduce risks as staging investments, using co-investment/ syndication possibilities and other, iii) the relatively high level of trust. Countries differ how successfully and how much local VC managers exploit these beneficial

practices. The difference could be explained by informal rules prevailing in the region (29nd category) and also by experience of local VC managers (1st category).

14th category - Exit possibilities

As VC investments are investments for a particular time (usually not longer than 7-8 years), it is very important that the funds after holding and nurturing period of the portfolio companies will have exit opportunities from these investments. Better exit opportunities can catalyse VC/PE market activity (Baldock, 2015; Da Rin, M., Nicodano, G., & Sembenelli, 2006). Stock-market-centric financial system in general provides better exit opportunities as bank-centric (Ibrahim, 2019). The study from China suggest that difficulties in exiting via IPO have hindered further development of the Chinese VC market (Liu, B., Cao, J., Johan, S., & Leng, 2019). If exits through public markets or mergers and acquisitions are hard to complete, especially important is existence of later-stage PE investors acting as exit channels for VCFs (Migendt et al., 2017). The importance of later stage investors as exit route is related to 2nd category (Number of VC firms in a market).

Exit possibilities provide a route for investors to gain profit from their investments. Therefore, the category (Exit possibilities) is related to 3rd category (Investment returns). Better exit opportunities and related returns leads to amount of money which often returns to the VC industry as recycled funds (Baldock, 2015).

15th category - Macroeconomic conditions

Macroeconomic conditions (i.e. GDP, export, money supply) seriously affect VC supply (Ning, Y., Xu, G., & Long, 2019). Financial crisis lead to decline in the supply, especially, from institutional investors, as it was observed during collapse of the technology bubble (Townsend, 2015). Financial crisis also lead to adjustment of investment strategies of the VC funds towards later-stage investments (Baldock, 2015; Ning, Y., Xu, G., & Long, 2019). Another feature observed in studies is that in times of good money supply, VCs are willing to expand their investment strategy, but during supply shocks VCs concentrate on investments in their core sectors. This tendency is observed between experienced VCists, but is not observed between less-experienced (Conti, A., Dass, N., Di Lorenzo, F., & Graham, 2019).

16th category - Technology innovations

As literature analysis pointed, technology innovations are widely acknowledged as one of the driving factors for VC investments. They usually are measured by the number of the patents. This factor appeared only in studies regarding unmatured markets (Ning, Y., Xu, G., & Long, 2019) in the content analysis. The literature analysis and also additional search in other data bases (Conti, A., Thursby, J., & Thursby, 2013; Hochberg et al., 2018) reaffirmed that Technology innovations are important driver for VC also in mature markets.

17th category - Alternative Investments for LPs opportunities

Category Alternative investments for LPs opportunities were found only in studies regarding unmatured markets (Ning, Y., Xu, G., & Long, 2019) in the content analysis. The

lack of this category in the mature markets is contra-intuitive. Therefore, recheck of the content analysis and additional search in other data bases was done. During the checking it was established the category "Alternative investments for LPs opportunities" in mature markets is organic part of the category "Investment returns", but it is not the case in the unmatured markets. The difference between mature markets and unmatured ones in this respect is that most of the VC fund managers in mature markets have had several funds and their investment returns from the previous funds are known. In many unmatured markets fund managers are new, their fund cycles have not been closed and as result investment returns are unknown. Therefore, the comparison between returns from investments in VC funds and public markets is close to impossible in unmatured markets. As result, for mature markets' investors results of the comparison between public markets and VC investments is important but for unmatured markets' investors lack of attractive investment opportunities could be reason for investing in VC funds.

18th category - The number of early-stage innovative entrepreneurs seeking for VC

The high number of innovative entrepreneurs seeking for VC provides better investment choice opportunities for VCFs, and, as result, seemingly better investment returns possibilities. Therefore, it is easier to attract money from investors (LPs) and raise VCFs in high demand for VC situation. Studies confirm existence of a significant complementarity between the number of entrepreneurs seeking for VC and the amount of VC funds (Bertoni et al., 2017; Cipollone & Giordani, 2019). The higher number of entrepreneurs leads to higher supply for VC. But low number of entrepreneurs leads to not only direct supply decrease, but also to a smaller number of entrepreneurs seeking for VC (Bertoni et al., 2017). This is explained by the fact that entrepreneurs anticipating high competition for VC are not seeking for it if other capital sources are available (Bertoni et al., 2017).

19th category - Successful entrepreneurs from prior generations

Existence of the successful entrepreneurs from prior generations is important for VC market further development because of two aspects. One, more obvious is that wealth of such entrepreneurs determines further supply for VC and also for one of its demand creators – business angels (Hellmann & Thiele, 2019). The other aspect is that VC investments are highly specialized and need specific knowledge formed during prior experience (R. Harrison, 2018).

20th category - Alternative IPO and listing regulation for SMEs

IPO is one of the exit routes for VC funds from their investments (category 14). Better exit possibilities lead to higher possibility of good returns from VC investments (category 3) and as result - better possibility to raise next funds from LPs (Number of VC firms in a market - category 2). Many countries tried to relieve possibility for SMEs to start public offering of their shares (Ibrahim, 2019) by providing alternative listing possibilities with less stringent standards. Study from China (Liu, B., Cao, J., Johan, S., & Leng, 2019) suggests that government-backed VCs firms and entrepreneurial firms from undeveloped regions are more sensitive to relieved conditions for entering public market.

21th category - Possibility to get additional financing for next rounds/further grow

Possibility to get additional financing for next rounds/further grow of portfolio companies is important factor for portfolio companies' growth perspectives. Timely follow-on funding secure portfolio companies' growth possibilities and as result good investment returns for LPs (category 3). Studies have documented that VCFs sell their portfolio companies under value if they cannot make follow-on investments and continue to assist them until the optimum exit situation (Baldock, 2015). Timely follow-on funding also allows to attract additional new capital. It is especially important when macroeconomic situation (category 15) is not good from money supply perspective. After collapse of the Technology bubble in US it was observed that companies backed by investors with less binding capital constraints and strong commitment to continue financing were able to attract additional new capital, but others were not (Hochberg et al., 2018). Still, some studies suggest that the possibility to get too much capital could result in too aggressive growth strategies making companies very vulnerable for unexpected market changes (Migendt et al., 2017).

22nd category - Governmental policies and regulations for particular industries

Favourable governmental policies and regulations for investments in particular sectors (e.g. cleantech, innovation, sustainability etc.) could increase willingness of the investors to invest in such sectors (Migendt et al., 2017). Still, for such investments to be successful VCF managers should have deep understanding (1st category) of such sectors (Antarciuc et al., 2018). Also, risk valuation rules (4th category) could limit ability and willingness of institutional investors to invest (Migendt et al., 2017) despite favourable policies regarding the particular sectors.

23rd category - Demand for new products

Positive shift in the demand for the innovative products can attract more funding to the VC industry (Kalcheva et al., 2018). The shift could be caused by several factors. Favourable governmental policies and regulations for investments in particular industries (category 22) or beneficial procurements are one (Migendt et al., 2017). For example, the inclusion of particular medical devices in US insurance coverage increased the demand for such devices. This, in turn, increased Patenting activity of the firms (16th category) (Kalcheva et al., 2018). The awareness of companies about corporate VC investments (category 13) as a way to assimilate valuable external knowledge and increase their competitiveness (Pinkow & Iversen, 2020) could increase demand for new innovative start-ups and their products.

24th category - Governmental funding

Governmental funding in VC funds give them a possibility to set up their first funds (Standaert & Manigart, 2018) (category 2). Also, governments acting as anchor investors in VC funds encourage other investors to invest in VCFs (Baldock, 2015; Chen et al., 2017; R. Harrison, 2018) (category 27).

25th category - Governmental programmes encouraging investors

Governments can attract more investors into VC market by introducing adequate incentive and protection mechanisms influencing the expected benefits and risks of the investors and increasing awareness about good practice in VC deals. Example of Scottish Co-Investment Fund showed that providing co-investment and syndication possibilities (category 6) with experienced VC managers government has encouraged even more than expected private investors into the market (R. Harrison, 2018). Examples from other countries also suggest that a guiding fund set up by a government (category 24) increases private investments into VC market (Chen et al., 2017). Also, for encouraging private investors many governmental VC programmes offer higher share of returns to private investors as to a government agency (Baldock, 2015). The programme in Scotland also shaped the business angel market towards practice to make deals in groups and syndicates (R. Harrison, 2018).

26th category - Public support for early stage

Public support is paramount for the earliest stages of the companies. It is due to the major information opacity of the firms in such stages which defer private investors from investing in them (Baldock, 2015). The studies suggest that in order to have good pipeline of investment objects for private investors government should provide early stage funding (24th category) and other support (Migendt et al., 2017).

27th category - Base of investors in VC funds

Robust and diversified institutional investor base is necessary for VCFs fundraising process (Migendt et al., 2017) (category 2). Investments in VCFs requires specific knowledge usually obtained during previous investments in VCFs. Therefore, most of the investments in VCFs are done by investors already having experience of LP in VCF. Existing investor base is especially important for smaller VCFs with allocation's size for typical institutional investors often being too small to justify transaction costs (Migendt et al., 2017). Also, during economic downturns (category 15) in the countries with more robust VC investors base decline in the supply of institutional capital was not so severe. The existing base of the LPs serves also as an attractor (if there are local anchor investors) or deterrer (if the base is weak) of other investors in VCFs (Migendt et al., 2017).

28th category - Capital market development

Developed capital market provides exit opportunities for VCFs (code 14).

29th category - Informal or intangible institutions

Society, in general, is a reflection of embedded customs, traditions and other informal norms and as result constraints or disposition towards VC deals (Suzuki & Miah, 2016). Category Informal or intangible institutions was not found in the studies of the content analysis covering mature markets. Additional search in other data bases was done and results of it confirmed intuitive assumption that Informal or intangible institutions as a factor influencing VC market supply is important also in mature markets (Grilli et al., 2018; Li & Zahra, 2012).

Twenty-six factors of all twenty-nine appeared in the studies researching mature markets. Three categories (Informal or intangible institutions; Technology innovations; Alternative investments for LPs opportunities) were not found in the studies chosen for the content analysis. The missing categories in the mature markets were contra-intuitive. Therefore, additional search in other data bases was done. During the additional search it was established that the factors "Informal or intangible institutions" (Grilli et al., 2018; Li & Zahra, 2012) and "Technology innovations" (Conti, A., Thursby, J., & Thursby, 2013; Hochberg et al., 2018) are important also in mature markets. The category "Alternative investments for LPs opportunities" in mature markets is organic part of the category "Investment returns", but it is not the case in the unmatured markets (as explained above).

Thirteen from the factors were found in the studies concerned unmatured markets. Lack of other categories could be explained by 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 (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). For easiness factors belonging to a particular group were coloured in the Table 1.4: factors belonging to the group "VC market players" – in green, factors belonging to the group "Environment" – in grey and factors belonging to the group "Embedded factors" – in red.

Factors belonging to the metagroup "VC market players" are:

1s VC firms 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 the 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 IPO and listing regulation for SMEs, 21S Possibility to get additional financing for next rounds/further grow, 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.

Factors belonging to the metagroup "Embedded factors" are:

7S Proximity from core economic regions, 13S Local custom for VC, 29S Informal or intangible institutions.

Several categories have direct beneficial effect also on the demand of the VC. Most of the categories have interconnections as described in Figure *1.2*.

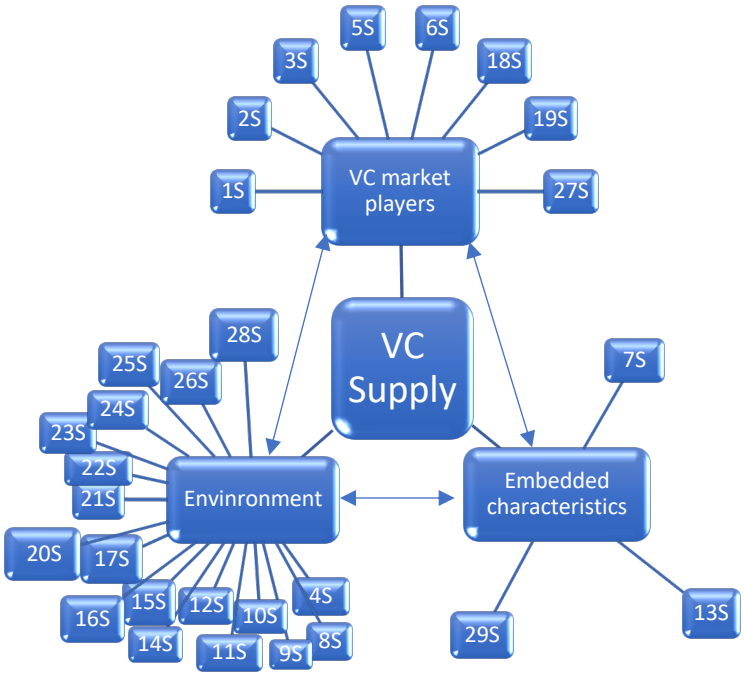

Figure 1.2. Factors influencing VC supply and their interconnections (Created by the author)

From the literature qualitative content analysis list of twenty-nine factors influencing VC supply was delivered. The factors were divided in three metagroups: 1. VC market players; 2. Environment and 3. Embedded factors. The metagroups were formed based on analogy with Williamson 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).

All factors and metagroups besides direct influence on the VC supply exhibit interdependence as described above and visualized in Figure *1.2*. Through the interdependencies the exposure of a particular factor could be increased or decreased.

The results of the content analysis regarding VC supply factors show that supply and demand of VC also 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.

1.2.2. Factors influencing VC demand

The 2nd qualitative content analysis of the literature aimed to establish 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 all studies taking into account previous research, the search scope was limited to the latest studies (2016-2020) and studies cited in them. Web of Science search tool found 91 articles. After acquittance with them and articles cited in them, 41 articles were recognised as covering the research topic, and they were used

for content analysis.

Twenty-nine influencing 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 counted. Still, because many studies researched several countries (some of them having mature VC markets, some not) the clear division of some determinants by regions was impossible. All factors are listed in Table 1.5, mentioning the frequency of their appearance in the Web of Science studies.

Table 1.5

The factors influencing VC demand (Created by the author)

No	Categories	Frequency	
		Mature markets	Unmatured markets
1D	Encouraging entrepreneurship	5	2
2D	Capital market development	3	
3D	Government subsidies/incentives for RD/specific		8
4D	Domestic ecosystem		3
5D	Entrepreneurial risk tolerance	3	2
6D	Awareness about VC	1	4
7D	Legal norms	5	
8D	Proximity from core economic regions/partners	3	
9D	Demand for particular products/technologies	8	
10D	Macroeconomic conditions	3	
11D	Diversity of human and social capital	2	
12D	Informal or intangible institutions	3	
13D	Formal institutions	3	
14D	Similarity between domestic and foreign policy	2	
15D	Local availability of VC		10
16D	Encouraging/supporting Technology Transfer of		3
17D	Characteristics of prospective VC investors	3	
18D	Readiness to partner	1	1
19D	Government business support measures in general	2	
20D	Business angels' development	1	
21D	Other capital availability	2	
22D	Entrepreneurs' preferences of particular funding	2	1
23D	Local Universities	3	
24D	Local human capital	5	
25D	Infrastructure	2	
26D	Outsourcing public services	1	

27D	Local success stories	1	
28D	Local major industries	1	
29D	Research facilities	1	

Below are explanations of categories delivered from the demand factors' Content analysis:

1D category - Encouraging entrepreneurship

Entrepreneurial activity depends on social values (category 12D). It could be increased by policy incentives (Hoppmann & Vermeera, 2020; Owen & Mason, 2019) (category 13D). Literature provides such examples of policy incentives as raising awareness of different occupational choice (employee vs entrepreneur) (Wang, Y., 2020), encouraging female entrepreneurship (Villaseca et al., 2020), facilitating spillovers (Hoppmann & Vermeera, 2020), incentives that support demand for specific technologies (Hoppmann & Vermeera, 2020) (category 3D), raising awareness about technology start-ups and growth businesses possibilities and business support measures in general (Owen & Mason, 2019). Also, measures supporting the creation and development of new companies linked to innovation and technology or start-up incentives raise entrepreneurial activity in general and necessity for VC (Cipollone & Giordani, 2019).

2D category - Capital market development

Acknowledged attribute of mature VC markets is developed capital market. It provides a necessary pipeline of investments and serves as a route for exits from investments (Owen & Mason, 2019). It also is beneficial for encouraging entrepreneurship (category 1D) and innovation processes (Mamedyarov, Z., 2020, Semenov, A & Eremeeva, E., 2016).

3D category - Government subsidies/incentives for RD/specific technologies

Governmental subsidies for R&D (Kou, M. et al., 2020) and specific technologies (Hoppmann & Vermeera, 2020; Kalcheva et al., 2018), (Arshad, M. et al. 2018), (Ash, A. et al. 2017), Wang, B. et al. 2017) raise entrepreneurial activity and as result demand for VC (Semenov, A. & Eremeeva, E., 2016).

4D category - Domestic ecosystem

Startups besides funding need non-financial resources (Riepe, J., & Uhl, K., 2020) (professional support and consultants, networking possibilities etc.) It could be provided by developed ecosystem. Developed ecosystem in turn facilitates demand for VC capital (Gooberman, L., & Boyns, T., 2019).

5D category - Entrepreneurial risk tolerance

Entrepreneurial risk tolerance level substantially impacts the new ventures establishment in general (Alzua, M. et al., 2020) (1D category). A high risk tolerance is especially important for strategies with demand, technological and competitive uncertainties (Islam et al., 2019), (Smit, H. T., & Trigeorgis, L., 2017) and typical external financing of them – VC (Shava, H., 2018).

Differences in entrepreneurial risk tolerance explains why funding choice of entrepreneurs not always follows pecking-order logic (Weigand, 2019).

6D category - Awareness about VC

The theory suggests that entrepreneurs' choice of particular funding type is deeply influenced by informational conditions under which the decision is made (Weigand, 2019). The awareness about VC is very limited in some regions (Campani, C. et al. 2016) or unreasonably affected by some dominant tendencies or opinions as for example crowdfunding as better option for companies with high-growth potential (Liu, H., & Wang, Y., 2018). The business trainings for entrepreneurs could help to understand availability and eligibility of different financial instruments and void lack of VC understanding in particular (Alzua, M. et al. 2020), (Weigand, 2019).

7D category - Legal norms

Legal norms regarding entrepreneurship affects substantially new ventures formation and demand for VC (Migendt et al., 2017). As example from Delaware, US showed suitable corporate law serves as a catalysator for creation of startups and VC investments in Silicon Valley (Giudici, P., & Agstner, P., 2019). Also, corporate taxation is very important for new innovative companies' establishment and growth (Juha & Kari, 2017). Besides legal norms being in general beneficial for entrepreneurship (Owen & Mason, 2019), the predictability of legal system is important (Islam et al., 2019).

8D category - Proximity from core economic regions/partners

The studies have documented that availability of the VC decreases with distance from core VC centers and as result demand for VC also (Colombo et al., 2019). Poorly performing regional economy is a barrier for ventures creation and necessity for VC (Gooberman, L., & Boyns, T., 2019). Also, geographical and functional nearness to key partners is important (Islam et al., 2019).

9D category - Demand for particular products/technologies

Positive shift in the demand for the innovative products can increase demand for VC (Kalcheva et al., 2018). The shift could be caused by several factors. Favourable governmental policies, for example, procurements of particular products are one (Kalcheva et al., 2018). Even, predictions regarding changes in the demand for some products could impact capital demand (Liu, H., & Wang, Y., 2018), (Zhu, J., et al., 2018), (Ash, A. et al., 2017). Also, rising segments (for example Internet of things) eventually could raise the demand for products/services (Jekov, B., E. et al., 2017).

10D category - Macroeconomic conditions

The macroeconomic context of a particular country is important VC demand determinant in it (Islam et al., 2019; Juha & Kari, 2017). Poorly performing economy is an obstacle for VC (Gooberman, L., & Boyns, T., 2019).

11D category - Diversity of human and social capital

Studies suggest that workforce diversity provides additional options for companies' growth (Guerrero M., 2020), (Islam et al., 2019).

12D category - Informal or intangible institutions

Social values drive entrepreneurial activity either directly and by facilitation spillovers (Hoppmann & Vermeera, 2020). Path-dependance of particular society could prevent economic growth (Giudici, P., & Agstner, P., 2019). The societal context determines why the results in seemingly similar situations but in different countries are different (Juha & Kari, 2017).

13D category -Formal institutions

Favorable institutions in a country not only drive entrepreneurial activities in general (Hoppmann & Vermeera, 2020), but also serve as innovation (Migendt et al., 2017) and venture capital market development (Owen & Mason, 2019) drivers.

14D category - Similarity between domestic and foreign policy incentives

Similarity between domestic and foreign policy enhances foreign policy incentives' effect on domestic entrepreneurial activity (Hoppmann & Vermeera, 2020) increasing the number of domestic VC deals, but not their value. Studies also have documented that because of close cultural and institutional distance demand for VC don't decrease when borders are crossed (Colombo et al., 2019) which would be case when cultural distance is longer.

15D category - Local availability of VC

Local availability of VC serves as substantial driver for new ventures establishment (Andersson & Berggren, 2016) and increased demand for VC. Studies suggest that when the local availability of VC is higher the companies are more willing to seek for VC (Cipollone & Giordani, 2019; Colombo et al., 2019; Kalcheva et al., 2018) On opposite, when VC supply is low, companies prefer to look for other funding types (Bertoni et al., 2017). From economic development perspective the visibility of local governmental funds and as result increasing entrepreneurs willingness to accept VC in general partly offsetts governmental funds underperformance in comparison with private ones (Baldock, 2015), (Wang, B., & Loo, B. , 2017).

16D category - Encouraging/supporting Technology Transfer of researchers

Entrepreneurial activity could be raised also by encouraging researchers to commercialize the results of their research (Goji, T, et al., 2019). Academic spin-offs need managerial advice and funding which could be acquired through VC firms (Huynh, T., 2016), (Diánez-González, J. et al., 2020).

17D category - Characteristics of prospective VC investors

Characteristics of prospective VC investors (as private or public ownership, their reputation, added value) are important for entrepreneurs looking for external funding. Good reputation of VC managers even decreases distance decay of the stimulating effect of the availability of VC. The same effect is from private ownership of VC funds (Colombo et al., 2019). VC financing is more attractive if fund managers provide also nonfinancial help contributing to ventures development (Weigand, 2019). But, still, visibility of VC funds also play a role for creating VC demand (Baldock, 2015).

18D category - Readiness to partner

Readiness of entrepreneurs to partner with VCFs or on opposite willingness for an autonomy influences the use of VC as a funding type (Weigand, 2019). Female entrepreneurs in general are regarded as more cautious with sharing a control over an enterprise (Shava, H., 2018) which could partially explain gender gap in VC. Readiness to partner is one of the reflections of the 12D category "Informal or intangible institutions".

19D category - Government business support measures in general

Government support for business in general (specifically export activity) and focus on alignment of business support measures could foster demand for VC (Owen & Mason, 2019).

20D category - Business angels' development

Business angels are ones who could help to start the companies and develop them until the stage where VC funding is necessary. Therefore existence of developed Business angels ecosystem is beneficial for VC demand (Owen & Mason, 2019).

21D category - Other capital availability

Some studies suggest that availability of other capital could decreases attractiveness of VC. For example, latest tendencies show that crowdfunding instead of VC could be preferred by some companies (Roma, P. et al., 2018). The same is true on opposite, the unavailability of other financing sources could be a reason for entrepreneurs to look on external funding possibilities wider than only bank loans (Brown, R. et al., 2018).

22D category - Entrepreneurs' preferences of particular funding

Entrepreneurs' typical preferences of funding influences VC demand. These preferences could be explained by Pecking order theory. The latest studies suggest that differences in entrepreneurial risk tolerance (category 5) and awareness of added value from VC (category 6) explain why entrepreneurs not always follows that logic (Weigand, 2019). Also, path dependency (code12) explains why in countries with limited VC history SMEs seldom use VC (Shava, H., 2018).

23D category - Local Universities

Local universities have a positive effect on new companies' creation by accumulated knowledge commercialization possibilities (Andersson & Berggren, 2016). Universities also work as boosters of the regional human capital (24 D category). The existence of an university

is beneficial factor for innovation (Kalcheva et al., 2018). Activities to encourage and support technology transfer (16 D category) are important to enhance the researchers' possibilities to commercialize their inventions (Huynh T., 2016).

24D category - Local human capital

Local human capital impacts VC demand in two ways. First, entrepreneurial literacy of people (Schebesch, K. et al., 2016) affects their awareness about VC. Second, qualified workforce and expertise availability impact the growth possibilities for VC portfolio companies (Garrone et al., 2018), (Styhre, A., & Remneland-Wikhamn, B., 2016), (Ash, A. et al., 2017). Therefore, local human capital is one of the societal context factors that make the environment for business growth different in different countries. (Juha & Kari, 2017).

25D category - Infrastructure

Developed infrastructure is one of the components necessary for successful market development (Semenov, A. & Eremeeva, E., 2016), (Ash, A. et al., 2017).

26D category - Outsourcing public services

The study related to public health systems suggests that outsourcing public services to third-party service providers can increase not only capacity and efficiency, but also innovation (Wright, M. et al., 2017).

27D category - Local success stories

The local success stories regarding successful startups can influence entrepreneurial activity, particularly university spin-offs (Andersson & Berggren, 2016).

28D category - Local major industries

Local major industries and especially communications industry development impact the path of the entrepreneurial activity in a country (Semenov, A. & Eremeeva, E., 2016).

29D category - Research facilities

Laboratory facilities for research and expertise are very important for innovation and commercialization (Styhre, A., & Remneland-Wikhamn, B., 2016). The ability to use Research facilities is dependent upon availability of qualified staff (24 D category).

The factors were grouped into three metagroups. The metagroups the same as for the supply content analysis were formed based on an analogy with Williamson (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). For easiness factors belonging to a particular group were coloured in the Table 1.5: factors belonging to the group "VC market players" – in green, factors belonging to the group "Environment" – in grey and factors belonging to the group "Embedded factors" – in red.

Factors belonging to the metagroup "VC market players" are: 15D Local availability of VC, 17D Characteristics of prospective VC investors, 20D Business angels' development.

Factors belonging to the 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, 16DEncouraging/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.

Factors belonging to the metagroup "Embedded factors" are: 5D Entrepreneurial risk tolerance, 6D Awareness about VC, 8D Proximity from 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.

Several factors have direct beneficial effect also on the demand of the VC. Most of the factors have interconnections as described above. Figure *1.3* visualizes the factors' ties to a particular metagroup and interconnections between metagroups.

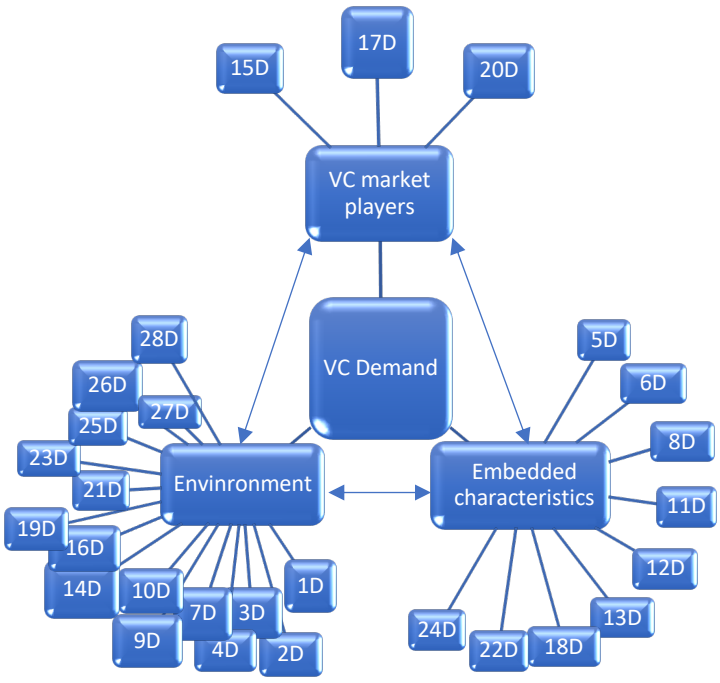

Figure 1.3. Factors influencing VC demand and their interconnections (Created by the author).

1.2.3. Venture Capitalists and entrepreneurs' cooperation's drivers and barriers

VC market supply and demand side should match each other not only in numbers of available and requested funding in general, but also in willingness of particular VC providers and particular entrepreneurs to make cooperation. 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., 2018a). Also, instead of financing the earliest stages of the development Venture Capitalists (VCs) predominantly invest in later stages and instead of equity investment provide mezzanine loans. Does it mean that number of firms/ideas qualifying for VC is low, especially for the earliest staged or are VCs not seeing the potential of entrepreneurs and/or not finding them?

There are four major topics in the literature, each answering a particular part of these questions. The first one is how VCs value entrepreneurs and their businesses/ideas (Boocock, G., & Woods, 1997; Muzyka et al., 1996). The second one is deal flow or demand for VC funding. The third is entrepreneurs decisions regarding which type of external capital to seek (Alperovych & Hübner, 2013; Burmeister & Schade, 2007). The fourth – the success factors in attracting capital (Prohorovs et al., 2018a).

All these topics are important to understand the process how VCs and entrepreneurs find or could find each other and start cooperation but separately they don't provide sufficient understanding of the whole process and is there a possibility for a match with those who currently stay outside from VCs interest zone.

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 whether Venture Capitalists and entrepreneurs seek out and begin cooperating was done.

Web of Science was used to find appropriate studies. The search terms were: entrepreneur opinion and VC; entrepreneur openness and VC and willingness to partner. Additionally, studies cited in the selected articles were inspected. After preliminary acquaintance with studies selected by Web of Science search tools 39 articles were recognised as covering the topic of the research and they were used for content analysis. The list of studies in provided in Appendix 4.

During content analysis, 52 codes were identified. From the codes, 11 categories were developed. As during the analysis, a difference in the intensity of codes identified in studies from countries with mature VC industries and others was revealed, so an analysis of codes and categories by region was also done. Theoretical studies were counted as studies from countries with mature VC industries because of the proportion of VC located in these countries (Invest Europe, 2020). The results of the content analysis are described in the next section.

Eleven factors influencing whether Venture Capitalists and entrepreneurs seek out and begin cooperating were developed after analysis. Table 1.6 shows the frequency of the categories. The leader of the categories "VCs characteristics" is followed by "Communication between VCs and entrepreneurs". It should be noted that there are two separate categories regarding potential VC target companies: Firms and Entrepreneur's characteristics, but only one related to VCs' side. The distinction between VC firm and the manager of it was not done because the papers under the study didn't provide sufficient data for it.

Table 1.6

The factors influencing cooperation between VCs and entrepreneurs (Created by the author)

No	Factors	Frequency		
		Total	Mature markets	Unmatured markets
1	VCs characteristics	25	24	1
2	Communication	19	17	2
3	Trade-off	13	13	
4	Firm characteristics	12	9	3
5	General awareness and perception of VC	10	2	8
6	Entrepreneur's characteristics	9	6	3
7	Availability of other funding	8	8	
8	Cultural obstacles	7	4	3
9	Business environment	6	5	1
10	Economic factors	5	5	
11	Resources to attract VC	4	4	

The analysis also revealed that there is a 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 *1.4* 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".

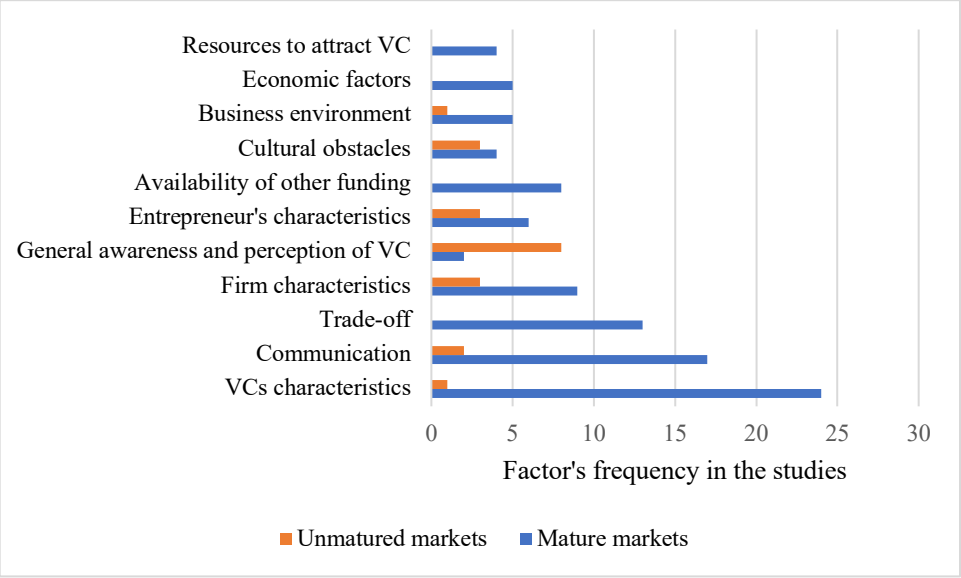

Figure 1.4. The factors importance by region (Created by the author)

The components of categories in order of total significance and whether they are drivers or barriers for cooperation are explained below:

The category "VCs characteristics" includes such subcategories as:

- Attractiveness of particular VCs for an entrepreneur which is dependent on:
    - Reputation of the particular VCist (Hsu, 2006), including possible negative elements such as unethical behavior (Busenitz, L. Et al., 2004, Collewaert, V., & Fassin, Y., 2013, (Drover et al., 2014) perceived abuse of power (Busenitz, L. et al., 2004, Collewaert, V., & Fassin, Y., 2013);
    - Level of value added services provided (Andrieu, G., & Groh, 2012; Drover et al., 2014), (Fairchild, R. 2011);
    - Prior investment success (Drover et al., 2014);
    - Level of empathy, moral support (Andrieu, G., & Groh, 2012), (Busenitz, L. Et al., 2004, Fairchild, R. 2011)

Better reputation, increased level of support for portfolio companies, empathy towards entrepreneurs, and success rate of prior investments work as drivers attracting potential target companies to VCs having these qualities. Conversely – low levels of these qualities and unethical behaviour is a barrier. These features influence attractiveness of particular VCs in the eyes of an entrepreneur:

- Possession of specific knowledge:
    - Industry-specific knowledge (Collewaert, V., & Fassin, Y. (2013), Mason, C., & Harrison, R. (2004), Salm, S., & Wüstenhagen, R. (2018), Wright Robbie, M. K. (1998), Vanags, A., et al. (2010), (D. J. Cumming & MacIntosh, 2003);
    - Knowledge necessary to invest in particular stage of companies' growth (European Investment Fund, 2007).

Industry-specific knowledge allows VCs to assess growth potential of projects with a particular type of technology and later manage such projects. This may not be so important in increasing the attractiveness of VCs, but it expands their circle of target companies with very specific business ideas.

- Ability to invest in ventures in seed and startup phases (Landier, A. (2003), Polzin, F. et al. (2018). The literature suggests that VCs, due to pressure to maintain predictable risk levels and economies of scale, have limited ability to invest in these stages. As a result, projects at these stages frequently remain outside VCs' target circle.

From VCs characteristics categories only "Industry-specific knowledge" was found in the studies of CEE.

The category "Communication" includes such components as:

- Misaligned perceptions about the other party's intentions (Polzin, F. et al. (2018), Wright, M. et al. (2006), (Prohorovs et al., 2018b);
- Problems in attracting interest of VCs to the project (Riding, A. L., & Short, D. M. (1987);
- Incompatible channels of communication (Busenitz, L. et al. (2004);

- Available channels to meet potential investors/entrepreneurs (Cassar, 2004), (Kuzmina-Merlino, I., & Kublina, S. (2014), Riding, A. L., & Short, D. M. (1987), Shepherd, D. A., & Zacharakis, A. (2001);
- Good match between the investors and entrepreneurs (Wright, M. et al. (2006);
- Disagreements in valuation of the target companies (Lockett, A. et al. (2008), Polzin, F. et al. (2018).

Misaligned perceptions are partly the root for a few other factors: problems of attracting VCs interest and incompatible channels of communication. They lead to choosing wrong places/means to meet VCs and the wrong way of presenting the projects for VCs and from VCs side – trying to look for potential target companies through channels with low response rates. Therefore increased awareness about other party and its intentions is a driver.

The available network resources to meet VCs in person or to be introduced to them by someone familiar with them is also a driver. The literature suggests that difficulties in finding the right partner leads to lower rate of deals between entrepreneurs and VCs. As a result, opportunities to identify and meet investors with characteristics matching the entrepreneurs' wishes is a driver.

Unsolved disagreements over distribution of equity between VCs and entrepreneurs is a reason why deals could fail. Studies identify two barriers regarding this factor: unrealistic expectations of young entrepreneurs regarding the value of their enterprise and a too high share of equity having been granted to investors in previous stages (Wright, M. et al. (2006).

The category "Trade-off" includes codes related to the balance, or lack thereof, between the interests of entrepreneurs and VCs:

- Differences in business goals and strategies between the company and VCs (Badguerahanian, L., & Abetti, P. A. (1995), Busenitz, L. et al. (2004), Parhankangas, A., & Landström, H. (2006), Polzin, F. Et al (2018);
- Awareness of benefits versus disadvantages of VC (Andrieu, G., & Groh, A. P. (2012), Cherif, M., & Gazdar, K. (2011), Gulati, R. (1995), Schwienbacher, A. (2013), Tavares-Gärtner, M. et al. (2018);

There is no doubt that the goals and strategies of VCs and entrepreneurs differ. This influences the "Communication" factor. The opposite can also be true, if communication helps align their interests. A high degree of differences in interests and low amount of flexibility is a barrier for cooperation.

Awareness of VC benefits also increases the possibility of aligning interests as it allows an entrepreneur to reasonably measure the pros and cons of equity financing. Therefore awareness is a driver.

The category "Firm characteristics" consists of:

- Quality/innovativeness/technical complexity of the business idea (Busenitz, L. W. et al. (2004), Kuzmina-Merlino, I., & Kublina, S. (2014), Puķīte, I., & Geipele, I. (2015);

- The level of research and commercialization of development results (Puķīte, I., & Geipele, I. (2015), Wright, M. et al. (2006);
- The risk level (technology, price) (Mason, C., & Harrison, R. (2004), Salm, S., & Wüstenhagen, R. (2018);
- The growth stage of the company (Schwienbacher, A. (2013);
- The financial characteristics of the company (Cassar, G., 2004., Coleman, S., Cotei, C., & Farhat, J. (2016);
- Consequences of rejecting the funding (Drover, W., Wood, M. S., & Fassin, Y. (2014);
- Share distribution between founders and previous stages investors at the moment of approaching VCs (Wright Robbie, M. K. (1998).

The innovativeness and technical complexity of the business idea is either a driver if VCs can assess the value of the idea or barrier if VCs don't have necessary industry-specific knowledge. Because of that, this code is interrelated with VCs characteristics. A higher level of commercialization always works as a driver and helps to increase the chances of a technically complex idea being chosen by VCs.

A higher level of risk, whether inherent in the technology or the products 'price fluctuations, is a barrier. Possibilities for lowering risk (for example co-financing) or getting a risk premium are a driver.

The growth stage of companies influences their eligibility for VC funding, and is dependent upon the focus of active VC funds on particular stages. Still, the literature suggests that because of risk management, even funds that focus on the earliest stage companies frequently choose to finance firms in later stages. Thus, later growth stage is a driver. The other financial characteristics of companies besides their growth stage (growth prospects, size, tangible assets) also influence their chances of receiving VC funding. Better financial indicators, especially growth prospects, are drivers for the willingness of VCs to conclude a deal. But at the same time, better financial indicators increase available funding options for entrepreneurs, thus allowing them to choose between different kinds of investors. Meanwhile, if the consequences of rejecting the funding are severe for the entrepreneur, it is a strong driver to make a deal with any available investor, even to the point of ignoring a VCs negative ratings.

Inappropriate share distribution between founders and previous-stage investors at the moment of approaching VCs is a barrier for reaching a deal – as new investors want to receive a reasonable share of the company, but at the same time to preserve the entrepreneur's interest to develop a company by still having a motivating part of ownership in it.

The category "General awareness and perception of VC" consists of:

- General awareness. In the CEE region companies are not well informed about available financial support (Kulikova, N. et al. (2016), Kuzmina-Merlino, I., & Kublina, S. (2014), Majková, M. (2008);
- Awareness about peculiarities of VC. CEE entrepreneurs are aware of VC availability in general, but don't understand VC financing mechanisms and non-financial benefits (Collewaert, V., & Fassin, Y. (2013), Kulikova, N. et al. (2016);

- Availability of statistics and analytical data about VC (Kuzmina-Merlino, I., & Kublina, S. (2014);

- Existence or nonexistence of PR system for VC industry (Kuzmina-Merlino, I., & Kublina, S. (2014);

- General opinion about VC:

  - Opinion about effectiveness of financial support of VC firms. Studies from CEE reveal that the general opinion of entrepreneurs is that non-financial support from VC firms is ineffective (Kulikova, N. et al. (2016);
  - Information about unethical and dishonest behaviour of VCs (Busenitz, L. et al. (2004), Collewaert, V. et al. (2014). Drover, W. et al. (2014). From the category "General awareness and perception of VC" only this code appeared in the studies regarding mature markets.

Awareness about VC and its benefits, along with PR support to improve the image of VC, are drivers towards cooperation. Conversely, the lack of them is a barrier. Availability of data regarding the VC industry could work either as a driver if the data find VC to be beneficial for companies, or as a barrier if the data reveal adverse facts. This category is related with the category "VCs characteristics".

The category "Entrepreneur's characteristics" consists of:

- The entrepreneur's characteristics, such as net worth, experience, education, gender and ethnicity Coleman, S. et al. (2016) Prohorovs, A. et al. (2018), Tinkler, J. E. et al. (2015);

- The business skills of the entrepreneur (Puķīte, I., & Geipele, I. (2015), Wright, M. et al. (2006);

- The professional capability of the entrepreneur (Parhankangas, A., & Landström, H. (2006), Prohorovs, A. et al. (2018);

- The effect of the entrepreneur's experience on decision bias (Burmeister, K., & Schade, C. (2007);

- The degree of the alignment of the entrepreneur's interests with that of the company (Collewaert, V., & Fassin, Y. (2013).

These features influence how an entrepreneur chooses a type of capital and forms the basis for VCs appraisal of a potential portfolio company's management team (business skills, industry-specific knowledge, reliability).

The category "Availability of other funding".

Promising ventures have access to various sources of capital (Andrieu, G., & Groh, A. P. (2012). It gives them the possibility to choose between multiple options and VC will be chosen if benefits outweigh disadvantages of such funding (Andrieu, G., & Groh, A. P. (2012), Shepherd, D. A., & Zacharakis, A. (2001). The category "Available funding" is related with the category "Trade-off".

But new ventures are not always perceived as obviously promising, and often not eligible for typical funding such as bank loans (Cassar, G., 2004). This could suggest that a lack of substitute financing for new ventures would increase demand for VC. But there are

contradicting studies (Gompers, P. A., & Lerner, J. (1999) which show that, for example, in the United States in the 1980s and 1990s when bank credit to young, small firms declined substantially, the same happened to venture capital commitments. It could point to the existence of a correlation between this factor and "Economic factors".

Cultural obstacles related to a particular country:

Difference between cultures (Shepherd, D. A., & Zacharakis, A. (2001), Vanags, A. et al. (2010) influences:

- The level of activity or inertia among entrepreneurs (Kuzmina-Merlino, I., & Kublina, S. (2014);
- Trust or suspicion level.

Cultural obstacles explain the dominance of certain forms of investors in a country and the willingness of small business owners to share their control with VCs.

The category "Business environment" consists of:

- Individual tax burden (Gompers, P. A., & Lerner, J. (1999), Poterba, J. M. (1989);
- State R&D expenses (Gompers, P. A., & Lerner, J. (1999);
- Level of investment and fundraising in the seed and early-stage (Vanags, A. et al. (2010), (European Investment Fund, 2007);
- Environment for innovation (Kalcheva et al., 2018).

The category "Economic factors" consists of:

- Economic factors in particular country (Gompers, P. A., & Lerner, J. (1999), Prohorovs, A., & Pavlyuk, D. (2013);
- Level of expected return (Cherif, M., & Gazdar, K. (2011), Gompers, P. A., & Lerner, J. (1999), which depends on other economic factors;
- Demand for the product (Kalcheva et al., 2018). This is also related to other economic factors and business environment, as long as the product is not regarded as disruptive.

Resources to attract VC

Studies (Collewaert, V., & Fassin, Y. (2013), Gulati, R. (1995), Harvey, M. et al. (1995) reveal that long negotiations period and the high expenses of due-diligence affect VC deals.

Metagroups

The factors can be divided into 3 metagroups:

- External factors;
- Internal factors;
- Process-related factors.

External factors are those where parties to the process (VCs and entrepreneurs) can't make any changes. They 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 in the impact of these factors. Figure *1.5* visually describes the correlation between metagroups and factors they consist of.

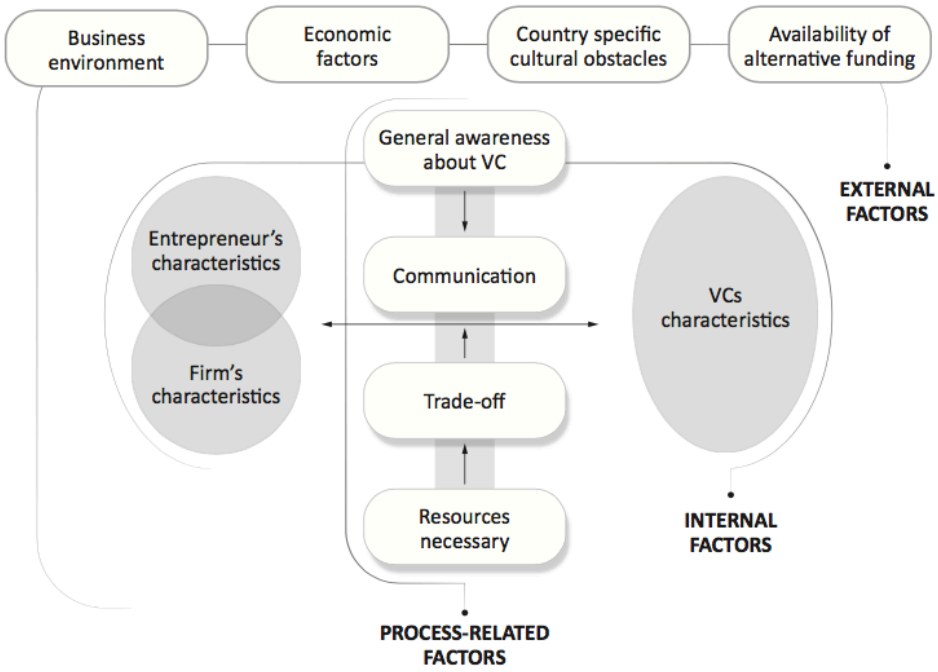

Figure 1.5. Metagroups and factors correlation (Created by the author)

The factors are not only interrelated in their influence, but some of them can work in both directions either as drivers and barriers. For example, the technical complexity of the business idea could be a driver if a particular VCist is capable of assessing the novelty and growth potential of it. But it would serve as a barrier if VCs doesn't have enough industry-specific knowledge and does not understand its problems to manage it further.

The qualitative content analysis of the literature suggests that a complex system of interdependent factors influences the willingness and readiness of entrepreneurs to partner with VCs, and the VCs valuation of such partnerships' potential. It also appears that most important factors affecting the issue under study in Central and Eastern Europe (CEE) are different from those in the countries with a more mature VC industry. The lack of awareness about VC, both in general and in detail, is the main factor preventing entrepreneurs from approaching VCs in CEE. This has not been found to be a factor outside the region.

The content analysis provides the framework for understanding the factors influencing whether Venture Capitalists and entrepreneurs seek out and reach deals. 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. 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 factors are not only interrelated in their influence, but some of them can also work in both directions, either as drivers for or barriers to cooperation between parties.

The results highlight that pressure to improve one factor without assessing its interrelation with others may not have the intended results.

The analysis of the literature suggests that the factors affecting cooperation in CEE countries and in countries with mature VC industries are different, or at least the weight of importance of the factors differs substantially. In particular, the lack of awareness about VC in general and in detail is the most significant factor in CEE countries. In other countries, however, this factor doesn't have any influence. The top factor outside the CEE is the characteristics of VCs.

The results of the analysis could be biased by the small number of studies from the CEE region. However, given the fact that VC in the CEE region has relatively recent, there is nothing surprise about the lack of awareness about VC and the factor's possible dominance on the level of deals between entrepreneurs and VCs.

1.3. Self-sustainable Venture Capital market development conceptual model

The features of the self-sustainable VC market (status which governments should help the market to reach) were aggregated from the literature analysis. 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.

The studies strongly suggest that self-sustainable VC market development requires complex approach. Numerous factors and their interdependence influence the status quo of the VC market. All of them should be considered designing policies for improving any of the market sides. In order to get comprehensive list of the factors literature qualitative content analyses described in the section 1.2. were done.

During the content 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. Some of the factors for one market side was part of another factor for other market side. For example, "Proximity from core economic regions" for the supply and "Proximity from core economic regions/partners" for the demand. The latter one is bigger category including aspects (proximity from the key partners) which 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. The results of combining the factors for supply, demand and matching are provided in Table 1.7.

Table 1.7

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

Factors' groups		**Category**	**Impact on**
VC capital providers	1	Number of VC firms in a market	Supply, Demand, Matching
	2	VC firms 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 from core economic regions	Demand, Supply
	23	Prohimity from key partners	Demand
	24	Similarity between domestic and foreign policy incentives	Demand
	25	Foreign VC investments	Supply
Government 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
	47	Exit possibilities	Supply
Human and	48	Diversity of human and social capital	Demand

social capital	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 the **Error! Reference source not found.** are grouped in groups by their c ommon traits. Still, previously introduced division in the three metagroups (VC market players; Environment and Embedded factors) is kept by highlighting appropriate factors in different colours. The green colour is for factors belonging to the metagroup "VC market players". The grey - for factors belonging to the metagroup "Environment". The red - for factors belonging to the metagroup "Embedded factors".

The structure of the interplay between all these metagroups and the VC market is provided in Figure 1.6.

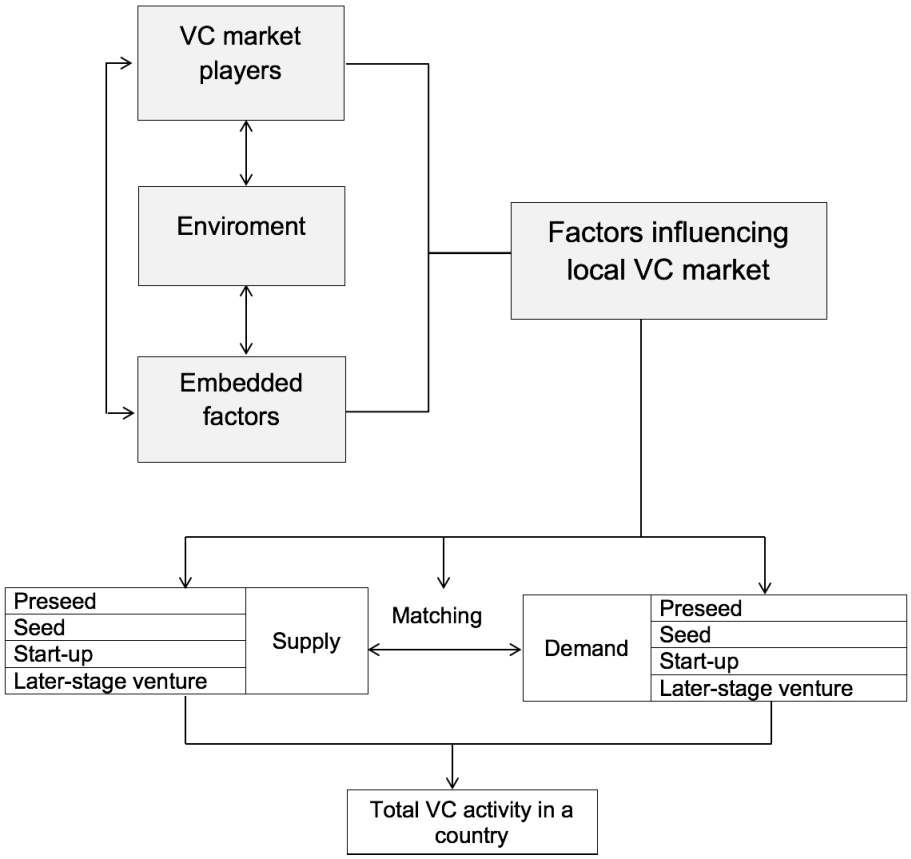

Figure 1.6. Structure of the factors' groups influencing local VC market (Created by the author)

From the literature analysis features of the self-sustainable VC market (a status which governments should help the market to reach) were aggregated. The studies strongly suggest that self-sustainable VC market development requires complex approach. Numerous factors and their interdependence influence the status quo of the VC market. All of them should be considered designing policies for improving any of the market sides.

In order to develop a comprehensive list of the factors, a qualitative content analysis of the literature as described in section 1.2. was carried out. To determine the factors influencing the VC market, separate qualitative content analyses of the literature were conducted for each of market side (supply, demand and matching between the supply and demand). Web of Science was used to find relevant studies. The search terms were: Supply and VC; Demand and VC; VC activity; entrepreneur opinion and VC; entrepreneur openness and VC and willingness to partner. Additionally, studies cited in the selected articles were inspected. Some of the categories appeared in two or all three of the content analyses. Therefore, a combined list of the factors, indicating their impact on a particular market side was prepared (Table 1.7).

Based on the Institutional theory (Williamson, 1998) and its applications in VC market studies (Li & Zahra, 2012) the factors were grouped in three metagroups depending upon whether they characterise:

i) players of the VC market or play of the game as described by Williamson or
ii) environment in which market players act or rules of the game by Williamson; or
iii) embedded traits of the local market, changes in which happen in a very slow manner (social norms and issues related to the particular geographical location).

The results suggest that most of the factors (55 in total) are interconnected and that total VC market activity is result of their interaction. The existing approach of public support for VC, which consists mostly of measures boosting the supply side while not paying enough attention to the other factors that influence the market, is incorrect. The returns from publicly co-financed funds, as predicted by the studies, are lower than those of private funds. Other limitations to publicly co-financed funds also exist (Luukkonen & Maunula, 2007). Once this ineffectiveness is recognised by policymakers, 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 (Figure 1.6) developed here builds upon analyses conducted to propose that VC market policies should encompass all factors influencing the market and their interdependence.

The studies reveal specific features of immature VC markets. One of them is that the market actors do not have equal footage with those from countries with mature VC markets. Another

is that immature VC ecosystems do not have enough resources to develop on their own nor interact with the government to seek a better local environment for the industry. Furthermore, the embedded attitudes of society are not welcoming for VC development. Another finding is that even countries with underdeveloped VC markets are in different stages of development and are proceeding at various paces. The difference between VC market development in otherwise seemingly similar countries may be explained by embedded factors, especially by embedded customs, traditions, and informal norms governing local society. The impact of these embedded factors is obvious from the conceptual model and should be taken into account when evaluating the results of the public support measures.

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 specific traits of the Latvian VC market (as example of VC market in an early development stage) and its participants (in the 2nd Chapter), the list of factors and the conceptual model will be complemented accordingly.

2. ASSESSMENT OF THE LATVIAN VENTURE CAPITAL MARKET SELF-SUSTAINABILITY

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 didn't 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: BaltCap (Avots et al., 2013).

The emergence of regional VC funds started in 2004 when funding from EU Structural funds become available. So far there have been six publicly financed programs for VC and PE funds in Latvia (Table *2.1*). The fourth program covers all 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	The programme	Public Funding	Min private Funding	VC funds
1st/2005	Entrepreneurship and Innovation	EU Structural funds 11.25 MER; Government of Latvia 3.75 MER	34%	TechVentures Fondu Vadības Kompānija, EKO Investors, Zaļās Gaismas Investīcijas (ZGI Capital)
2nd/2010	JEREMIE	EU Structural funds 21 MER; Government of Latvia 7 MER	33%, except for Imprimatur seed fund (0%)	BaltCap, Imprimatur Seed fund, Imprimatur Start-up fund

3rd/2012	Investment fund for investments in guarantees, credit guarantees, venture capital and financial instruments	EU Structural funds 30 MER; Government of Latvia 10 MER	33%	ZGI Capital, Imprimatur Capital, Expansion Capital, FlyCap
4th/2012	Baltic Innovation Fund under European Investment Fund	Each of three Baltic States – 26MER, EIF – 52MEUR.	50%	BMP, Baltcap (Private Equity Fund II and Growth Fund), Livonia Partners, Karma Ventures
5th/2013	Soft loans for start-ups	LGA 2MEUR	0%	Imprimatur Capital
6th/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. There are weak signs that during the next few years any considerable private VC fund will be established in Latvia.

Previous studies regarding Latvian VC industry consider that the small size of venture capital funds, the unattractiveness of local VC market in the eyes of foreign investors, the immaturity of the market and its participants and the shortage of companies suitable for VC financing (Prohorovs, 2014; Prohorovs & Jakusonoka, 2012) are major barriers for Latvian VC market maturity.

Notwithstanding the six public support programmes, Latvian VC fund managers can still not raise funds without public support (Appendix 5). The managers of publicly supported funds had an obligation to attract private investment into the hybrid funds. One of the 2nd and 6th generation fund managers even was not able to rise necessary private share for the fund. Only one Latvian VC fund manager tried to raise a fund without public support, but it made and exited from 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

Previous research shows that VC fund managers use several financial instruments to finance their portfolio companies. Equity investments are more favourable for companies in their early development stages, especially high-tech ventures with unproven business ideas. Also, VCFs provide more value-adding assistance to portfolio companies to help them grow in the case of equity investments. Therefore, the financial instruments used by Latvian VCF managers were studied and are explained in this subsection.

There are a lot of studies seeking to determine an optimal capital structure of companies and explanations why the financing choice for their growth differ. Starting from groundbreaking works of Modigliani and Miller, Pecking Order theory and followed by later contributors to the field. Though the research over the issue continues for several decades, the studies provide directions towards optimal capital structure range but no explicit consensus on how to reach it.

Still, there are set of factors influencing the choice of the capital structure determined. Internal factors such as the probability of bankruptcy, volatility of cash flow, intangibility of assets, intensity of R&D and advertising (Bradley et al., 1984) are those who lead to lower debt load toleration. Because of external factors, companies from the same industry and country tend to have similar debt ratios.

Potential targets of VCFs - new firms with high growth potential usually don't 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. Nonetheless, VC target companies are also financed with different types of loans.

The literature (Alperovych & Hübner, 2013; Andrieu, G., & Groh, 2012) acknowledges that besides financial help VC portfolio companies receive nonfinancial help or value-adding assistance from the VCFs. Previous research shows that debt-like investments are accompanied with less value-adding assistance than in a case of injections in equity (Hartmann-Wendels et al., 2011).

The subsection is organized as follows: the next section introduces with the literature review regarding financial instruments of VCFs and factors for their choice. The third section describes the research design. The results of the study are presented in the fourth section. Section 5 outlines the main conclusions.

Analysis of literature

There are four main types of financial instruments used by VCFs to finance their portfolio companies (Hartmann-Wendels et al., 2011):

First is **Equity investments** -

Equity investments provide VCists with shares or stocks of their portfolio companies.

Second is **Quasi-equity investments**:

- Mezzanine investments.

Mezzanine investments provide lenders with junior positions regarding repayment of their investments compared to typical debt investors and senior positions compared to shareholders.

They are usually tailor-made - the pay-off investors receive is dependent on individual terms negotiated between VCists and entrepreneurs. Therefore, as noted by the European Commission (Commission, 2014), mezzanine products are complex. Whether a mezzanine product can be classified as debt or part of equity in the balance sheet of a company depends on national and/or international regulations/principles.

- Normal subordinated loans – unsecured loans with fixed interest rate;

- Participating loans - instead of fixed return, remuneration is contingent upon the results of the business of a portfolio company. Most often loan provider has right to a fixed interest payment component, a claim on the firm's cash flows and a cap as the maximum rate of return which can be earned on the investment (Hartmann-Wendels et al., 2011). Participating loans are also called silent partnerships because loan providers not bent by fixed interest rate benefit from companies operations, but they are not apparent to outsiders. There are two types of silent partnerships: typical and atypical. The first is more debt-like but the latter – equity-like.

- Convertible loans (also convertible bonds and bonds with warrants).

Providers of such loans and holders of such bonds have the right for a defined period to acquire shares in the company instead of accepting repayment of the loan. The conversation rate is predetermined at the moment of providing a loan (Commission, 2014).

Third is **Debt** - typical loan without any linkage to a capital of a borrower and with no subordination in repayment schedule.

Forth is **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).

Convertible preferred stock is the most commonly used security by VCists in the USA. Convertible preferred stocks are a specific type of participation in equity of a company that includes an option for the owner to convert the shares into a fixed number of common shares after a predetermined date (Gilson et al., 2015).

For example, in the study of Kaplan and Stromberg (Kaplan & Strömberg, 2003) convertible preferred stock appeared (including mixes with other financial instruments) in 94,5% of USA VCist investments. As the VC industry in the USA is and was very developed, there are plenty of studies confirming convertible preferred stock as the most frequent financial instrument for VC deals. It led to the perception that convertible preferred stock is optimal for VC financing in general.

Later studies pointed that VCists in other countries use different securities, and convertible preferred equity is not the most frequent (D. J. Cumming, 2005b). The survey regarding Canadian venture financing revealed that convertible preferred equity (including mixes of straight preferred equity and warrants) was used only in 10.67% of the observed investments. The most frequent security was common equity - used in 36.33% of the investments, followed by straight (non-convertible) debt - 14.99%, convertible debt (including mixes of straight debt and warrants) - 12.36%, mixes of straight debt and common equity - 10.67%, straight preferred equity - 7.27% and different less frequently employed combinations of other securities, such as mixes of straight preferred equity and straight debt and other combinations - 7.53%.

The German transaction analysis (Hartmann-Wendels et al., 2011) revealed similar situation as in Canada that there is no one prevalent financial instrument used by VCists. Instead, broad array of financial instruments is used: equity 34,86%, equity + typical silent partnership 28,29%, typical silent partnership – 13,14%, equity + atypical silent partnership - 12%, equity + debt 4%, convertible securities - 3,43%, atypical silent partnership 3,71%, other 0,57%.

The researchers have found different explanations for the use of particular financial instruments in VC deals.

As regards to the USA, the strong influence from tax benefits for the owners in case of convertible preferred equity is observed (D. J. Cumming, 2005a; Gilson et al., 2015).

German corporate law prohibits the issuance of convertible preferred equity for limited liability companies, which is the most common legal form for start-up firms (Hartmann-Wendels et al., 2011). Due to that, a possibility of use of convertible preferred equity in VC deals is limited.

Besides legal and tax system implications more general studies not focused on VC investments point that a dimension of 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 observed in the literature could be divided into below-mentioned groups:

1. **Factors dependent on VCF managers (GPs).**

Many studies point to the necessity to address the severity of agency problems (moral hazard and adverse selection) in VC financing by using the most appropriate financial contract (Bascha & Walz, 2001; Cornelli & Yosha, 2003; Hartmann-Wendels et al., 2011). The necessity to have optimal exit possibilities is one aspect VCFs try to solve by designing appropriate financial contracts (Bascha & Walz, 2001). VCists invest for a limited period of time necessary to achieve expected growth of a company and once it is reached search for the

exit channels. VCists and entrepreneurs may have and, in many cases, have divergent interests with respect to exit.

The common industry's knowledge confirmed by the studies is that debt-like financing instruments should be chosen when agency problems are low. On opposite convertible securities – when there is a necessity for complex and flexible financial securities reducing information asymmetries and moral hazard between venture capitalists and their portfolio firms (Bascha & Walz, 2001; Hartmann-Wendels et al., 2011).

1.1. GPs experience.

The studies suggest that the experience of VCists influences their decisions on addressing the agency problems. As regards Germany, Less experienced investors tend to finance companies with rather downside-protected securities. experienced investors significantly less use financial instruments with downside protection (debt-like) and are considerably more likely to use straight equity to finance their investments (Hartmann-Wendels et al., 2011). This observation can be explained by experienced investors' ability more reliably to judge the risks associated with individual investment.

Syndicated investments facilitating screening by relying on other investors experience also have a greater proportion of straight equity or at least combinations of straight equity with atypical silent partnership (Hartmann-Wendels et al., 2011).

1.2. VCF's strategy.

Based on the partners' experience and observed knowledge of the industry, Funds' have their strategy on financial instruments to be used (Kuckertz et al., 2015) which also influence a selection of securities in the deals.

2. **Factors dependent from investors in VCF (LPs).**

2.1. Investment strategies of VCFs helping to attract LPs.

Fundraising for new VC funds is always an issue. Success in fundraising is not only determined by previous VCF's manager track record (Rigaut, 2002). Market conditions, legal and fiscal environment and on individual level – soft qualities as trustworthiness of a manager are also important.

Moreover, in CEE, there is a lack of private investors willing to invest in VCFs. Managers of the region have limited experience (Karsai, 2018) and as a result, have no proven track record to persuade investors with. Therefore, funds' investment strategies are important document for potential LPs to valuate.

2.2. Conditions of public programs.

High share of VC financing in Europe comes from the governmental agencies. As a result VCFs which have received such funding should follow EU and local government's rules regarding allowed investment patterns, including use of particular financial investments (Karsai, 2018).

Empirical studies have reported that there are some, but not very substantial differences in the frequency of use of particular financial instruments between private VCFs and governmental VCFs (D. J. Cumming, 2005b).

3. **Factors dependent from portfolio companies.**

3.1. Valuation problem.

The startups are hard to valuate (D. Cumming, 2006), and there are a lot of disagreements between investors and entrepreneurs on the issue (Lockett et al., 2008; Matisone et al., 2018; Polzin et al., 2018). Because of that, a final valuation frequently is postponed to a later moment using securities allowing conversion to equity, when more information is available.

3.2. Owners willingness to maintain control of the business.

Business owners, in general, are reluctant to share their control of the company with VCists (Shepherd & Zacharakis, 2001). Awareness of VC benefits versus disadvantages is a driver for accepting equity or equity-like investments from VCFs (Andrieu, G., & Groh, 2012). On the opposite, mezzanine products solve concerns of the owners allowing them to retain control of the company (Commission, 2014; OECD, 2015).

3.3. The stage of portfolio company.

The stage of the company to be financed also influences the selection of a financial instrument.

Mezzanine products require a stable cash flow [111]. Therefore, a lot of startups in early stages of their development don't qualify for such kind of investments.

This is confirmed by the studies of Cumming (D. J. Cumming, 2005b) observing that seed-stage firms are less likely to be financed with debt-like instruments or mixes of debt and common equity.

Still, there are some differences in security choice for early-stage companies between countries. Cumming (D. J. Cumming, 2005b) observed that seed-stage firms in Canada are more likely to be financed with either common equity or straight preferred equity. Still, the study in Germany (Hartmann-Wendels et al., 2011) revealed that start-up firms are less likely to be funded with straight equity.

The use of mix with debt-like instruments likelihood is 20% higher when investments are large (Hartmann-Wendels et al., 2011). By intuition, large investments may be injected in more mature firms. This also confirms mezzanine products match with stable companies.

4. **Market conditions.**

There is strong support for the market conditions influence on the selection of financial instruments. 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 (D. J. Cumming, 2005a; Hartmann-Wendels et al., 2011).

This section introduced with the conceptual framework of the financial instruments used by VCists and the factors influencing their selection. The following section outlines the design of the research.

Investments of all Latvian VCFs established in the frame of the European Union's 2007–2013 programming period were examined. In total five VCFs' managers were selected for the management of funds under the program (SIA "Expansion Capital AIFP", SIA "FlyCap AIFP, SIA "ZGI Capital', SIA "AIFP Imprimatur Capital Fund Management", SIA "BaltCap AIFP"). Their investment period started in 2010 and finished in 2017. There were no other VCFs with Latvian jurisdiction at that time. As the investment period is finished, it was possible to analyse investment patterns for the whole program.

The information about financial instruments used by managers was obtained from the governmental agency responsible for the appropriate equity program in Latvia - Financial Institution Altum.

Drawing on the results of previous studies described in Section 2.2.1.1., the questionnaire was developed. The questionnaire aimed to determine the factors influencing the choice of financial instruments in VC deals. All five VCF management companies were approached. All of them 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 summer 2019. The answers were aggregated in the table. A Likert scale was used to present the level of each factors influence.

Latvian VCFs' managers within analysed programm made 199 investments in portfolio companies in total amount of EUR 68 509 747. Appendix 6 provide data regarding the investments.

16,58% from total investments were pure equity, 21,11% - quasi-equity, 30,15% - loan and 32,16 % – mix of equity and quasi-equity. As results show, there were no dominant financial instruments in total (Figure 2.1). As quasi-equity mezzanine loan and convertible loan investments were grouped.

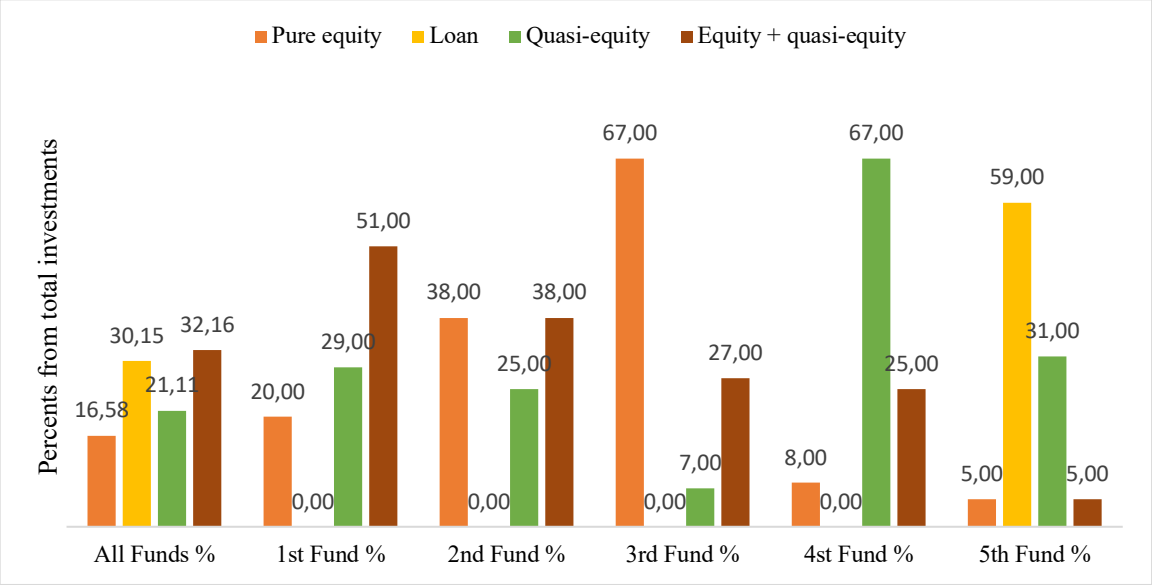

Figure 2.1 Financial Instruments used by Latvian VCFs in % (Created by the author)

Still, there are substantial differences between the patterns of fund managers.

Only one of the fund managers (5th fund) provided typical loans (59,41% of its investments). The explanation for that is specific mandate for this fund manager to provide loans without collaterals for companies in a very early stage of their development. Other managers didn't have the right to provide loans except for mezzanine loans which could become part of a capital of a portfolio company and convertible loans.

30,69 % of the 5th fund manager investments were quasi-equity which all were provided under a convertible loan contract. If soft loans for start-ups which this fund provided under

specific mandate would be excluded from data, then quasi-equity investments would be 75,61% of its investments. 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.

Quasi-equity investments were heavily (66,67% from all investments) used by 4th Fund manager focusing on later-stage financing. 81,25% from its quasi-equity investments were mezzanine loans with no further participation intentions in a company. 12,5% - contracts with equity-like conditions. In one case (6,25%) convertible loan was provided.

Other funds used quasi-equity investments in 28,57%, 25% and 6,67% of cases.

Investments in pure equity was basic financial instrument of the 3rd fund (66,67%), who invested in later-stage companies. The 3rd fund's manager is the most experienced from the Latvian VCFs managers starting operations in 1990ies. In the study (Hartmann-Wendels et al., 2011) in Germany were observed that experienced investors significantly less use financial instruments with downside protection and are considerably more likely to use straight equity to finance their investments. The experience seemingly could also explain the difference of the 3rd fund's financial instruments' breakdown with others. Other funds had substantially less investments in equity - only 20%/37,5%/8,33% and 4,95%.

The 4th fund is more experienced as 1st and 2nd fund but have the lowest share of investments in equity from the later stage funds. So, the experience can only partially explain patterns of financial instruments use of later-stage fund managers in case of Latvia.

Similar studies in Canada and Germany show that in total VCists there use more investments in common equity as in Latvia. Total amount of equity investments was 16,58 % in Latvia, while in Canada – 36,33% and Germany – 34,86% (D. J. Cumming, 2005b; Hartmann-Wendels et al., 2011).

It could be partially explained by the fund's investing in early stages completely different from other funds financial instruments breakdown and its impact on total data. From all investments (199) 101 were done by this fund. Excluding 5th fund from data, total investment in equity would be 28% which is still lower than in the studies in Canada and Germany.

A mix of equity and quasi-equity dominantly was used by the 1st fund (51,43%). Other funds had 37,5%/26,67%/25% and 4,95% of mix of equity and quasi-equity instruments.

Some kind of equity: either in the form of pure equity or in mix with quasi-equity were in 48,74% of deals in total. The smallest share of investments in some kind of equity had 5th fund investing in early-stage companies. But excluding loans provided under the specific mandate of the 5th fund all other its instruments were equity or loans convertible in an equity. Three funds (1st, 2nd, 3rd) investing in later-stage companies had high level of investments in some kind of equity (equity of equity + quasi-equity) - 71,43%/ 75%/ 93,34. The 4th fund also investing in later-stage companies had much lower level – 33,33%.

No use of convertible preferred equity was observed in Latvia. This is unsurprising since the most common type of companies which received investments during the program were limited liability companies. Similar to Germany (Hartmann-Wendels et al., 2011) Latvian company law doesn't provide a possibility for a limited liability company to issue such kind of

stocks. From all investees, only 4 were joint-stock companies for whom it is allowed to issue convertible securities.

Factors influencing the Financial Instruments' choice

From the literature review, five groups of factors were developed. They are: 1) factors related to portfolio companies' characteristics; 2) factors dependent upon limited partners (LPs) of the fund; 3) factors dependent on VCF managers (GPs); 4) conditions of the public programs; 5) market conditions.

Conditions of the public programs were separated from factors dependent upon LPs due to the fact that all Latvian VCFs are mainly financed with governmental resources and, therefore, the rules of the programs have a major impact on the VCFs activities.

The conditions of the economy, typical market practices in the region and other country-related factors are factors grouped under the market conditions.

The results of interviews with Latvian fund managers regarding the factors influence on a selection of a financial instrument in a particular deal are provided in Table 2.2. Likert scale 1 to 5 were used to rate answers with "1" pointing to a limited impact and "5" - for substantial impact of the factor.

Table 2.2.

The factors influencing the Financial Instruments' choice importance (Created by the author)

Factors' groups	Factors	1st Fund	2nd Fund	3rd Fund	4th Fund	5th Fund	Total
Dependent from portfolio companies	Valuation problem	4	4	5	3	5	4,2
	Owners 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
	LPs attitude towards QE as less risky	1	4	2	3	1	2,2

Dependent from GPs	Experience of s 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 interviews with Latvian VCFs managers show that several factors influence the selection of a particular financial instrument in a deal. Most important factors are an inability to agree on valuation of a company between VCF and owners of a company and market conditions.

Lowest mark for the valuation problem (3) was given by 4th fund with the highest share of mezzanine investments (54,17%). As regards to mezzanine investments, the valuation of a portfolio company's shares is unnecessary as a loan provider doesn't have intention to become an owner of a company. Highest mark (5) was given by 3rd fund manager with the highest share of equity investments (66,67%) and 5th fund manager whose basic financial instrument was convertible loans substituting equity investments for a period while company's valuation becomes more apparent.

Market conditions were market similarly by 1st, 3rd, 4th and 5th fund with "3", while 2nd fund manager gave the highest mark (5) for it. The 2nd fund manager had most even distribution between different types of financial instruments (37,5% for equity, 25% for quasi-equity and 37,5% for equity+quasi-equity). The 2nd fund manager also stressed the problem with scarcity of firms suitable for typical VC financing (Prohorovs & Stikute, 2017) and explained that in situation when banks are not generously crediting enterprises mezzanine loans becomes more attractive. The answers of 2nd fund managers, breakdown of its investment instruments and a newly raised fund in 2020 with mezzanine fund strategy indicate that it's choice more than of other fund's is dependant from the market conditions.

All fund managers emphasized that dominant market practices in the region are very important for selection of the financial instrument by thus meaning potential portfolio companies' readiness to accept particular financial instrument.

As explained in the previous subsection, 4th fund managers investments' instrument choice is substantially different from other later stage managers. This fund manager gave high marks for dependency on LPs wishes and especially willingness to receive predictable cash flow which in case of VC financing is possible only in case of mezzanine investments. The answer makes clear major difference with other later-stage fund managers which was not due to the fund manager's experience (Hartmann-Wendels et al., 2011).

Also, a stage of a company is an important factor. This is confirmed by the 5th fund's investing in early stages completely different financial instruments' breakdown.

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 (D. J. 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 from 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.

The other reason explaining the prevalence of use of downside protection financial instruments (nonequity like) is investors (LPs) in funds risk appetite, which per VCFs managers view is low in Latvia. Also, potential portfolio companies' readiness to accept particular financial instruments (equity-like) is low in Latvia.

Still, at least the fund investing in the early stages main financial instrument 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.

The factors explaining patterns of fund managers' financial investments confirm that metagroups delivered from the literature qualitative content analysis are correct. Particularly, the locally prevalent norms and practices as part of the metagroup "Embedded factors" are admitted to substantially influence all VC market players (VC funds, investors in VCFs, portfolio companies) decisions regarding financial instruments.

2.2.2 Value added to VC fund portfolio companies

The study on value adding assistance (VAA) provided by Latvian VCFs was done to assess the ability of the Latvian VC market to support the riskiest companies with essential for them nonfinancial help. Results of the study are presented in this section.

It is a common understanding supported by studies that in addition to financing venture capitalists also provide their portfolio companies with non-financial benefits. Strengthening management skills and expertise, providing access to wide networks of suppliers, customers and next stage investors, and help defining company strategy are some of the non-financial contributions provided by venture capitalists that add value to their portfolios. Studies show these nonfinancial benefits help companies grow faster (Andrieu & Groh, 2018) as in case when just financial support is provided. Such additional benefits from VC investments are essential for companies in the earliest stages of their development and with unproven business ideas (Knockaert & Vanacker, 2013b).

Previous research on VC 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.

As part of the study, the author conducted a survey of VCF managers established in the frame of the European Unions' 2007–2013 programming period. It revealed an additional factor restricting the non-financial impact of VCF managers on their portfolio companies in Latvia. The unwillingness and fear of Latvian entrepreneurs to let VCFs acquire equity in their companies very often results in the recourse to mezzanine funding instead. Mezzanine loans decrease the motivation as well as the rights of VCF managers to provide value adding assistance to portfolio companies.

Previous studies reveal a different level of non-financial benefits provided by various VC funds. Among 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.

Latvia belongs to the Central and Eastern European group of countries which seriously lags behind the rest of Europe in features influencing entrepreneurial activity (Acs et al., 2014). Not only financing opportunities but cultural support, startup skills, opportunity perception etc. are low. This is a likely indication that the full potential of VC is not being realized in the region.

The current research was done with the aim of determining the level of VAA provided by Latvian funds and which value adding activities are being provided by VCF managers in Latvia. An additional objective was to determine which factors influence the level of value adding assistance provided.

This section is organized as follows: the next subsection introduces the conceptual framework for the research. The subsection after describes the research design. The final subsections discuss the research results and present the main conclusions.

Analysis of Literature

There are many different sources of external financing. Banks are undoubtedly the best known. Family and friends are the easiest to approach. Crowdfunding is the most fashionable at the moment. Other sources are a stock exchange listing, subsidies, business angels and venture capitalists. All of them may be divided into two groups depending on the benefits they bring to the companies. The majority of investors are passive or generalists (Andrieu & Groh, 2018). They provide the necessary financing, but there are no non-financial benefits from having relationships with them. In addition to investments, active investors or specialists bring to their portfolio companies knowledge, expertise, network and other benefits often called added value. Business angels and venture capitalists are the most typical representatives of the active investor group and therefore are also called value–added investors (D. Cumming, 2006).

It is widely accepted that value added by VCs is an essential component of the success of their portfolio companies (Alperovych & Hübner, 2013; Andrieu & Groh, 2018; Hellmann, T., & Puri, 2002) even it comes at a high cost for an entrepreneur (losing part of the equity). As VC target companies are young they typically lack necessary competencies and resources in strategy, finances and marketing. Therefore, VCs very often provide the missing knowledge and expertise (Knockaert et al., 2006; Lockett et al., 2008).

Activities undertaken by VCs to promote the growth of their portfolio companies and their value are called value adding assistance (VAA). Research (Alperovych & Hübner, 2013;

Proksch et al., 2017) shows that, in general, funds are most active in providing support on financial, managerial and human capital issues. Less attention is paid to the assistance in building necessary contacts. The lowest amount of support is provided for operational activities.

The interests of the founders and a company do not always align. Therefore, some VAA may not be appreciated by the portfolio company's founders, e.g. replacement of the founder-CEO. The "hard" aspect of the VC (Hellmann, T., & Puri, 2002) is faced when a conflict situation between the representatives of the VC Fund and the founders occurs.

VCFs monitor their investments in addition to providing VAA. Monitoring activities are performed to ensure the security of investments (Alperovych & Hübner, 2013; Knockaert & Vanacker, 2013a). Typical examples of monitoring are periodical checks of financial statements and onsite visits to production plants/warehouses. Monitoring activities are pretty the same for all fund managers and are not determined by either fund or human capital characteristics (Knockaert & Vanacker, 2013b). They also do not differ from the general supervisory practices of generalist investors. Studies conducted up until 1995 mainly focused on the monitoring function of VCFs (Hellmann, T., & Puri, 2002). Later papers strictly divide monitoring from VAA and emphasize the role non-financial input of VCFs in the growth of their companies.

Unlike monitoring, the intensity and variety of VAA depends on a lot of factors and differs considerably between funds (Proksch et al., 2017). Studies conducted before the 1990s suggested that VCFs actions depend on the needs of their portfolio companies (Lockett et al., 2008). Later studies revealed several factors which are mentioned below.

The influencing factors may be divided into groups depending on: 1) VCF characteristics; 2) portfolio company features; 3) regional cultural and institutional features where the VCF is based.

The factors driven by VCF features are the previous experience of its managers, the fund type, the specialization of the fund and the size of the fund. Knockaert, M. et al. (2006) found that VCF managers with experience in a particular business sector are the most involved in the provision of VAA. Corporate and public VCFs are less involved in VAA than independent VCFs. Studies provide different explanations for it: i) lesser motivation of the funds employees (Knockaert & Vanacker, 2013b), ii) additional goals besides the growth of portfolio companies (Benson & Ziedonis, 2009) and iii) administrative burden (Luukkonen & Maunula, 2007). The diversification of the fund portfolio has a negative correlation with the involvement of its employees in VAA provision (Knockaert & Vanacker, 2013b). The size of the fund also influences VAA. Medium-sized funds (25-100 MEUR) provide the highest level of assistance, while smaller and bigger ones are less involved in VAA (Elango et al., 1995).

The factors driven by the portfolio company's features are the stage of its development and the entrepreneur's willingness to cooperate or the entrepreneurs' receptivity (Andrieu & Groh, 2018). Early stage companies usually lack staff and knowledge in management and finances. Companies in this stage in general need and attract the most assistance from VCFs (Knockaert & Vanacker, 2013b). The willingness of entrepreneurs to cooperate with the investor positively correlates with the amount of VAA provided by the VCF (Andrieu & Groh, 2018).

The third factor influencing VAA is the regional cultural and institutional features. For example, Knockaert, M. and Vanacker, T. (2013) found that Scandinavian funds provide an above average level of VAA in Europe. Milosevic, M. & Fendt, J. (2016) observed that the institutional context of a particular country influences the activities of the funds.

The studies on VAA reviewed by the authors of this paper are based on data provided by VCFs. Still, Luukkonen, T., & Maunula, M. (2007) point to the existence of studies from the viewpoint of portfolio companies. The previous research shows similarity in both sides' perspective regarding what funds do. The difference is how they evaluate the importance of this contribution: funds rate their influence higher than portfolio companies.

Based on the previous studies it may be concluded that Latvian VCFs have several limiting factors to providing a high level of VAA. They are: the small size of the funds, that they are mainly publicly financed and lack of specialization in a particular business area. Therefore, it may be assumed that Latvian VCFs, unlike those providing a high level of assistance are less involved in management team formation and the operational activities of their portfolio companies (Elango et al., 1995).

Drawing on examples of previous studies (Gorman, Michael, 1989; Knockaert & Vanacker, 2013a) a semi-structured questionnaire was developed. The first part of the questionnaire was devoted to establishing the characteristics of the particular VCF management company. The second part was consecrated to the respondent's experience and involvement in VAA. The third part contained questions regarding the reasons for failed investments and in the last part sought to determine the possibility for digital solutions to lighten the duties of fund managers so they would have more time to devote to VAA. The questionnaire is provided in Appendix 7.

VCF managers established in the frame of the European Unions' 2007–2013 programming period were approached (SIA "Expansion Capital AIFP", SIA "FlyCap AIFP, "SIA "ZGI Capital', SIA "AIFP Imprimatur Capital Fund Management"). All of them 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. The data from the Latvian State Finance development agency ALTUM regarding the size of the VCFs and the number of their portfolio companies was used. Also publicly available information on the representatives' experience was checked. No deviations in the answers of the respondents were found.

Most of the questions on the questionnaire were closed-ended, requesting answers "yes" or "no" or particular data, for example the amount under management in EUR. A qualitative analysis of the data was carried out. The data were aggregated in tables. Likert scale was used to present the level of each type of VCF assistance to portfolio companies. Because of the personal interactions a lot of comments/explanations underlying the factual data were made by respondents. These comments were interpreted by the qualitative content analysis method.

The average amount under management of Latvian VCF management companies in 2018 was 15 MEUR (Figure 2.2). All except one, which is running two funds, have one currently

active VCF. The primary source of the funds (on average 93% with tiny deviations) is public funding.

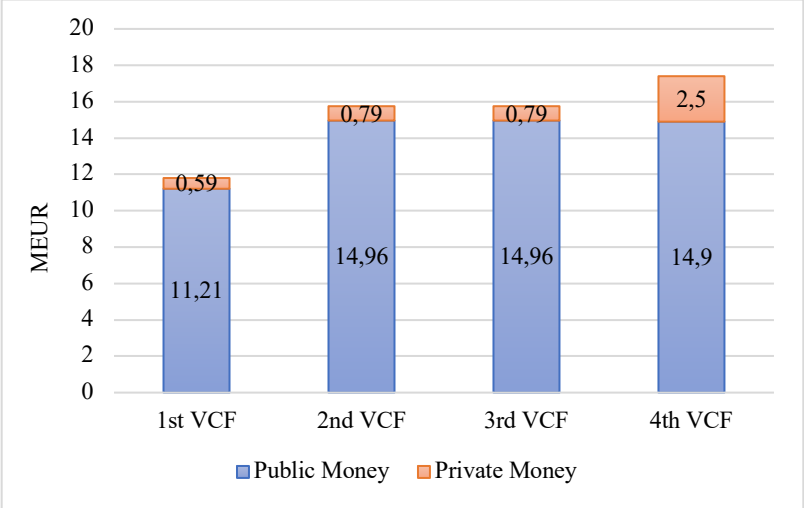

Figure 2.2 Funding sources and amount under the management of Latvian VCF management companies (Created by the author)

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 nonpartners have 8.

There is a difference between more experienced and younger VCFs concerning the distribution of responsibilities between partner and nonpartner employees. In the oldest ones, nonpartner level employees have portfolio companies under their personal responsibility. In the youngest ones, nonpartner level employees help partners and are not in charge of any portfolio companies.

Three of the VCFs invest predominantly in later stage ventures, one – in very early stages. None of the Latvian VCFs have a specific industry focus.

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.

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 loosed investments and in very stable companies to whom funds provided a mezzanine loan. The number of such companies variated between 10%/ 23% and 37% correspondingly. The fourth fund manager claimed to have no passive role at all as even in companies severely underperforming VCF he represents tries to do the best to have most from liquidation proceeds. Similar differences in attitude regarding "loosed" investments (active and passive) were found in previous studies (Elango et al., 1995).

VAA provided by different VCFs varies. But there are common features for all Latvian fund managers: they don't 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 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 Figure 2.3.

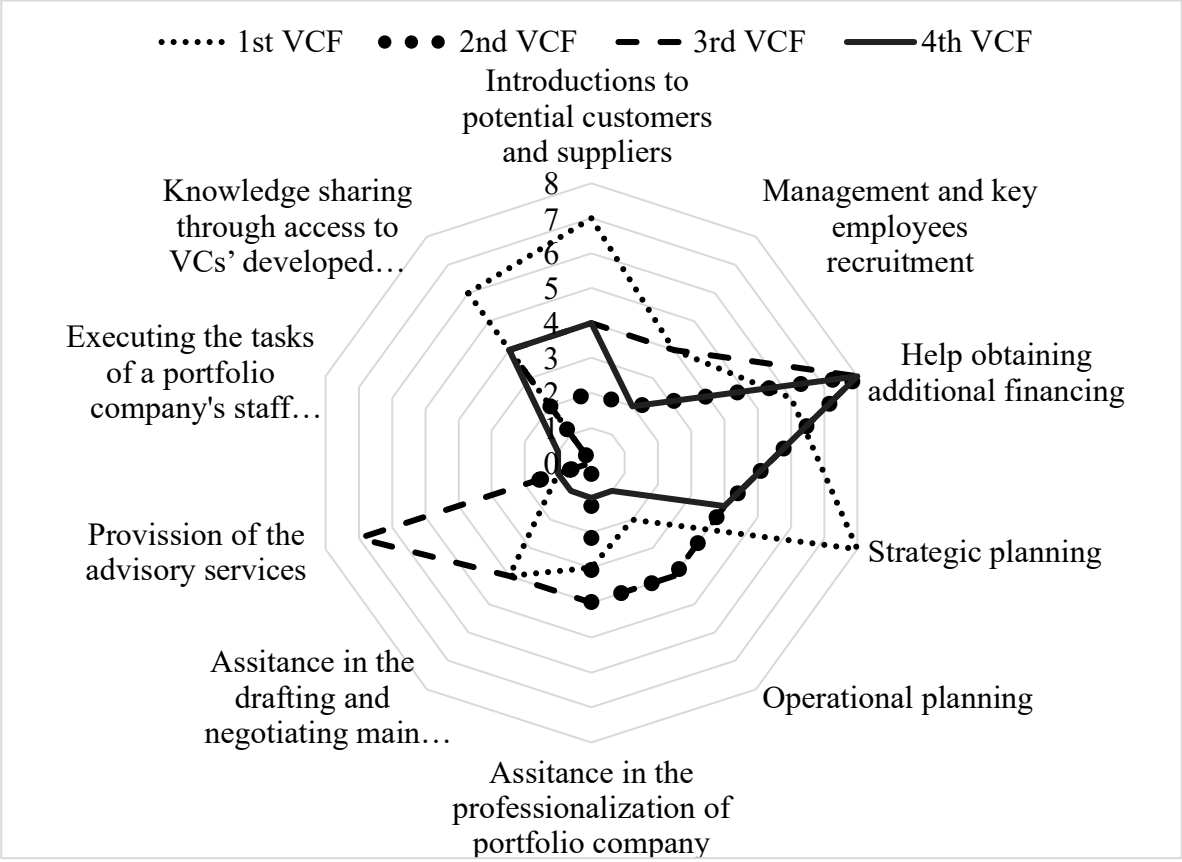

Figure 2.3. VAA provided by Latvian VCFs (Created by the author)

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

Table 2.3.

The factors influencing the level of VAA of VCFs in Latvia

Categories mentioned by VCFs managers	Frequencies of categories
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. Usually, VC portfolio companies receive money from the funds as an equity investment or

convertible loan. It is possible only when a fund and a portfolio company have agreed on a valuation of the company, and owners are in fact ready to part with a stake in the company in exchange for the investment. All respondents mentioned that reaching an agreement regarding the valuations of the companies is very hard and often impossible in Latvia. Entrepreneurs evaluate their ideas unreasonably high. The other problem is that Latvian entrepreneurs have fear of outside shareholders and therefore, in general, refuse to sell stakes in their companies to VCFs. As a result, in many cases mezzanine loans are used instead. All respondents mentioned that the amount of 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 funds. 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 a company operations.

The study showed that VCFs in Latvia don't use any special platforms/programs to work with portfolio companies' data or communicating with them. The reason behind this is a scarcity of resources to purchase specialised software and also the unwillingness of portfolio companies to use any unusual tools. Thus, one possibility to to increase the non-financial benefits provided by VCFs in Latvia is identifying some tools which are easy to use and share that would digitalise part of the monitoring and communication activities with portfolio companies, again saving VCFs managers time for more productive activities.

To sum up, as per the classification of Elando et al (1995), 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. A portfolio company can influence the amount of non-financial benefits received from their VCF.

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 VAA from VCFs (Knockaert & Vanacker, 2013b).

The study on VAA by Latvian VCFs confirms the assumption drawn from previous studies that Latvian VCFs don't 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.

An important finding of the study is that nonequity (particularly, mezzanine) investment is a factor substantially reducing the level of VAA being provided. Also, the results confirm conclusions from previous studies that willingness of entrepreneurs to cooperate with the

investors positively correlates with the amount of VAA provided by the VCF (Andrieu & Groh, 2018).

To increase the level of VAA and, thus, ability of Latvian VCFs to support the riskiest, but at the same time very promising ventures, three possible recommendations are generated from the results of the study: i) to reduce the administrative burden of the fund management companies to allow them to spend more time with their portfolio companies; ii) raising the awareness of the benefits of active cooperation with VCFs managers and having them as shareholders among entrepreneurs running potential VC target companies; iii) identifying some tools which are easy to use and share that would digitalise part of the monitoring and communication activities with portfolio companies, again saving VCFs managers time for more productive activities.

2.2.3. Innovativeness ratio of Venture Capital fund portfolio companies

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 technology and knowledge intensity point.

The literature analysis reveals five main factors influencing VC funds' managers preferences towards particular industries: three external factors (existing clusters in the investment region; high growth industries; availability of other funding for companies from specific sectors) and two internal ones (factors driven by VC funds' limited partners profile; possession of specific industry related knowledge).

There are several aims of the European Union (EU) support for VC development. The first one is chasing for the level of the US innovation system. The second - to overcome the uneven distribution of VC in the EU and support the regions where there is no private VC (Karsai, 2018). The third is to broaden access to finances for small and medium enterprises (SME). The last one became crucial after the Financial crisis.

Notwithstanding to the existence of three aims appropriate public VC schemes usually provide support for SMEs in general (3rd reason), in particular regions (2nd reason), but very often there are no special requirements for innovation level of the company receiving a support (1st reason) (Delapierre et al., 1998; Karsai, 2018)

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). As concerning to Central and Eastern Europe (CEE) VCists are experiencing the shortage of companies potentially suitable

for VC financing (Storey & Bruce, 1996) and as a result of lack of knowledge about such type of funding (Matisone & Lace, 2019a) could be that eligible firms even don't approach VCists.

So, where do Latvian VCists invest?

This section is organised as follows: the next subsection introduces with the conceptual framework of the research. Third subsection describes the research design. Fourth subsection discusses the research results. Subsection 5 presents the main conclusions.

Analysis of Literature

Only a small fraction of companies seeking for VC can attract it (Prohorovs et al., 2018a). On the other hand, there is a doubt do companies potentially suitable for VC financing even approach VCists as it could be in CEE because of lack of knowledge about such type of funding (Matisone & Lace, 2019a).

So, the question is which companies are or could be lucky enough to attract VC and which should not even bother themselves with approaching VCists? There are plenty of studies explaining how VCists chose their investment objects. The observations are pretty the same: VCists formulate investment strategy and follow it (Benson & Ziedonis, 2009; Zider, 1998) They make selection of potential investment targets between companies fitting their investment strategy scope, do due diligence on those who have been selected as most promising. They make valuation of selected companies and negotiate about it with founders. Those companies which have luckily passed all stages receive investments from VCists.

So, the first test companies searching for VC should pass is matching with the investment strategy of the particular VC fund. Investment strategy stipulates such criteria as geographical scope of investments, stage of the company and preferable industries for investments (Bertoni et al., 2016).

Industries for investing are important feature for VC funds specialization. It is widely accepted that specialization instead of diversification lets VC funds perform better (P. Gompers et al., 2009). It is true either to ability to pick best portfolio companies, either to risk reduction and the level of value adding assistance provided to portfolio companies (Callagher et al., 2015; Conti, A., Dass, N., Di Lorenzo, F., & Graham, 2019; Knockaert et al., 2006; Patzelt et al., 2006) Studies suggest that because of these abilities those funds who specialise on investments in certain industries are more likely to perform better than those without a specialised portfolio. They also have a competitive advantage against generalists as best potential portfolio companies prefer to choose fund managers with industry-specific knowledge and networks (Aulakh & Thorpe, 2011; Pavlova & Signore, 2019).

The beneficial effect of industry's specialization is not only scientifically finding, but common knowledge of VC practitioners. The study of Conti & al. (Conti, A., Dass, N., Di Lorenzo, F., & Graham, 2019) shows that VCists belief in benefits from industry-specific knowledge and appropriate specialization leads to a higher share of investments in VCists core sectors during financial crises. Still, there are contradicting studies pointing that thin specialization could be changed to broader one allowing investments across a wider number of sectors because of certain events as the financial crisis for example (Aulakh & Thorpe, 2011).

Nevertheless, most of the funds in mature VC markets have specialisation (Patzelt et al., 2006). Literature suggests that there are several factors influencing the decisions of VCists to prefer investments in particular industries.

- Industry-specific knowledge

Specific industry experience VC funds managers possess influences the funds' focus [18]. Also, experience accumulated during past VC fund investments is a reason for future preference of some particular sectors (Conti, A., Dass, N., Di Lorenzo, F., & Graham, 2019).

- Clusters

VC firms tend to be concentrated in highly economically developed regions, and their investments are located around these regions (Green, 2004; Martin et al., 2005) Such tendency is the consequence of mature innovation ecosystems and better growth prospects in these regions (Green, 2004). As a result of the high density of VC in particular regions substantial number of companies from high growth industries are established there (Green, 2004). On the other hand, data from European countries suggest that industries dominating in these regions attract a lot of locally available VC causing local VC funds to specialize in investments in these industries (VCAs, 2019). For example, 35% of all VC investments in Norway during 2007-2017 went to energy sector companies, but in neighbouring countries investments in this industry account for less than 10%.

- High growth industries

As a result of necessity to ensure high returns (Harris et al., 2014) and probability that some investments will be written off (Prencipe, 2017) VCists invest in companies with high growth potential. Growth in the VC industry is perceived as an increase in sales and employment (Grilli & Murtinu, 2014).

There are certain types of companies and industries which are perceived to be able to ensure the possibility for high growth better. In 1977 Arthur D. Little defined criteria for New Technology-Based Firms (NTBF) (Little, 1977) which as data from the US showed exhibited faster growth in employment, sales and assets. The criteria for NTBFs are: (1) age of the company is less than 25 years; (2) the business is based on a potential invention or one having substantial technological risks; (3) the company is not a subsidiary of an established company; (4) the company is established to exploit an invention or technological innovation.

Studies in EU provided similar results as in US suggesting that NTBFs compared with start-ups, in general, have faster average employment and sales growth rate (Storey & Bruce, 1996) and they yielded the greater returns for VCists (VCAs, 2019).

Not all industries are a suitable workplace for NTBFs. Butchart (Butchart, 1987) defined that NTBFs are working in High technology industries. His definition proposed to identify High technology industries as those that have significantly higher than average expenditure on R&D as a proportion of sales or percentage of employers who are qualified scientists and engineers. The list of sectors per his classification are:

High Technology Manufacturing: Synthetic Rubber & Plastics; Pharmaceutical Products; Office Machinery; Electronic Data Processing Equipment; Basic Electrical Equipment; Telegraph and Telephone Equipment; Electrical Instruments and Control Systems; Radio and Electronic Capital Goods; Components other than Active Components; Active

Components and Electronic Sub-Assemblies; Aerospace Equipment; Measuring Checking and Precision Instruments; Medical and Surgical Equipment and Orthopedic Appliances; Optical Precision Instruments; Photographic and Cinematographic Equipment.

High Technology Services: Telecommunications; Architectural and Engineering Activities and related Technical Activities; Technical Testing and Analysis; Professional and Technical Services not elsewhere specified; Computer Services; Research and Development in Natural Sciences and Engineering.

European Union for statistical reasons developed a very similar classification of industries by their technological intensity and share of tertiary-educated persons employed.

Still, literature point that not all NTBFs are fast growing (Delapierre et al., 1998) or at least they can show another growth trajectory. For example, investments in life sciences industry usually are connected with more extended testing periods (Benson & Ziedonis, 2009) and higher development costs. Therefore, the growth takes comparatively longer to materialize (Pavlova & Signore, 2019).

Some of VCists don't consider innovativeness as a key requirement for investment (Pavlova & Signore, 2019). Their decision is based on particular industry's perceived growth prospects in the nearest 5 years (Zider, 1998).

- Factors driven by LPs profile

Entities providing funding for VC funds are called limited partners (LPs) because they as investors of VC funds can take a decision regarding directions of the funds' operations, but they have limited rights to be involved in other activities of the funds. Depending on the profile of anchor LP all VC are divided into groups: public, corporate and independent VC funds. Each of the LPs group has some specific reasons for providing funding.

LPs of IVC funds believe that the VC industry can provide a higher return on investments as other types of investments (Harris et al., 2014). Therefore, investment strategies of these funds are driven by the intention to exploit in the best possible way all capabilities of the fund, it's managers and current economic situation to earn a high return from the investments.

Public VC funds besides return have public policy goals to fulfil. Particularly, EU public initiatives in VC industry are targeted to support the development of SMEs in general, especially in less developed countries, and to close the gap of financing for new, innovative enterprises (Prohorovs, 2014). As part of public support for VC conditions, there are several industries which are not eligible for financing (Karsai, 2018). Each member country has the right to amend the list of excluded industries as far this is in conformity with EU appropriate legislation. In general, the list of industries where public VC funds were/are allowed to invest was and is very broad, and these public initiatives were not designed to support particularly NTBFs and industries they are working (Delapierre et al., 1998; Karsai, 2018).

Corporate VC (CVC) funds are set to be a lab for big companies to develop new technologies for their core business (Benson & Ziedonis, 2009). Start-ups can provide the environment necessary for new technologies to emerge. While in-house R&D teams have other priorities making them not the best place for breaking innovations to blossom. Therefore, CVC invest in start-ups developing products applicable in their core business.

- Availability of other funding for companies from specific industries

Promising ventures have access to various sources of capital (Andrieu, G., & Groh, 2012). It gives them the possibility to choose between multiple options. As rule companies, in general, prefer investors who provide capital at the lowest cost and do not require control rights as VCist do (Andrieu & Groh, 2018; Bertoni et al., 2016) or at least benefits from VC funding outweigh its disadvantages (Andrieu, G., & Groh, 2012; Shepherd & Zacharakis, 2001).

New ventures are not always perceived as obviously promising (Cassar, 2004). As regards to NTBFs, their assets typically are firm-specific human capital and/or intangible, and they cannot be pledged as collateral (Grilli & Murtinu, 2014). Because of that for such companies it is hard to attract typical external capital – bank loans.

The lack of available funding is another reason why VCists prefer investments in NTBFs. The situation when VC is close to only available external financing for NTBFs lets VCists not only have a possibility to invest in NTBFs but also to negotiate a good share of equity they receive in return for the investment. Research shows that price is very important for VCists. To ensure high return from the investment they need to acquire a share relatively cheaply (Bertoni et al., 2016).

To conclude, the literature suggests that five main factors are influencing VCists preferences regarding investments in particular industries Figure 2.4. 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.

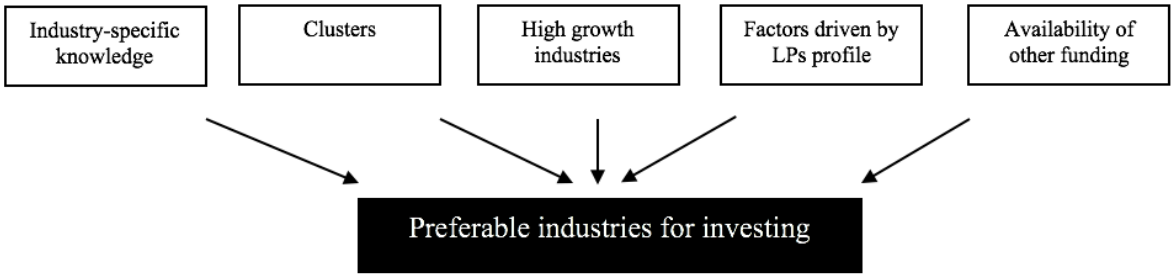

Figure 2.4. Factors influencing industry's for investments of VC funds choice (Created by the author)

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.

Research Design

To achieve the aim of the study investments of all Latvian VC funds established in the frame of the European Union's 2007–2013 programming period were examined. The first step was obtaining list of their investments from the governmental agency responsible for the appropriate equity program in Latvia - Financial Institution Altum. The information about industries where portfolio companies of funds are working was collected from Latvian Enterprises databases Firmas.lv and Lursoft.lv. The data from these databases were verified with information from appropriate companies' websites, available articles about them and if there were no website and other reliable information in articles, then annual reports of companies were searched.

For industries classification, standard classification system in EU NACE 2nd revision 3-digit level was used. To understand in what extent the faster growth potential of firms working in High-technology sectors is exploited in Latvia investments were divided by Eurostat classification of industries by their technological intensity and share of tertiary-educated persons employed.

The data about VC funds managers industry experience were obtained from interviews with fund managers in March 2018 and verified with publicly available information. The data about the fundraising process of the fund managers were received from public resources.

In the frame of the European Union's 2007–2013 programming period, five VC funds were established in Latvia. During their investment period, they made 199 investments in total amount of 67,9 MEUR. Size of particular investments differs a lot starting from 50 000 EUR up to 2,75 MEUR. Therefore, analysis of investments was done not only by amounts invested in particular sectors but also by number of investments. Total data of the investments by industries and sectors are aggregated in Appendix 8.

51,55% of investments (total amount in EUR) went to Services sectors, 44,58% to Manufacturing, 1,5% to Waste collection, 1,47% to Agriculture and 0,9% to Construction. The proportion of number of investments in these sectors is very similar: 55,78% from investments total number went to Services sectors, 41,71% to Manufacturing, 0,5% to Waste collection, 0,5% to Agriculture and 1,51% to Construction.

The breakdown of investments' total amount in EUR in Manufacturing by Eurostat classification is as follows: biggest amount went to Low technology (34,93%), High-technology firms received 26,09%, Medium-high technology companies - 23,95% and Medium-low technology - 15,02%. The leader from number of investments point of view is High-technology (36,14%), followed by Low technology (28,92%), then - Medium-high technology (22,92%) and the smallest number of investments was done in Medium-low technology (12,05%).

The highest share of total invested money in Services was provided to companies with High-tech knowledge-intensive services – 45, 86%. This sector was also a leader and received 67,57% from total number of investments. Less knowledge-intensive market services received 38,38 % from total amount and 21,62 from number of investments. Other less knowledge-intensive services received 5,91% from total amount and 1,8% from number of investments. Other knowledge-intensive services received 4,4% and 5,41 % respectively. Knowledge-

intensive financial services received – 4,29% and 1,8% respectively. Knowledge-intensive market services received 1,16% and 1,80% respectively.

The results show that 35% of total investments went to companies from High-technology and High-tech knowledge-intensive sectors. This share is achieved not because of all Latvian VC funds, but only three from five investing in these sectors. The analysis shows that the investment patterns of Latvian VC funds differ even on a sectoral level (Figure 2.5). 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).

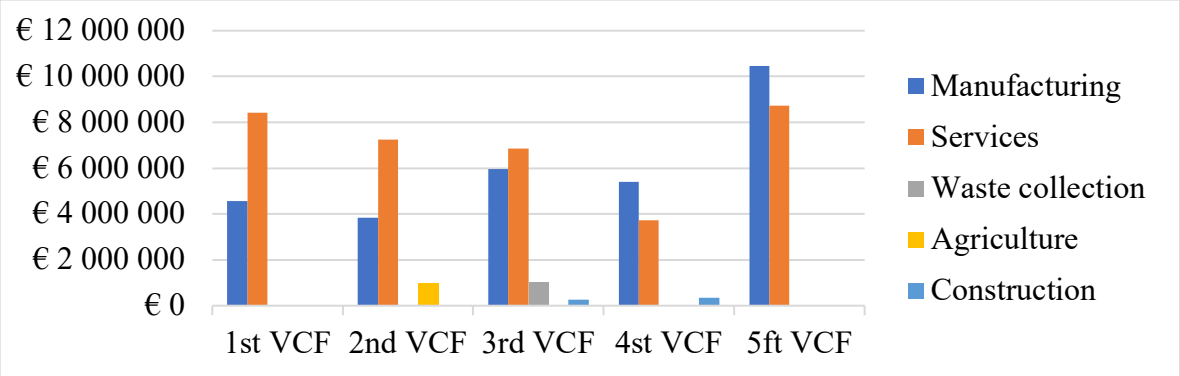

Figure 2.5 Amount of total investments in particular industry sector by VC funds (Created by the author)

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 2.6. The first and 2nd fund invested heavily in High technology – 60,08 % and 52,06 % respectively. 3rd and 4th fund 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.

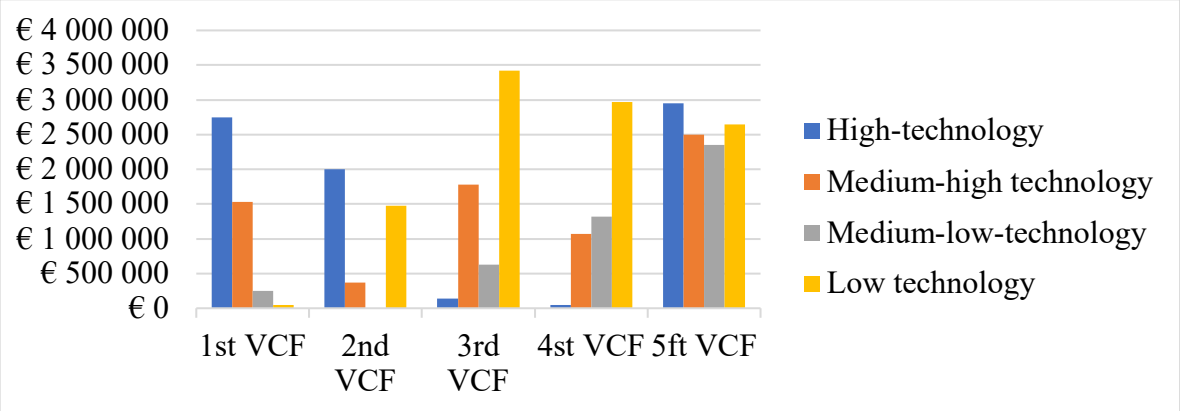

Figure 2.6. Amount of total investments in Manufacturing sectors by VC funds (Created by the author)

The investment patterns of funds in Services sectors are described in Figure 2.7. The leader in investments in High-tech knowledge-intensive services was the first fund with 89,32% from

its total investments in Services. It was followed by the 5th fund with 73,99%. Most of 2nd, 3rd and 4th funds' investments in Services went to Less knowledge-intensive market services (63,17%, 82,76%, 63,96% respectively).

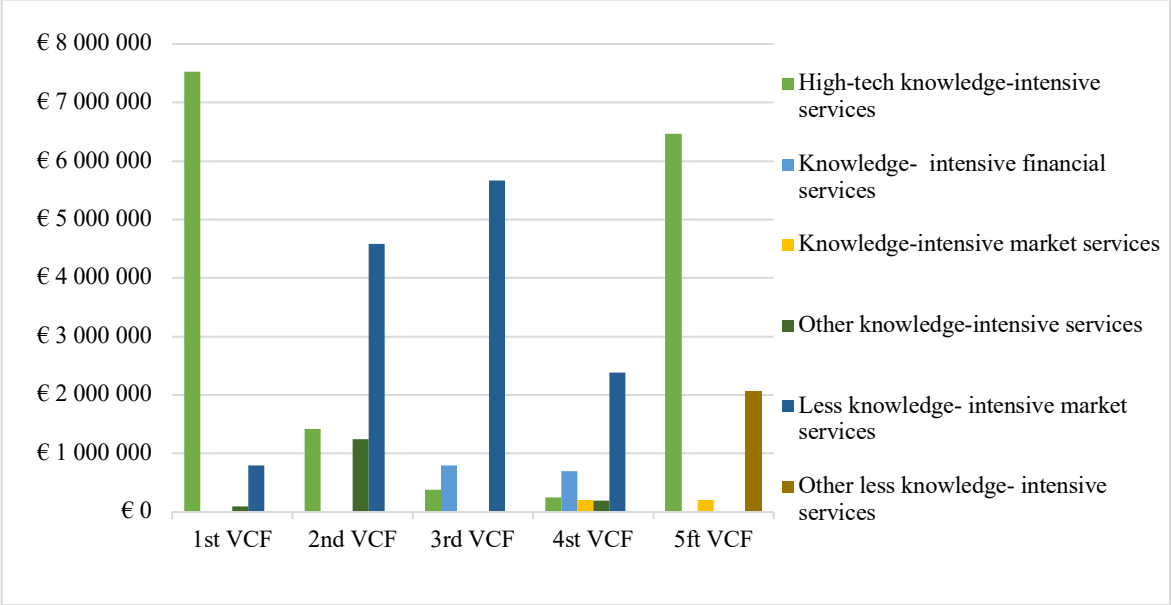

Figure 2.7 Amount of total investments in Services sectors by VC funds (Created by the author)

The only obvious factor differentiating Latvian funds is their manager previous experience and obtained knowledge in some particular sector.

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	No	Most of the investments in High-technology and High-tech knowledge-intensive services
2nd VCF	No	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
5ft VCF	One of the investment managers in charge has previous experience in mining and forestry products	The smooth distribution of investments between companies with varying technological intensity in the manufacturing

	company. Others – no industry-specific experience	sector and the high share of high-tech and knowledge-intensive services in the services sector's investments

Data in Table 2.4 shows that funds were partners have networks/experience in industries with lower R&D intensity invested mainly in these industries. Funds without such partners linkage were more open to investments in NTBFs.

During the study side observation was done: fund managers with the focus to Low technology and Less knowledge-intensive market services where able quicker close 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. The 5th fund management company did not compete for next public VC fund management rights in Latvia.

The fundraising ability of funds depends on many other obstacles besides investment riskiness profile (Zider, 1998). The funds observed in the study have exited only from few of their investments. Therefore, there is no possibility to judge the successfulness of their operations from investment return.

As assumed after the literature review, in general, Latvian VC funds' portfolios are a mix of companies from different industries and with no high technology firms' dominance. Still, particular funds' investment patterns differ substantially, which could be explained by different respective funds management team knowledge and previous experience.

The results of the study show that 52% of Latvian VC funds' investments (total amount) went to Services sectors, 45% to Manufacturing and 3% to other industries. From the full amount invested in Services according to the classification of Eurostat, investments in High-tech knowledge-intensive sectors account for 46%, Knowledge-intensive services - for 10% and less knowledge-intensive sectors – for 44%. The breakdown of investments in Manufacturing is as follows: 26% in High-technology firms, 24% in Medium-high technology, 15% in Medium-low technology and 35% in Low technology.

Investment patterns of different Latvian VC funds' managers vary substantially. For example, investments in High-technology and High-tech knowledge-intensive sectors were made only by three of five Latvian fund managers. The other two invested heavily in Low Technology and Less knowledge-intensive sectors. Industry-related knowledge and experience accumulated in a particular fund management team presumably explain the variances in the patterns.

The necessity to keep the ability to raise next fund also influences the fund managers operations. During the study side observation was done: fund managers focusing on Low technology and Less knowledge-intensive market services were able quicker to close their 1st round of fundraising for the next fund. The fund that heavily invested in High-technology and High-tech knowledge-intensive services could not finish fundraising for the next fund.

The results of the assessment of the Latvian VC market from the self-sustainability point are not surprising. The market is far from the point where it could work without governmental support.

The history of the VC industry in Latvia is short. First local VC managers appeared only after 2004 when funding from EU Structural funds became available. The results of the study show that so far there have been six publicly financed programs for VC in Latvia, and the funds currently operating in Latvia are running under one of them. There are no local VC funds without public capital. There are weak signs that any considerable private VC fund will be established in Latvia during the next few years. The results show that the fund managers who invest in the early stages even have the problem of attracting the necessary private funding share for the next fund.

As predicted by previous studies, the capability of the Latvian VC industry to finance the companies in their earliest stages, especially high-tech, is low. The reason partially is insufficient experience of local VC managers and, as a result, willingness to use more downside protection providing financial investments (non-equity like). Another major reason is local social norms such as acceptable risk level and readiness to partner which influences investors in VCFs and portfolio companies.

Assessment of the value adding assistance (VAA) provided by Latvian VCFs to their portfolio companies showed that Latvian VCFs don't provide a high level of VAA to their portfolio companies. The high level of VAA is essential for companies in the earliest stages of their development. Previous research on VC 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. Also, prevalence of the quasi-equity investments, especially mezzanine loans decreases the level of VAA.

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). The results show that several factors influence the VCF manager' choice of a particular financial instrument (equity like or non-equity like) in a deal. Most important factors are an inability to agree on valuation of a company between VCF and owners of a company and market conditions and practices. Also, a stage of a company is essential. This is confirmed by the fund's investing in early stages completely different from other funds investing in later-stages financial instruments breakdown. In addition, funds heavily using mezzanine investments pointed to the dependency on their LPs who regard quasi equity (QE) investments as less risky and are willing to receive predictable cash flow which is possible in case of QE but impossible in case of the straight equity investment. These observations indicate dependency of the local VCF managers on the base of investors not only in general (fundraising possibilities), but also in the choice of the investment patterns.

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. For example, investments in High-technology and High-tech knowledge-intensive sectors were made only by three of five Latvian fund managers. The other two invested heavily in Low Technology and Less knowledge-intensive sectors. Industry-

related knowledge and experience accumulated in a particular fund management team presumably explain the variances in the patterns.

52% of Latvian VC funds' investments (total amount) went to Services sectors, 45% to Manufacturing and 3% to other industries. From the total amount invested in Services according to the classification of Eurostat, investments in High-tech knowledge-intensive sectors account for 46%, Knowledge-intensive services - for 10% and less knowledge-intensive sectors – for 44%. Breakdown of investments in Manufacturing is as follows: 26% in High-technology firms, 24% in Medium-high technology; 15% in Medium-low technology and 35% in Low technology.

In the light of the results from the Latvian VC market analysis especially below mentioned factors seem to be major reasons for the deficiency of self-sufficiency in the market:

- Base of investors in VC funds and their reluctant attitude to the riskiness of the VCFs investment patterns;
- Low VC firms previous experience;
- Readiness to partner of entrepreneurs;
- Administrative burden of VCF managers.

Above listed factors are already part of the factors list created after the literature qualitative content analysis (1st Chapter).

The observed attitude to the risk level by investors in VC funds, the entrepreneurs' readiness to partner and their impact on the VC market practices confirm that metagroups delivered from the literature qualitative content analysis are correct. Particularly, the locally prevalent norms and practices as part of the metagroup "Embedded factors" substantially influence all VC market players (VC funds, investors in VCFs, portfolio companies) decisions regarding financial instruments, cooperation practices between VCFs and entrepreneurs and industries to invest.

3. PUBLIC SUPPORT TO VENTURE CAPITAL MARKET IN LATVIA

This section presents the results of a study on the impact of EU structural funds on the development of a self-sustainable venture capital (VC) market in Latvia from the perspective of VC fund managers. Also, other Latvian government activities beneficial for VC market were evaluated.

The chapter is organized as follows: the next section introduces the literature review of public support for VC. The third section describes the research design. The results of the study are presented in the fourth section. Section five outlines the main conclusions.

3.1. Review of scientific literature on the existing public support for VC market development

The study had two objectives. The first was to assess the contribution of European Union (EU) structural funds (SF) programmes toward the development of a self-sustainable VC industry in Latvia. The second was to identify ways by which the structural fund support could be better exploited for the development of the VC industry in Latvia. During three SF planning periods, the stated primary goal of the programmes to support high-growth SMEs was attained—to date, 294 VC investments have been made by publicly supported hybrid VC funds. During the 2004–2006 planning period, the first generation of professional VC fund managers in Latvia emerged in response to the opportunity to manage publicly supported hybrid VC funds. During the subsequent programmes, a high continuation rate by the established managers was observed. Nevertheless, Latvian VC fund managers (as witnesses from the 2nd Chapter) are not yet capable of raising private funds and still encounter difficulties in attracting the necessary level of private capital for the publicly supported hybrid VC funds. The novelty of the study is the finding that improvements in the SF programme designs did not significantly decrease the impact of factors identified as limiting the success of the operations of VC managers. This suggests and confirms conclusions of other studies that argue that public policies aimed at creating healthy and supporting conditions for VC activity are necessary in addition to public financial support for VC funds. Regarding the next planning period, the suggestion regarding programme design is to continue with already started improvements: increasing the volume of funds, widening the geographic area eligible for investments, reducing restrictions on the types of financial instruments that may be used, lowering the administrative burden for VC fund managers and avoiding micromanagement of VC funds by governmental agency. The observation that the influence of investments in VC funds on the governmental agency's responsible for VC investments financial statements may be partly responsible for the tendency to micromanage VC funds could be useful not only in Latvia but also in other countries.

In numerous documents (Bilbao-Osorio et al., 2018; European Commission, 2010), the European Union (EU) has acknowledged the need to boost entrepreneurs' access to venture capital (VC) as a way to achieve a higher level of R&D, innovation, productivity and

employment. In order to close the significant gap with the US in the amount of available VC, the EU has contributed a significant amount of money to support VC funds since 1998 (European Court of Auditors, 2019).

Over the period of 2007–2019, governmental agencies provided €16.4 billion to VC funds in the EU (Invest Europe, 2020) (calculations by the author). In 2019 alone, €2.3 billion or 15.4% of the newly raised committed capital of European VC funds came from governmental agencies.

Public contributions to support VC funds and, as a result, the growth of companies (European Court of Auditors, 2019), are made not only by each EU member state via so-called shared management interventions, but the EU also provides support for VC funds by centrally managed interventions directly designed and developed by the European Commission (EC).

In the case of shared management interventions, a particular state voluntarily uses part of its available European structural funds (SF) budget and determines which financial instruments (grants, guarantees, loans, venture capital) may be used. Subject to approval from the EC, states even make decisions regarding the volume of the financial instruments. Therefore, the usage of SF for venture capital investments differs substantially among countries (Karsai, 2018). The explanation lies not only with the considerable differences in the maturity and self-sustainability of the VC industries between countries and consequently the level of the necessity for public support. There are undoubtedly also gaps regarding the experience and knowledge of local authorities about the benefits of VC and its development requirements, which are also important factors when deciding whether to use SF as VC (Karsai, 2018). Furthermore, the "grant dependency" culture (Wishlade et al., 2016) SF programmes developed before the 2007–2013 planning period had a strong impact on the decisions.

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 and has deployed part of its available SF in financial instruments, including VC, in all of them. Nevertheless, the Latvian VC industry is still dependent on public support, as is the case in other CEE (Central and Eastern Europe) countries (Karsai, 2018; Matisone et al., 2018).

The existing ex-ante and post-ante evaluations of SF mostly focus on direct assessments of the stated aims and achieved results of programmes. The development of a self-sustainable VC industry across the EU is not a direct aim of SF programmes. VC is simply an instrument which may be used to achieve the goals. The direct objectives are to broaden access to finance for small and medium enterprises (SMEs) and to support innovation and employment.

Existing studies known to the authors on the subject cover the 2007–2013 planning period. Therefore, this study was designed to assess the contribution of the EU structural funds programmes (including 2014–2020) to the development of the VC industry in Latvia and to identify the ways by which SF support could be better exploited for this indirect aim of the programmes.

The centrally managed interventions of the EC were excluded from the study due to the lower possibility for Latvia to influence their design. Moreover, until now, Latvian VC funds benefited from them only if they were focused on private equity and not at the VC stage (the author's observation).

VC as an industry developed after the Second World War in the US (P. A. Gompers, 1994) and therefore has a history of over 50 years. It has reached maturity only in the US, while its development elsewhere is only moderate (Grilli et al., 2018). Other studies (Lerner, 2010) have pointed to Israel and the UK as good examples of other countries that have made progress in developing VC industries while stressing that the industry is small in continental Europe and even minor in some EU countries (Economidou et al., 2018).

There are two main factors that have forced governments across the globe to start numerous public initiatives to support the industry and, as a result, to create publicly financed or co-financed VC funds. The first one is the well-documented correlation of VC investments with higher levels of R&D, innovation, productivity, growth, and employment (Lerner, 2010). The second concerns the private sector's inability to fill the market gap for such risky investments (Wishlade et al., 2016).

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). Studies (Karsai, 2018; Prohorovs, 2014) show that there are regions where there is an absence of private VC investors, such as CEE. In other more mature regions (Kraemer-Eis et al., 2019), the information asymmetry concerning investments into early stage companies discourages the private sector from investing. Start-ups lack sufficient track records for potential investors to assess risks and if their ideas are technology-based, special knowledge may be required, which investors rarely have. Thus, market imperfections related to such investments and willingness to raise investments in R&D and innovation serve as a justification for public interventions when viewed from the perspective that they should be benefiting society as a whole.

Good design of public interventions is essential (Lerner et al., 2012) to achieve the desired results. In the case of SF, the development of the VC industry is not a direct aim of the programmes. VC is one of several delivery mechanisms for programme objectives (Karsai, 2018) to provide SMEs access to finance. Other such delivery mechanisms are grants, guarantees, and subsidized loans. Therefore, when designing SF programmes, the market gap is measured, but supporting factors increasing VC investments influence in a longer period are not assessed.

Several authors (Karsai, 2018; Lerner, 2010) have pointed that the lack of experience and understanding of VC among governmental officials was one major reason for not only the limited ambition of using VC as an instrument but also for the design problems of the programmes.

Studies have highlighted that the VC industry does not develop alone (Karsai, 2018; Martin et al., 2005). Besides increasing supply of VC, boosting the demand for it also is necessary. Support infrastructure (Matisone & Lace, 2019b) including universities, is of paramount importance as part of an innovation ecosystem (Krishna, 2019). Its presence or not explains why some regions are regarded as VC hubs, while others, despite efforts of their governments, still do not have mature VC markets. There are also other factors that increase the likelihood that venture capitalists and companies with high growth potential will link up (Goo & Heo, 2020; Matisone & Lace, 2019b) and, as result, increase VC market activity.

Wishlade et al. (Wishlade et al., 2016), in their assessment of 2007–2013 programmes, proposed using the theory of change to not only evaluate the results of the programmes but to develop them in future. Lerner (Lerner, 2010) developed design guidelines for assessing government VC interventions based on lessons learned from VC intervention programmes worldwide. Both of these approaches point to the necessity to supplement money interventions with other actions to make these interventions successful. Several studies with proposed models for assessing the development of regional innovation systems and economic growth (Ewens & Rhodes-Kropf, 2015; Firsova et al., 2020; Laplane & Mazzucato, 2020) could be used for designing VC programmes. However, during the current SF period (2014–2020), complementary instruments for VC interventions have not been implemented or implemented vaguely. Furthermore, an assessment of VC programmes from the angle of the long-term effect on VC market development and their interconnections with other programmes or governmental policies has not been done.

Lerner (Lerner, 2010) also pointed out that, besides a good design of the programmes, there are several tricky aspects to be overcome for their successful implementation. One of them has roots in the theory of regulatory capture. The idea is that, instead of boosting entrepreneurship, the benefit from the intervention could be captured by local public representatives. The study of Karsai (Karsai, 2018) points to some possible unfair fund managers selection tenders in CEE. There are also other implementation problems. For example, delays in the implementation of programmes may result in insufficient time to complete activities (Karsai, 2018; Wishlade et al., 2016), a succession of initiatives may be not provided or there may be time lags between initiatives.

Despite numerous governmental initiatives, design and implementation problems have kept the VC industry in most countries from reaching maturity. Karsai (Karsai, 2018) concluded that SF had very limited impact on the VC industry in CEE: the five-year (2011–2015) average ratio of VC investments to GDP in the CEE region was only one-third of the European average. Wishlade et al. (Wishlade et al., 2016) found that introducing financial instruments (especially VC) as a delivery mechanism of SF programmes generated a beneficial side effect—a move away from a ‘grant dependency’ culture and the fostering of an entrepreneurial culture.

Lerner (Lerner, 2010) cited as an excellent example of governmental VC programmes, mentioned Israel’s experience with the $100 million USD Yozma initiative. Starting from the situation where there was just one private VC fund in the country, ten years later the Israeli venture market expanded to 60 groups managing approximately $10 billion USD. The success of the programme was attributed to the involvement of experienced VC investors from outside the country to manage available governmental resources and the easiness of administrative procedures.

Besides several studies assessing SF influence starting from 2007–2013 planning period, member states were required to conduct ex-ante and post-ante evaluations of the SF programmes (Wishlade et al., 2016). The researchers pointed to two significant problems in conducting their assessments. First, the data available were hard to compare and were not sufficient for assessment purposes (Karsai, 2018; Wishlade et al., 2016). Second, results from

the planning period underway were not available early enough to implement lessons learned for the subsequent planning period.

Little research has been done concerning Latvia and there are no studies regarding the 2014–2020 planning period. From previous studies it can be concluded that in Latvia as in other CEE countries there are several factors that potentially reduce the impact of public VC programmes—lack of experience and understanding of VC by governmental officials responsible for the design and implementation of the programmes, a high administrative burden for VC fund managers, limitations on the financial instruments that may be used, restrictions on location, and the financial status of portfolio companies. In addition, the absence of an overarching policy enabling the VC market to prosper is a hindrance.

Therefore, it may be assumed that the impact of the SF programmes on VC market development would be more substantial if the influence of these limiting factors are mitigated.

3.2. Assessment of the public support for Latvian Venture Capital market

As a member of European Union starting from 2004 Latvia benefits from the available funds for implementation of the Cohesion policy and other strategical goals of the EU. In the framework of the goals, the member states have the freedom to choose which industries, regions, target groups will be supported and witch instruments for the support will be used. Starting from its joining to the EU, Latvia continuously has used part of the available funds for support of SME with equity and quasi-equity investments. For such reason publicly co-financed Venture Capital funds in several rounds were established and Latvia entered in agreements with European institutions (namely EIF) to boost VC investments in the Baltic region. During the period of 2006-2020, 158 MEUR of public finances (European and LV governmental funds) were available for VC investments. As a result 294 VC investments in SMEs 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. The existing evaluations of the public interventions measure only the achievement of the primary goals – the number of investments in SME. To understand is and how VC public interventions could better serve for society's needs, the assessment of the interventions from self-sustainable VC market development perspective is necessary.

Research design

Latvian government interventions in the VC market during three SF planning periods (2004–2006, 2007–2013, 2014–2020) and their impact on the local VC fund managers community were examined using mixed research methods.

The first step was collecting information from a wide range of documentary sources (listed in Appendix 9) about the design and implementation of the interventions. Additional data not publicly available (the actual number of investments) from the governmental agency ALTUM and the former governmental agency's Latvian Guarantee Agency (LGA) staff was requested. The accuracy of the data was verified with information available on the websites of Latvian VC

fund managers and the Latvian Private Equity and Venture Capital Association (LVCA). The data were evaluated using the inductivism and generalization approaches.

The second step was to measure the impact of the factors restraining the operations of VC managers. For that purpose, a questionnaire was developed containing factors identified in previous studies (Karsai, 2018; Lerner, 2010) and derived from the content analysis of discussions with several Latvian VC managers conducted in the first part of 2020. The respondents were asked to rate the impact the factors had on limiting their operations using a Likert scale (1–5). A ‘5′ indicates a very strong limiting impact, and ‘1′ indicates no impact. All active VC fund managers in Latvia were approached (eight in total). Answers to the questionnaire were provided by seven managers (for a response rate of 88%). To understand the distribution of the answers, the mean, its standard deviation, mode, and median were calculated.

Explanations regarding the impact of the factors were obtained during personal interviews, and some managers added explanations as comments to the questionnaire.

The observation about a possible correlation between the level of the micromanagement and the impact of VC investments on the governmental agency’s financial statements was derived from the ALTUM financial statements, interactions with several ALTUM staff members and an interview with the former head of ALTUM’s VC unit.

The main limitation of the study is that the impact from Latvian government interventions was assessed only from the perspective of Latvian VC fund managers.

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. Appendix 5 contains information on all Latvian VC fund managers who participated in SF programmes, the funds they raised and their further involvement in the Latvian VC ecosystem. Table 3.1. provides calculations on continuation rate of VC fund managers.

Table 3.1.

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 activity continuation rate of VC fund managers (%) was calculated using the formula:

$$\frac{Number\ of\ the\ managers\ continuing\ operations\ in\ the\ next\ period * 100}{Number\ of\ the\ managers\ in\ the\ previous\ period}$$

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. (One of them decided not to participate in Latvian public VC fund managers tender for the next period as a result of the ability to raise next funds from directly managed EC programmes.)

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 retention of individuals within the sector is the same important as the continuation of firms, and data presented in Table 3.1 indicates this has indeed been the case in Latvia. The existence of a cluster of venture capital firms in a region is regarded as a factor which can stimulate the development of local demand for venture finance, which in turn can catalyse the growth of the entire VC ecosystem (Martin et al., 2005). 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 sufficient amount of private capital (Appendix 5). One of the 2nd generation fund managers even was not able to rise necessary private share for the fund from 2014–2020 planning period. Only one Latvian VC fund manager tried to raise a fund without public support, but it made and exited from only one investment before being dissolved.

Impact of the SF programmes

Comparision of the VC programmes over 2004-2006, 2007-2013, 2014-2020 Planning periods

Latvia was the first Baltic country to employ VC as a means for achieving SF programme goals. From its EU accession in 2004, there have been three planning periods (2004–2006, 2007–2013, 2014–2020), and in each of these, structural funds were used to create VC funds. During the 2004–2006 planning period, Estonia and Lithuania did not create VC funds. In Latvia, like many other CEE countries (Karsai, 2018), public funding was provided to 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 3.2 explains the structure of VC funds, their managers, and portfolio companies.

Table 3.2.

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. A manager of a fund	Private VC fund manager	Tender procedure	Private SMEs

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

The managers had an obligation to attract private investment into the hybrid funds (with several exceptions mentioned in Table 3.3, third column). Table 3.3 provides an overview of all the VC programmes implemented in Latvia. The latest programme (2014–2020 planning period) has not finished yet. Complete data will become available only after 2023, when all investments have been completed.

Table 3.3.

Public VC interventions in Latvia (Created by the author)

Planning period /The programme	**Public Funding**	**Required Private Funding**	**VC funds**	**Allowed stages**	**Max investment in one company**	**Geography**	**No 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	Latvia	199

					Start-up - EUR 1 000 000 Growth - EUR 3 000 000		
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 - preseed funds 10% - seed 25% - Start-up 40% - Growth	3 preseed funds with acceleration programmes 4 seed funds 1 start-up fund 2 growth funds	Preseed Seed Start-up Growth	50 000 EUR - preseed 250 000 EUR - seed 2,1 MEUR - start-up 3,75 MEUR – growth	Latvia – for preseed stage. For other stages - at least 75% in Latvia	67 up to 03.2020

(Source: compiled by the author from the interviews, Ex-ante and Post-ante reports, public information on websites. Complete list of the sources in Appendix 9)

Data in the second column of Table 3.3. 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 3.4).

Table 3.4.

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 first period (2004–2006) was significantly shorter than later ones. During the second period (2007–2013), two initiatives where implemented, each with a different starting year for investments.

1. Joint European Resources for Micro to Medium Enterprises (JEREMIE) with funds created as a part of it activities beginning operations in 2010;
2. Investment fund for investments in guarantees, credit guarantees, venture capital and financial instruments, with funds created as a part of it starting activities in 2013.

In total, €68 million in public funding was made available for VC funds during the 2007–2013 period. During the subsequent period (2014–2020) public funding for VC increased by 9%. However, the total available capital during the 2014–2020 period is expected to be much higher as during the previous period the level of private funding required was lowered to 5% given the financial crises. As all funds have not yet finished their second round of fundraising, it is not possible to make completely accurate comparisons between the periods.

The required percentage of private capital that funds were required to attract fluctuated over the planning periods. In 2004–2006, it was 30% for all funds. The actual amount that was attracted was higher: instead of €6.4 million a total of €16.9 million in private capital was attracted. The high level of participation by private investors in the VC funds was not repeated in later periods (Prohorovs, 2014), in Latvia or CEE in general (Karsai, 2018). The conditions before the 2008 financial crisis—the availability of money and willingness of investors to accept risk in search of higher returns—could explain the exceptional situation.

During the subsequent 2007–2013 period, 33% in private funding was required. An exception was a fund providing loans for start-ups in their earliest development stage (seed) and in next round of quasi-equity financing. For this fund, no private funding was required. In addition, for those funds which started their operations after 2013, the required level of private funding was decreased to 5% due to the impact of the eurozone sovereign debt crisis.

Zero private funding is required for pre-seed funds in the current period. The level is 10% for seed funds, 25% for start-up funds, and 40% for growth funds.

The number of funds established during a period has increased with each subsequent period—three in 2004–2006, six in 2007–2013, and 10 in 2014–2020.

The stages of the company life cycle in which investments were permitted was 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 catchment 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 of 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, the design of the programmes 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.

Factors limiting Latvian VC managers successful operations

The author conducted a survey of Latvian VC fund managers. The participants were asked to rate by a Likert scale (1–5) the impact of factors limiting their operations. A ‘5′ indicated that a factor had a very limiting impact, and ‘1′ indicated no impact. The responses of the managers are in Appendix 10.

The impact from different factors varied a lot between managers investing in the earliest stage (accelerator funds) and those investing in later stages. Therefore, Table 3.5 provides the mean value of the accelerator funds’ answers value and separately the mean of other fund managers answers. Results of other methods assessing the distribution of the answers are in Appendix 10.

Table 3.5.

Impact from the limiting factors on the fund managers activities in 2014-2020 planning period (Created by the author)

Factors	Mean value of the accelerator fund managers answers	Standard deviation	Mean value of the other fund managers answers	Standard deviation

Restrictions on investments (limits on geography, allowed financial instruments; financial status and stages of a portfolio company; max amount of one investment)	3.0	*1.6*	4.0	*0.7*
Small size of funds	3.3	*0.5*	2.5	*1.5*
ALTUM rights to influence a fund investment decisions (exceeding typical LPs rights)	4.0	*0.8*	3.3	*1.3*
Reporting obligations towards ALTUM and Financial Market commission	3.0	*0.8*	2.5	*0.5*
Imperfections of the infrastructure and legislation affecting VC market	2.7	*0.9*	2.3	*1.1*
Lack of the experience and capacity of the governmental agency responsible for the programmes (ALTUM)	2.7	*0.9*	2.8	*1.5*

(Calculations from data in the Appendix 10)

The most powerful obstacle for the later stage fund managers are the restrictions on investments. These restrictions include the location of the portfolio companies, their financial status and development stage, which financial instruments may be used, and the maximum amount of one investment. Deviation from the mean value of the answers was small, indicating that the impact of the factor was rated similarly by all later stage managers. The distribution of the answers of later stage fund managers regarding the impact of the restrictions is Gaussian.

The opinion of the accelerator funds regarding the impact of investment restrictions was very diverse, but with a mean value of medium impact.

The most powerful obstacle for the accelerator fund managers is excessive rights of the Latvian governmental agency (ALTUM) to take part in decision-making regarding investments. The limiting effect of the factor was rated as 4, meaning a substantial negative impact, and there was a low deviation in responses (normal distribution). This factor was rated lower by the later stage fund managers, and their answers had a wide range (no Gaussian distribution). The higher effect upon accelerator funds was explained by them as being due to higher number of investments they make and necessity at the accelerator stage to make decisions quicker.

Accelerator funds also rated higher as limiting factors the small size of funds and burdensome reporting obligations than later stage funds. The variance between answers of the accelerator fund managers was close to normal distribution. The explanation for the difference here also could be the higher number of investments increasing the reporting burden on small funds that have limited resources for administrative expenses.

A lack of infrastructure and legislation necessary for the smooth operation of the VC market and the lack of experience and capacity of the governmental agency were rated as having slightly less than medium impact by all funds. However, the deviation between answers was rather significant and did not show a normal distribution.

To see if the improvements in the design of the SF programmes led to a diminution of the impact of the factors the authors asked fund managers to rate the impact in the 2007–2013 and 2014–2020 planning periods separately. Table 3.6 provides a comparison between the impact value differences of the 2007–2013 and 2014–2020 planning periods.

Table 3.6.

Comparison between impact value differences in 2007-2013 and 2014-2020 planning periods (Created by the author)

Factors	**Mean value for the 2007-2013 planning period**	**Standard deviation**	**Mean value for the 2014-2020 planning period**	**Standard deviation**	**Difference between impact value in the 2007-2013 and in the 2014-2020**
Restrictions on investments (limits on geography, allowed financial instruments; financial status and stages of a portfolio company; max amount of one investment	4.3	*0.4*	4.0	*0.7*	- 7%
Small size of funds	3.0	*1.4*	2.5	*1.5*	- 16.7%
ALTUM rights to influence a fund investment decisions (exceeding typical LPs rights)	2.3	*1.1*	3.3	*1.3*	+ 43,5%
Reporting obligations towards ALTUM and Financial Market commission	2.8	*0.4*	2.5	*0.5*	- 10.7%
Imperfections of the infrastructure and legislation affecting VC market	2.8	*1.1*	2.3	*1.1*	- 17.9%
Lack of the experience and capacity of the governmental agency responsible for the programmes (ALTUM)	2.8	*1.3*	2.8	*1.5*	0%

(Calculations by the authors from data in the Appendix 10)

The results of the comparison do not provide sufficient grounds for reaching a conclusion that design improvements led to a decrease in the impact of limiting factors. The reduction in the impact as perceived by the fund managers is small, except for the impact from the governmental agency's micromanagement, which became substantially stronger.

Results from several interviews suggest the impact of VC investments on the financial statements of the governmental agency ALTUM could be partly responsible for its micromanagement and the trend for this to increase.

The investments into VC funds form part of ALTUM's assets. ALTUM has listed securities, and from a ratings perspective, ALTUM is interested in the better performance of its assets and a risk level that is easy to understand for investors. This is a mismatch with VC, which is high-risk, long-term investment.

3.3. Assessment of other governmental activities for VC market support

Governmental activities promoting VC market operations

Lerner (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 3.7Table *3*..

Table 3.7.

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 crisis	Stock market for SME. Decreasing of reporting obligations towards Financial Commission and fees.

(Compiled by the author from data in the sources in the 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 are directed at supporting regions and not companies with high growth potential. Furthermore, assessments of the influence of programmes upon one another is not being conducted and not taken into account when programmes are designed.

In 2017, the European Commission prepared a special report on the effectiveness of tax incentives on venture capital (European Commission, 2017). It was concluded that taxation

plays a critical role in supporting or hindering venture capital investments. Latvia was listed among states that had no tax incentives to promote venture capital investments. Latvia later that year adopted the Law on Aid for the Activities of Start-Up Companies. The law is regarded as a good idea but with a very limited set of companies eligible for support. As of 28 February 2020, only six companies had been able to qualify under the criteria set out under the law to benefit from lower corporate or individual income taxes.

As seen in the data in Table 3.7 there is no comprehensive policy for the development of the VC market in Latvia. Few initiatives in the 2014–2020 planning period are beneficial for VC managers.

As in other CEE countries (Karsai, 2018), the VC market in Latvia is still not mature and depends on public support. As the result of SF interventions, 294 VC investments (as of 31 March 2020) have been made by the funds established during the three planning periods. As a side effect of the programmes was the emergence of a generation of professional VC managers for the VC funds that were established. These fund managers have a high activity continuation rate—even if a fund manager has suspended activities its partners continued to work in other fund managers or stayed within the VC ecosystem in another capacity.

Despite gaining experience over three planning periods these managers have yet not to be able to raise independent private funds. The study also confirms the conclusion of other authors (Karsai, 2018; Prohorovs, 2014) about the difficulties encountered in attracting private investors into publicly supported VC funds in CEE. It adds the observation about the persistence of this problem from one planning period to another. This suggests that even if the primary goal of SF programmes to support SMEs is attained, the programmes are not sufficient to attain the self-sustainability of the VC market in Latvia.

The proven track record of a VC fund manager is considered to be a crucial factor in its fundraising ability. The researchers (Kuckertz et al., 2015) found that for fund managers with low levels of track records, other factors (particularly trustfulness) do not serve as substitutes. Latvian VC managers still have low levels of track records. The state has no direct ability to influence the successfulness of VC firms' exits from their investments. Still, studies suggest several pathways on how VC funds' exit landscape could be improved. One is raising entrepreneurial activity in general and particularly activity on a local stock exchange marke (Black & Gilson, 1998). Another is raising growth perspectives for the funds' portfolio companies.

The survey of Latvian VC fund managers confirms that their activities are impacted by restrictions on investments; the small size of funds; governmental agency micromanagement; burdensome reporting obligations; infrastructure and legislation imperfections, and the lack of the experience and capacity of the governmental agency. Surprisingly, the value of the impact did not decrease significantly as a result of design improvements in the programmes.

There is no overarching governmental policy to support the VC market in Latvia, a tool that has been suggested by other authors (Lerner et al., 2005; Martin et al., 2005). The Latvian government's support of VC investments as a way to support the establishment and development of high-growth enterprises has been sporadic and has missed out on reaching a potentially cumulative result. There are gaps between programmes. There are other potentially

beneficial activities for the VC market, such as the recently started support of initial public offerings for SMEs. But these initiatives are not aligned.

The lack of aligned support measures could be a reason why improvements in the programmes' design did not result in a decrease in the factors restraining the impact of the activities of VC fund managers. It strongly suggests that an umbrella strategy for developing the Latvian VC market is necessary. This would eliminate existing gaps between VC programmes and support them with other activities essential for the development of the market. As Lerner (Lerner et al., 2012) suggested, there is a need to respect the need for conformity with VC global standards and as a result, adjust local legislation and implementation of support programmes. In addition, other activities which support entrepreneurship are necessary.

Results from several interviews suggest that there is conflict of interests of sorts for the government agency: the need to justify the value and appropriate risk level of its publicly listed notes, runs counter to the reasons that justified public investment in VC—that these were investments in SMEs that were too risky for private investors and would require considerable time to generate profits.

Further investigation of this possible conflict of interest is merited. A review of the experience in other countries is necessary to determine if a correlation between micromanagement and a similar listing of notes of the public entity holding VC investments.

4. SELF-SUSTAINABLE VENTURE CAPITAL MARKET DEVELOPMENT MODEL FOR LATVIA

4.1. Relevance of the VC market drivers in Latvia

The list of the factors (55 in total) from the 1st Chapter was complemented with additional factors found after researching Latvian VC market in the 2nd and 3rd Chapters. The complemented list with 60 factors is provided in Table 4.1 showing for which side of the market factor works as a driver.

Table 4.1.

The factors influencing VC supply, demand and total market activity (Created by the author)

Metagroup	Group	Factor	Driver	Drivers influence on		
				Supply	Demand	Matching
Factors related to actors of VC market	**Factors related to VC firms**	**Total amount of available capital from VC firms**				
			High amount of total VC		↑	
		Number of VC firms	High competition between VC firms in a particular stage	Varied influence	Negligible influence	
			Existence of VC firms in all stages	↑	↑	↑
		Characteristics of VC firms	Existence of local VC firms	↑	↑	↑
			Existence of foreign VC firms in a market	↑	↑	
			Publicly co-financed VC firms Decreasing influence on returns Decreasing influence on added value	↑	↑	
			Private VC firms	↑	↑	
			High reputation		↑	↑
			Experienced VC firms	↑	↑	
			Substantial added value from VC firms		↑	↑
			High investment returns of VC firms	↑		
			Successful growth of VC firms' portfolio companies		↑	↑
	Factors related to investors in VC funds	**Base of institutional investors**	Diversified and robust institutional investor base	↑		
		Private entrepreneurs	Successful entrepreneurs from prior generations	↑		
	Factors related to entrepreneurs	**The number of entrepreneurs seeking for VC**	High amount of entrepreneurs seeking for VC	↑		
		Entrepreneur's characteristics	General awareness about VC		↑	↑
			Understanding the added value from VC		↑	↑
			High risk tolerance and partnership acceptance and trust		↑	
			Gender – male		↑	↑
			High net worth of entrepreneurs		↑	↑
			Previous experience in the entrepreneurship			↑
			Technical or MBA education		↑	↑

Environment	**Legal environment**	**General legal environment**	Internationally harmonized and stable regulation for securities, bancrupcy, labor and tax	↑	↑	
		Legal environment for LPs	Flexible policies regarding risk evaluation and broad limits for investments in VC funds	↑		
			Tax application on LPs not VC fund level	↑		
		Legal environment for VC funds	Broad limits of VC funds (size of the investment; geography; focus; life span of the fund; risk profile)	↑	↑	↑
		Legal environment for entrepreneurs	Entrepreneur friendly tax application and little administritive burden for starting a business		↑	
		Legal environment for particular kind of investments	Government policies and regulations beneficial for particular kind of investments (i.e. cleantech; sustainability)		↑	
	Goverment policies	**General**	Programmes encouraging entrepreneurship		↑	
			Raising awareness about financial instruments		↑	
			Support for Technology Transfer and RD		↑	
			Outsourcing public services		↑	
		For VC funds	Providing public funding for VC funds	↑		
			Raising awareness about VC		↑	
			Alternative IPO and listing regulation for SMEs with less stringent standards	↑		
			Similarity between domestic and foreign policy	↑		
	Infrastructure	**General infrastructure**	Developed infrastructure	↑	↑	
			High development of IC industry	↑	↑	
		Research facilities	Existing and available research facilities		↑	
		Local Universities	Existence of local technical universities		↑	
		Capital market	Capital market providing exit possibilities	↑	↑	
			Absence of other available capital		Varied influence	↑
			Possibility to get additional fundinging for next rounds/further growth	↑		
			Low transaction costs	↑		↑
			Lack of other high yield investment for LPs options	↑		
		Domestic VC ecosystem	Developed ecosystem with consultants and business angels	↑	↑	↑
	Envinronment for inovation	**Technology innovations**	High level of technology innovation	↑		↑
		Demand for new products	High level of demand for new products	↑		↑
		Demand for particular products/technologies	High level of demand for particular products/technologies		↑	
		State R&D expenses	High level of state R&D expenses			↑
	Resources	**Human resources**	High diversity of economically active		↑	

			persons (nationality, gender)			
			High unemployment		↑	
			High student rate	↑		
			Availability of technically skilled entrepreneurs and personel		↑	
			Availability of economically competent individuals		↑	
	Macroeconomic conditions		High GDP and export	↑	↑	↑
Embedded factors	**Geograpfical location**		Close location to core economical regions	↑	↑	
			Close location to countries with a high VC activity	↑		
	Social norms	**Attitude to risk, uncertainty, cooperation, trust**	High level of risk and uncertainty toleration, tendency to cooperation and trust	↑	↑	↑

The list of the factors (Table 4.1) was as used to develop the questionnaire for experts to rate the factors influencing VC market development in the countries with immature VC markets. The appropriateness of the survey instead of using quantitative market data to reach the study goal is justified by limited availability 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 also is widely used by reputable VC market development experts such as Lerner J. (Lerner et al., 2015), Harding R. (Harding, 2002), Migendt M. (Migendt et al., 2017), Baldock (Baldock, 2015) and in other studies related to the small countries with unmatured VC markets (Owen & Mason, 2019).

Minor regrouping of factors was done, and some factors were divided in 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 the 1st Chapter into three metagroups and twelve factors' groups:

- Metagroup "VC market participants" had three factors' groups: q11 Factors related to VC firms; q12 Factors related to investors in VC funds and q13 Factors related to entrepreneurs,
- Metagroup "Environment" had six factors' groups: q21 Legal environment; q22 Government policies; q 23 Infrastructure; q24 Environment for innovation; q25 Resources; q26 Macroeconomic conditions,
- Metagroup "Embedded factors" had three factors' groups: q31 Geographical location; q32 Culturally determined social norms; q33 Reputation of a particular country. Respondents were asked to rate the possible factors influence on the following market dimensions: 1. supply side of the VC market; 2. demand for VC; 3. total VC activity (measured as VC investments). The questionnaire is provided in Appendix 11.

Thirty-one persons being influential in Latvian VC market were approached by direct emails with a link to the questionnaire in google drive to fill. 22 from approached provided

answers to the questionnaire. The survey was carried out in May-June 2021. Considering the complicated structure of the questionnaire (several dimensions for rating a factor), most of the respondents chose to fill the questionnaire during a personal interview with the authors. Thus, providing possibility besides quantitative rankings to collect some qualitative data.

The aim of the expert opinion collection was:

- to understand are factors delivered from the studies important in countries with immature VC markets and small internal markets (such as Latvia, for example);
- to determine whether government policies can influence the various factors;
- to measure to what degree the Latvian government is exercising any possibility to influence the factors.

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. The experts approached were:

1. VC fund managers representatives

All VC fund managers registered or permanently active in Latvia were approached – in total 9. 8 from 9 provided answers to the questionnaire.

2. Public agencies responsible for VC programmes in Latvia/Baltics representatives

Latvian public agency's ALTUM representatives in charge for VC programmes were approached. All 3 approached provided answers. Also, three representatives of EIF in charge for VC and Private Equity programmes in Baltic States were approached. EIF is one of the most important players in the EU venture capital market managing European Commission VC programmes (European Court of Auditors, 2019). All three representatives from EIF provided answers. The representative from European Bank for Reconstruction and Development in charge for VC market programmes in Baltics approached did not provide the answers.

3. Policymakers in charge of VC programmes

Representatives from Latvian Finance Ministry and Ministry of Economics in charge of the country's VC policy (3 in total) did not fill the questionnaire. Latvian Bank representative involved in Capital Market development issues provided answers.

4. Limited partners or investors in VC funds

From few institutional investors in VC funds (5 pension funds) four were approached. Three of them provided answers.

5. Representatives of start-up community or serial entrepreneurs

Seven persons deeply involved in shaping Latvian start-up ecosystem were approached. Three of them responded that they don't feel to be equipped with enough knowledge to respond to the questionnaire (Similar situation was observed in the earlier study of Latvian VC industry (Prohorovs, 2013)). Four of the approached ones responded.

Some of the respondents marked several responded groups to which they belong. Some of the respondents from public agencies, policymakers and LPs groups were not active in that position at the time of the filling questionnaire but previously had substantial role in these capacities. Table 4.2 provides a summary of the respondents.

Table 4.2.

Respondents of the questionnaire (Created by the author)

Group of the respondents	Number of the representatives approached (% from the group members related to LV)	Number of the respondents (Response rate %)
Latvian VCFs managers	9 (100% of registered and active VCFs in LV)	8 (89%)
Public agencies responsible for VC programmes in LV (Altum, EIF, EBRD)	7 (100%)	6 (86%)
Policymakers in charge of VC programmes in LV	4 (100%)	1 (25%)
Institutional LPs in Latvian VCFs	4 (80%)	3 (75%)
Representatives of LV start-up community	7 (100% of main institutions involved in shaping Latvian start-up ecosystem)	4 (57%)

The respondents were asked to rate the impact of the factors using a Likert scale (1–5). A "5" indicating a very strong influence and "1" — no influence. To determine the internal consistency of the results, the importance of the factors and their correlations the data were analyzed by Statistical Package for the Social Sciences 26.

1.1.Results

Twenty-two experts in Baltic VC market issues provided answers for the questionnaire. The principal components analysis was done with the results of the questionnaire. The rotated component matrix did not provide any meaningful outcome for regrouping the factors. Therefore, the authors kept the previous grouping of the factors in groups and metagroups.

The reliability of composite results of the survey is very high – above 0.9 by Cronbach's alpha coefficient (Table 4.3).

Table 4.3

Reliability Statistics

Cronbach's Alpha	N of Items
0,990	365

The results of the survey show that all factors delivered from the literature have influence also in the immature VC markets. Mean value of the vast majority of the factors is above moderate. Further the results from the survey are provided in tables and in the box and whisker charts of the factors showing the distribution of the values into quartiles and highlighting the mean and outliers. To make tables easier to understand the different colours are used to

highlight the influence of the factors. The green is used to highlight the factors with strong influence. The pale red shows factors which have below moderate influence on the market.

1.1.1. metagroup “VC market players”

The values of the factors belonging to the metagroup “VC market players” are in Figure 4.1.

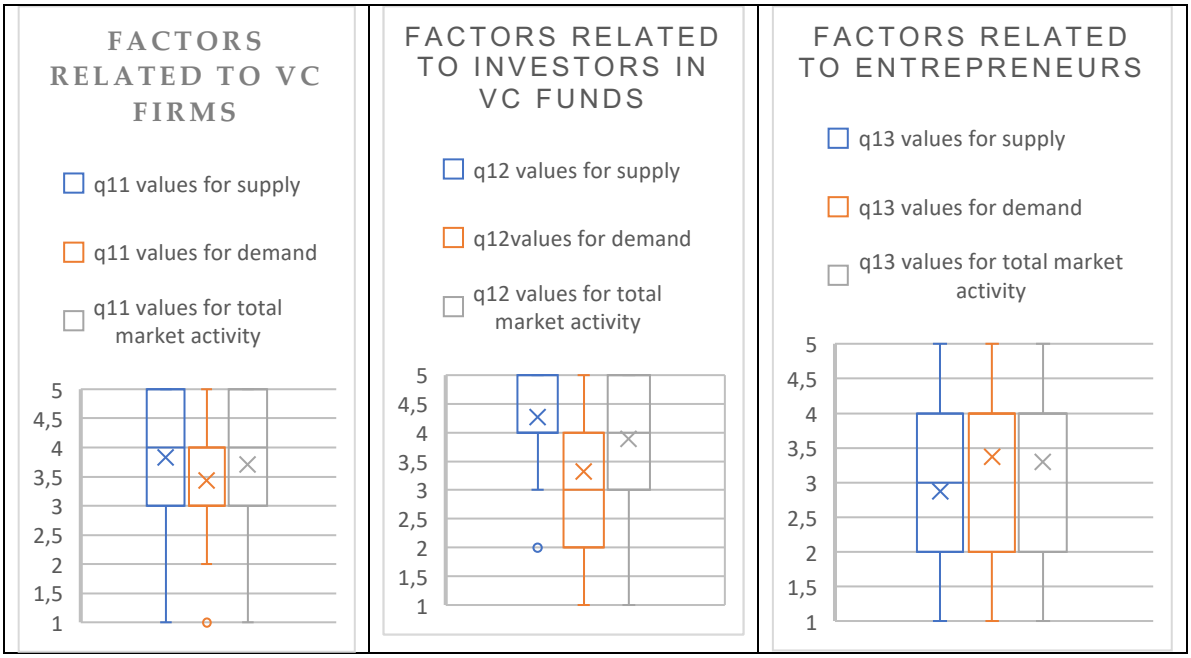

Figure 4.1 Values of the factors belonging to the metagroup "VC market players"

The analysis shows that the characteristics of the VC firms have bigger influence on the supply side and total market activity than 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.

Further the results of the study are explained on the factors level. Each factors’group consists of several factors the weight of which experts were asked to rate. From the factors’ group which are related to “VC firms” several factors have strong influence on the market (Table 4.4) – highlighted in green. Three factors have below moderate influence (highlighted in red), still only on one side of the market.

Table 4.4.

The factors related to the group “VC firms”’ weigh

No		Factor’s influence on the VC supply				Factor’s influence on the VC demand				Factor’s influence on the total VC market activity			
		Mean	Min	Max	Std. Dev.	Mean	Min	Max	Std. Dev.	Mean	Min	Max	Std. Dev.
q11_1	High total amount of available capital from VC firms in a market	**4,32**	1	5	1,06	**3,37**	2	5	1,07	**4,05**	2	5	1,03
q11_2	High competition between VC firms in a market	**3,84**	2	5	1,07	**3,68**	2	5	1,11	**4,16**	2	5	0,96
q11_3	Existence of VC firms in all stages in a market	**3,95**	2	5	0,91	**3,68**	2	5	0,95	**4,11**	3	5	0,74
q11_4	Specialization of VC firms	**2,95**	1	4	0,97	**3,16**	1	5	1,12	**3,05**	1	5	0,91

q11_5	Existence of local VC firms in a market	**4,11**	2	5	1,10	**3,58**	2	5	1,02	**3,74**	2	5	1,10
q11_6	Existence of foreign VC firms in a market	**4,32**	3	5	0,58	**3,42**	2	5	0,90	**3,89**	2	5	0,81
q11_7	Existence of publicly co-financed VC firms in a market	**4,26**	2	5	0,87	**3,05**	2	5	1,08	**3,79**	2	5	1,13
q11_8	Existence of private VC firms in a market	**4,11**	2	5	1,10	**3,26**	1	5	1,15	**3,84**	2	5	1,01
q11_9	High reputation of VC firms in a market	**3,58**	1	5	1,30	**3,58**	1	5	1,22	**3,63**	1	5	1,26
q11_10	Existence of experienced VC firms in a market	**4,00**	2	5	1,00	**3,74**	2	5	0,87	**3,89**	3	5	0,81
q11_11	Substantial added value from VC firms	**3,42**	1	5	1,22	**4,26**	2	5	0,87	**3,89**	2	5	0,99
q11_12	High investment returns of VC firms	**4,63**	4	5	0,50	**2,79**	1	5	1,27	**4,00**	1	5	1,05
q11_13	Successful growth of VC firms' portfolio companies	**4,16**	3	5	0,76	**4,11**	2	5	0,94	**3,95**	3	5	0,85
q11_14	Low risk profile of VC firms (financial instruments used by VC firms; investment strategies)	**3,21**	1	5	0,92	**2,21**	1	4	0,98	**2,63**	1	4	1,01
q11_15	High risk profile of VC firms (financial instruments used by VC firms; investment strategies)	**3,16**	1	4	0,83	**3,47**	1	5	1,07	**3,37**	2	4	0,76

The factors related to the "Investors in VC funds" or Limited partners (LPs), the same as "Factors related to VC firms" have bigger influence on the supply and total market activity than demand side (see Figure 4.1). As predictable, the influence on the supply is paramount with bottom line of the 1st quartile above "strong influence" and only one outlier at the level "little influence". Still, the mean influence even on the demand side is above moderate. Analysis of the data on factors' level (Table 4.5) shows that one factor has strong influence on all market sides – "Existence of successful entrepreneurs from prior generations". Other two factors have strong influence on the supply side; slightly below moderate influence on the demand and above moderate influence on the total market activity.

Table 4.5.

The factors related to the group "Investors in VC funds" weigh

No	q12 factors related to the group "Investors in VC funds"	Factor's influence on the VC supply				Factor's influence on the VC demand				Factor's influence on the total VC market activity			
		Mean	Min	Max	Std. Dev.	Mean	Min	Max	Std. Dev.	Mean	Min	Max	Std. Dev.
q12_1	Diversified and robust institutional investor base	**4,47**	2,00	5,00	0,84	**2,89**	1,00	5,00	1,41	**3,95**	2,00	5,00	0,97
q12_2	Existence of successful entrepreneurs from prior generations	**4,37**	3,00	5,00	0,76	**4,11**	2,00	5,00	0,94	**4,26**	3,00	5,00	0,73
q12_3	High experience and capacity in VC investments of governmental agency responsible for public VC investments	**4,11**	2,00	5,00	**0,88**	**2,79**	1,00	5,00	1,36	**3,42**	1,00	5,00	1,17

The last factors' group belonging to the metagroup "VC market players" is "Factors related to the entrepreneurs". Figure 4.1 shows that according to the previous research, the factors from this group have bigger influence on the demand side and total market activity than supply. The total rating of the group would be even higher if not reduced from the values of the one factor, which was regarded as having little influence on all dimensions – particularly, "Male gender

dominance between entrepreneurs". The previous research has documented that VC funds' portfolio companies selection is gender-biased, where male entrepreneurs have bigger possibility to attract investments (Alsos & Ljunggren, 2017). Still, our survey doesn't support this is being valid at least in Latvian market. From the factors related to the entrepreneurs one factor has strong influence on all market sides (Table 4.6) – "High number of entrepreneurs seeking for VC". Two factors have little influence on all market sides: "High net worth of entrepreneurs seeking for VC" and previously mentioned - "Male gender dominance between entrepreneurs". The low mean value for these two factors is in contradiction with previous research. Some studies suggest that high net worth of entrepreneurs is an advantage for receiving investments from VC funds (Coleman, S., Cotei, C., & Farhat, 2016). Other factors have moderate influence on all market sides. Exception is "Awareness of the added value from VC between entrepreneurs/potential entrepreneurs" which influence on the supply side is below moderate, but on the demand side, opposite – strong. Also, factor's "Technical or MBA education of entrepreneurs/potential entrepreneurs" weight is below moderate.

Table 4.6.

The factors related to the group "Entrepreneurs" weigh

No	q13 factors related to the group "Entrepreneurs"	Factor's influence on the VC supply				Factor's influence on the VC demand				Factor's influence on the total VC market activity			
		Mean	Min	Max	Std. Dev.	Mean	Min	Max	Std. Dev.	Mean	Min	Max	Std. Dev.
q13_1	High number of entrepreneurs seeking for VC	**4,00**	1,00	5,00	1,11	**4,32**	2,00	5,00	1,06	**4,26**	2,00	5,00	0,87
q13_2	General awareness between entrepreneurs/potential entrepreneurs about VC	**3,05**	1,00	5,00	1,35	**3,89**	2,00	5,00	1,10	**3,79**	1,00	5,00	1,23
q13_3	Awareness of the added value from VC between entrepreneurs/potential entrepreneurs	**2,74**	1,00	5,00	1,33	**4,05**	2,00	5,00	1,08	**3,74**	1,00	5,00	1,28
q13_4	High risk tolerance and partnership acceptance and trust of entrepreneurs/potential entrepreneurs	**3,26**	1,00	5,00	1,05	**3,95**	3,00	5,00	0,62	**3,89**	2,00	5,00	0,88
q13_5	Dominant gender of entrepreneurs/potential entrepreneurs – male	**1,47**	1,00	3,00	0,70	**1,53**	1,00	3,00	0,70	**1,53**	1,00	3,00	0,70
q13_6	High net worth of entrepreneurs seeking for VC	**2,26**	1,00	4,00	0,99	**2,68**	1,00	4,00	1,06	**2,58**	1,00	5,00	1,12
q13_7	Previous experience in entrepreneurship of entrepreneurs/potential entrepreneurs	**3,68**	1,00	5,00	1,42	**3,53**	1,00	5,00	0,96	**3,53**	1,00	5,00	1,12
q13_8	Technical or MBA education of entrepreneurs/potential entrepreneurs	**2,89**	1,00	5,00	1,24	**3,05**	1,00	5,00	1,22	**3,05**	1,00	5,00	1,18

4.1.2. metagroup "Environment"

The values of the factors belonging to the metagroup "Environment" are in Figure 4.2.

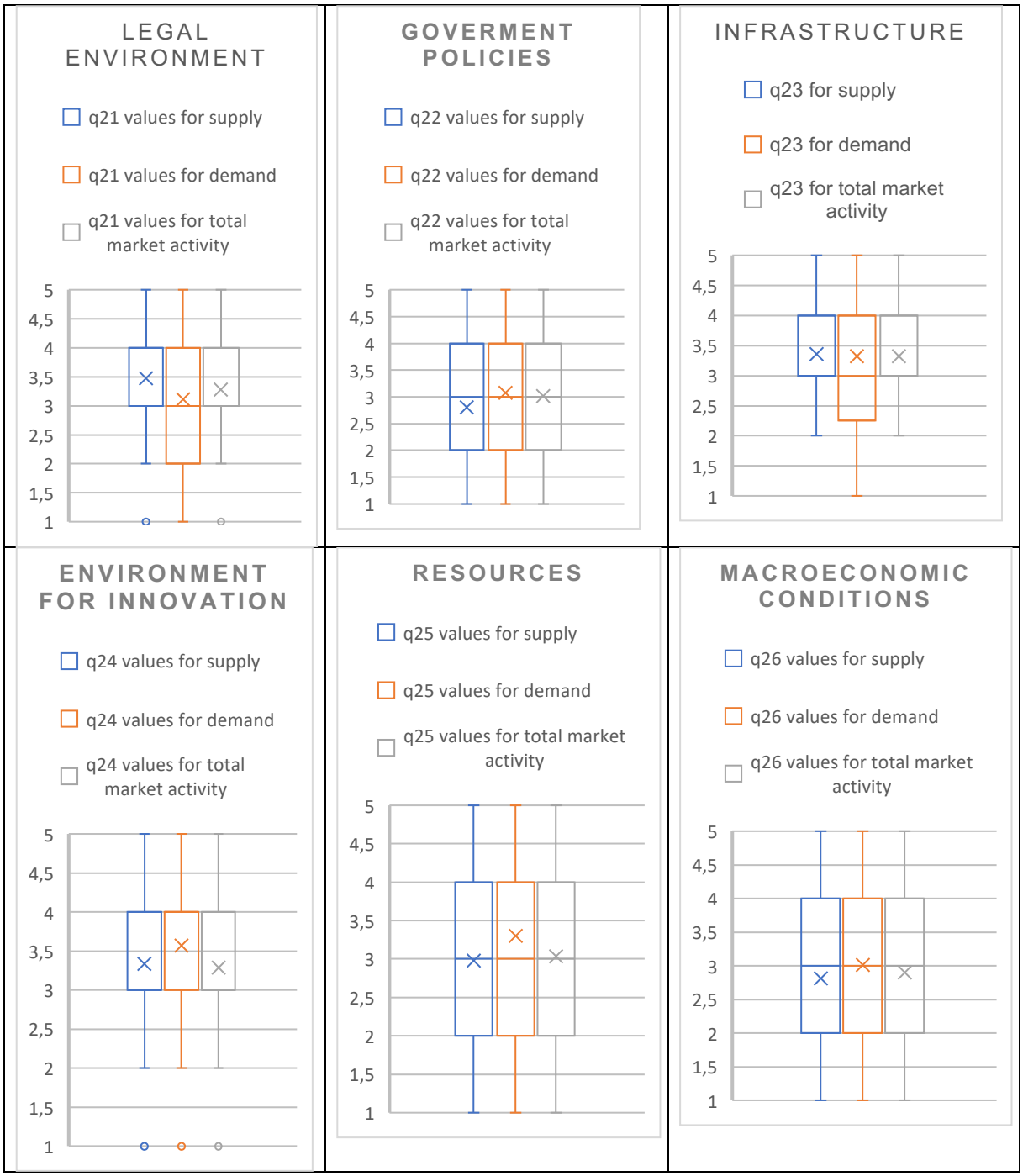

Figure 4.2 Values of the factors belonging to the metagroup "Environment"

The results at Figure 4.2 shows that “Legal environment” have 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.

Analysis of the Legal environment group on factors’ level reveal that most of the factors related to that group (Table 4.7) have moderate or above it impact. The factors “Internationally harmonized and stable regulation for securities, bankruptcy, labor and tax” and “Broad limits for VC funds” have strong influence on the supply side. Several factors have below moderate influence on the demand side. Reduced labour regulation has below moderate influence on the demand and total market activity.

Table 4.7.

The factors related to the group "Legal environment" weigh

No	q21 factors related to the group "Legal environment"	Factor's influence on the VC supply				Factor's influence on the VC demand				Factor's influence on the total VC market activity			
		Mean	Min	Max	Std. Dev.	Mean	Min	Max	Std. Dev.	Mean	Min	Max	Std. Dev.
q21_1	Internationally harmonized and stable regulation for securities, bankruptcy, labor and tax	**4,21**	3,00	5,00	0,71	**3,21**	1,00	5,00	1,08	**3,79**	3,00	5,00	0,71
q21_2	Reduction in labour regulation	**3,05**	1,00	5,00	0,91	**2,74**	1,00	5,00	1,10	**2,89**	1,00	5,00	0,94
q21_3	Easiness to hire foreign employees	**3,37**	1,00	5,00	0,90	**3,21**	1,00	5,00	1,03	**3,16**	1,00	5,00	1,01
q21_4	Flexible policies regarding risk evaluation and broad limits for investments in VC funds for investors in VC funds	**3,89**	1,00	5,00	1,15	**2,84**	1,00	5,00	1,30	**3,53**	1,00	5,00	1,02
q21_5	Tax application on investors in VC funds not VC funds level	**3,89**	1,00	5,00	1,15	**2,42**	1,00	4,00	1,26	**3,32**	1,00	5,00	1,11
q21_6	Broad limits for VC funds (size of the investment; geography; focus; lifespan of the fund; risk profile)	**4,11**	2,00	5,00	0,99	**2,89**	1,00	5,00	1,33	**3,47**	1,00	5,00	1,17
q21_7	Entrepreneur friendly tax system	**3,47**	1,00	5,00	1,07	**3,74**	2,00	5,00	0,99	**3,42**	2,00	5,00	1,07
q21_8	Little administrative burden for starting a business	**3,21**	1,00	5,00	1,27	**3,79**	1,00	5,00	1,44	**3,26**	1,00	5,00	1,33
q21_9	Easiness for foreigners to start a business	**3,11**	1,00	5,00	1,29	**3,42**	1,00	5,00	1,26	**3,16**	1,00	5,00	1,30
q21_10	Government policies and regulations beneficial for particular kind of investments (i.e. cleantech; sustainability)	**3,16**	1,00	5,00	1,26	**3,16**	1,00	5,00	1,12	**3,21**	1,00	5,00	1,18

The group "Government policies" impact (Figure 4.2) is very similar for all dimensions – with equal quartiles, median, min and max values and very similar mean value around "moderate influence".

Analysis of the group on the factors level reveals that similarly the same impact on the group level is unevenly spread between different factors. The factors of this group in general have below moderate influence on the supply side of the market. Exception is provision of public funding for VC funds, which has strong influence on the supply side and the market activity in total (Table 4.8). On the opposite, on the demand side provision of the public funding has below moderate influence, but other factors have higher influence than on the supply side. Unexpectedly, the factor "Similarity between domestic and foreign policy" has below moderate influence on all market sides. The previous research considers (Hoppmann & Vermeera, 2020) a greater similarity between domestic and foreign policy incentives as a driver for cross-border investments, which as per VC firms characteristics analysis (Table 4.4) has high beneficial influence on the market, especially on the supply side.

Table 4.8.

The factors related to the group "Government policies" weigh

No	q22 factors related to the group "Government policies"	Factor's influence on the VC supply				Factor's influence on the VC demand				Factor's influence on the total VC market activity			
		Mean	Min	Max	Std. Dev.	Mean	Min	Max	Std. Dev.	Mean	Min	Max	Std. Dev.

q22_1	Programmes encouraging entrepreneurship	**2,95**	1,00	4,00	1,13	**3,79**	2,00	5,00	0,79	**3,37**	1,00	5,00	1,12
q22_2	Programmes raising awareness about financial instruments	**2,11**	1,00	4,00	0,94	**3,32**	2,00	5,00	1,00	**2,84**	1,00	5,00	1,01
q22_3	Support for technology transfer and RD	**3,11**	1,00	5,00	1,10	**3,42**	2,00	5,00	0,84	**3,16**	1,00	5,00	1,12
q22_4	Outsourcing of public services	**2,16**	1,00	5,00	1,26	**2,11**	1,00	5,00	1,10	**2,16**	1,00	5,00	1,17
q22_5	Providing public funding for VC funds	**4,26**	1,00	5,00	1,10	**2,74**	1,00	5,00	1,05	**4,00**	3,00	5,00	0,94
q22_6	Raising awareness about VC	**2,84**	1,00	5,00	1,30	**3,74**	2,00	5,00	1,15	**3,16**	1,00	5,00	1,26
q22_7	Similarity between domestic and foreign policy	**2,63**	1,00	5,00	1,38	**2,47**	1,00	5,00	1,31	**2,47**	1,00	5,00	1,26

The group “Infrastructure” mean value (Figure 4.2) is similar for all dimensions. Still, the 1st quartile bottom line for the demand is closer to “little influence” value, but for the supply and total market, it is “moderate influence”.

Analysis of the group on the factors level reveals that most of the factors have similar influence on all dimensions (Table 4.9). Two factors (q23-1 and q23-11) from the infrastructure group have below moderate influence on all market dimensions. The low rating of the q23_11 “Existence of alternative IPO and listing regulations for SMEs with less stringent standards” contradicts the previous research (Liu, B., Cao, J., Johan, S., & Leng, 2019). During interviews with the experts, many of them said that they don’t see the local stock exchange as an exit route for the VC funds from their portfolio companies. As a result, regulation of the local stock exchange is not important. “High development of ICT industry” has strong influence on all market sides. “Developed VC ecosystem with consultants and business angels” has strong influence on the supply and demand side and very close to strong – on market activity. Other factors have moderate or close to moderate influence.

Table 4.9.

The factors belonging to the group "Infrastructure" weigh

No	q23 factors belonging to the group "Infrastructure"	Factor’s influence on the VC supply				Factor’s influence on the VC demand				Factor’s influence on the total VC market activity			
		Mean	Min	Max	Std. Dev.	Mean	Min	Max	Std. Dev.	Mean	Min	Max	Std. Dev.
q23_1	Well developed public infrastructure (Transportation systems, communications)	**2,89**	1,00	4,00	1,05	**2,74**	1,00	4,00	0,99	**2,68**	1,00	4,00	0,89
q23_2	High development of ICT industry	**4,00**	3,00	5,00	0,82	**4,21**	2,00	5,00	0,85	**4,05**	2,00	5,00	0,85
q23_3	Existence of local business clusters, well developed industries	**3,63**	1,00	5,00	1,21	**3,79**	1,00	5,00	1,03	**3,74**	1,00	5,00	1,05
q23_4	Existence and availability of research facilities	**3,53**	1,00	5,00	1,07	**3,74**	2,00	5,00	1,05	**3,58**	2,00	5,00	1,07
q23_5	Existence of local technical universities	**3,58**	1,00	5,00	1,07	**3,68**	2,00	5,00	0,95	**3,63**	2,00	5,00	1,01
q23_6	Active capital market providing exit possibilities	**3,95**	1,00	5,00	1,31	**3,16**	1,00	5,00	1,17	**3,74**	1,00	5,00	1,33
q23_7	Absence of other available capital for entrepreneurs	**3,05**	1,00	5,00	1,08	**3,95**	2,00	5,00	0,97	**3,53**	2,00	5,00	0,90
q23_8	Possibility to get additional funding for next rounds/further growth	**3,58**	1,00	5,00	1,07	**3,79**	2,00	5,00	0,98	**3,74**	2,00	5,00	0,99
q23_9	Low transaction costs	**2,84**	1,00	4,00	1,12	**2,63**	1,00	4,00	1,01	**2,74**	1,00	5,00	1,15
q23_10	Lack of other high yield investments for investors in VC funds	**3,53**	1,00	5,00	0,97	**2,05**	1,00	4,00	0,97	**2,68**	1,00	5,00	1,11

q23_11	Existence of alternative IPO and listing regulations for SMEs with less stringent standards	**2,74**	1,00	4,00	1,19	**2,47**	1,00	5,00	1,17	**2,53**	1,00	4,00	1,07
q23_12	Developed VC ecosystem with consultants and business angels	**4,16**	3,00	5,00	0,83	**4,05**	3,00	5,00	0,91	**3,89**	3,00	5,00	0,88

The group “Environment for innovation” impact (Figure 4.2) 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 highest score for the demand.

Analysis of the group on the factors level reveals that most of the factors related to the environment for innovation have moderate influence (Table 4.10). Still, “High level of technology innovation” has strong influence on the demand side and close to strong on other dimensions. But “High level of state R&D investments” has 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 relatively low rating for q24_4 during interviews with experts was explained by the opinion that sometimes state with its support for R&D investments is crowding out private investors.

Table 4.10.

The factors related to the group "Environment for innovation" weigh

		Factor’s influence on the VC supply				Factor’s influence on the VC demand				Factor’s influence on the total VC market activity			
No	q24 factors related to the group "Environment for innovation"	Mean	Min	Max	Std. Dev.	Mean	Min	Max	Std. Dev.	Mean	Min	Max	Std. Dev.
q24_1	High level of technology innovation	**3,89**	1,00	5,00	0,99	**4,16**	3,00	5,00	0,69	**3,79**	2,00	5,00	0,79
q24_2	High level of demand for new products	**3,05**	1,00	5,00	1,03	**3,42**	1,00	5,00	1,22	**3,16**	1,00	5,00	1,07
q24_3	High level of demand for particular products/technologies	**3,32**	1,00	5,00	1,16	**3,42**	2,00	5,00	1,02	**3,16**	2,00	5,00	0,96
q24_4	High level of state R&D investments	**3,21**	1,00	5,00	1,08	**3,26**	1,00	5,00	1,05	**2,95**	1,00	5,00	1,08

The group “Resources” impact (Figure 4.2) 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.

Analysis of the group on the factors level reveals that most, surprisingly, but the factor “High diversity of economically active persons (nationality, gender)” mean value is below moderate in all dimensions (Table 4.11). 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. Only factor “Availability of technically skilled entrepreneurs and personnel” is regarded as having high influence for the demand side and above moderate for other dimensions.

Table 4.11.

The factors related to the group "Human resources" weigh

No	q25 factors related to the group "Human resources"	Factor's influence on the VC supply				Factor's influence on the VC demand				Factor's influence on the total VC market activity			
		Mean	Min	Max	Std. Dev.	Mean	Min	Max	Std. Dev.	Mean	Min	Max	Std. Dev.
q25_1	High diversity of economically active persons (nationality, gender)	**2,74**	1,00	5,00	1,37	**2,84**	1,00	5,00	1,17	**2,63**	1,00	5,00	1,26
q25_2	High student rate	**2,63**	1,00	5,00	1,30	**3,00**	1,00	5,00	1,25	**2,74**	1,00	5,00	1,19
q25_3	Availability of technically skilled entrepreneurs and personnel	**3,68**	1,00	5,00	1,11	**4,00**	3,00	5,00	0,82	**3,84**	1,00	5,00	1,17
q25_4	Availability of economically competent individuals	**3,05**	1,00	5,00	1,22	**3,42**	1,00	5,00	1,17	**3,11**	1,00	5,00	1,33

The group "Macroeconomic conditions" impact (Figure 4.2.) 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.

Analysis of the group on the factors level reveals that from macroeconomic conditions (Table 4.12) only "High GDP growth rate" and "High export level" appear to be important. As regards unemployment, which per some authors opinion (Parker, 2004) could be a reason for starting a business, it doesn't appear to be important, at least, seriously impacting 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 it could seem that in periods of high interest rates, entrepreneurs could be more interested in VC the studies, for example from USA, don't validate such conclusion (Gompers, P. A., & Lerner, 1998).

Table 4.12.

The factors related to the group "Macroeconomic conditions"

No	q26 Macroeconomic conditions' factors	Factor's influence on the VC supply				Factor's influence on the VC demand				Factor's influence on the total VC market activity			
		Mean	Min	Max	Std. Dev.	Mean	Min	Max	Std. Dev.	Mean	Min	Max	Std. Dev.
q26_1	High GDP growth rate	**3,63**	2,00	5,00	1,07	**3,68**	2,00	5,00	1,00	**3,74**	2,00	5,00	0,99
q26_2	High export level	**3,32**	1,00	5,00	1,34	**3,58**	1,00	5,00	1,07	**3,63**	2,00	5,00	1,01
q26_3	High unemployment	**2,05**	1,00	4,00	0,85	**2,26**	1,00	5,00	1,15	**2,05**	1,00	4,00	0,85
q26_4	High interest rates	**2,37**	1,00	4,00	1,34	**2,68**	1,00	5,00	1,34	**2,37**	1,00	4,00	1,12

4.1.3. metagroup "Embedded characteristics"

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

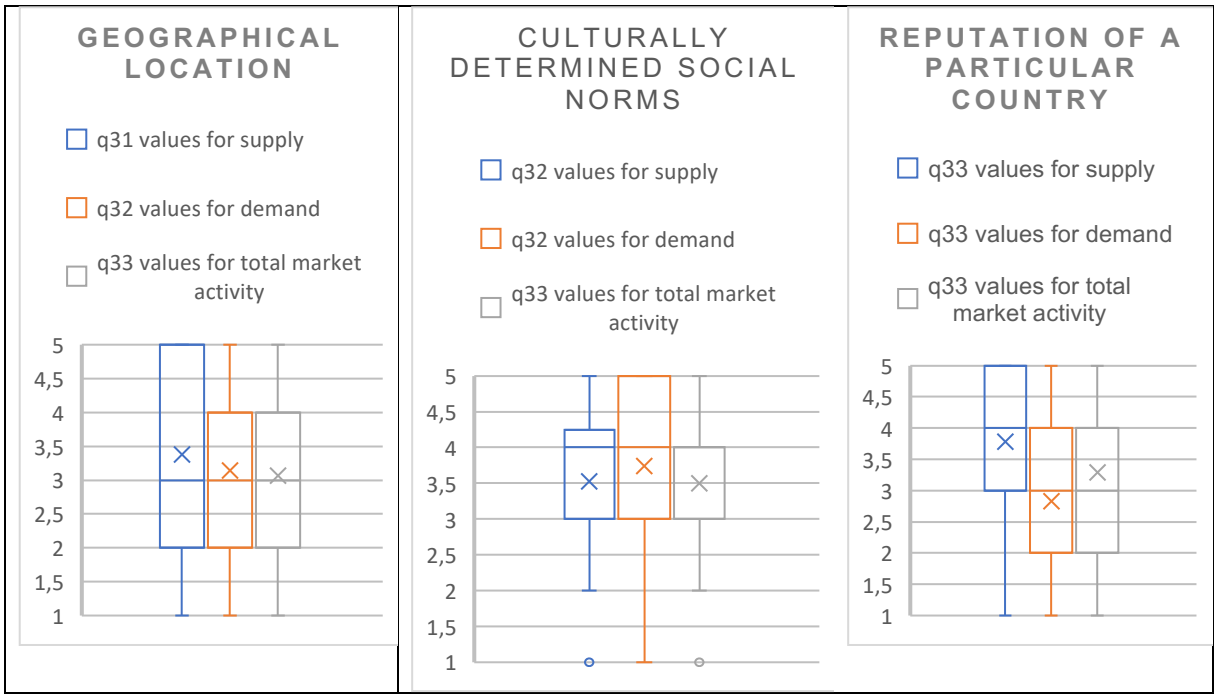

Figure 4.3 Values of the factors' groups belonging to the metagroup "Embedded characteristics"

The analysis (Figure 4.3) show that factors' group "Geographical location" mean value 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, data of the supply are a little bit skewed and as result 3rd quartile upper line reaches the highest possible rating, while for the demand and total market activity it is on "strong impact" level.

Analysis of the group on the factors level (Table 4.13) reveals that all factors' mean value is fluctuating around moderate values. "Close location of a particular place to the country's core economical regions" has slightly below moderate influence on the total market activity. During interviews the experts explained that as Latvia is small, location of nearly any place could be regarded as close to the core economical regions – thus, this factor is not so important in small countries like Latvia. The factor' "Close location to the countries with high VC activity" value is closer to strong than moderate for the impact on the supply side.

Table 4.13.

The factors related to the group "Geographical location"

No	q31 Geographical location' factors	Factor's influence on the VC supply				Factor's influence on the VC demand				Factor's influence on the total VC market activity			
		Mean	Min	Max	Std. Dev.	Mean	Min	Max	Std. Dev.	Mean	Min	Max	Std. Dev.
q31_1	Close location of a particular place to the country's core economical regions	**3,21**	1,00	5,00	1,47	**3,00**	1,00	5,00	1,15	**2,95**	1,00	5,00	1,27
q31_2	Close location to the countries with high VC activity	**3,74**	2,00	5,00	1,05	**3,26**	1,00	5,00	1,19	**3,21**	2,00	5,00	1,08

The analysis (Figure 4.3) shows that factors' group "Culturally determined social norms" has 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.

Analysis of the group on the factors level (Table 4.14) show that both factors have above moderate, close to high influence on all market dimensions.

Table 4.14.

The factors related to the group "Culturally determined social norms"

No	q32 Culturally determined social norms' factors	Factor's influence on the VC supply				Factor's influence on the VC demand				Factor's influence on the total VC market activity			
		Mean	Min	Max	Std. Dev.	Mean	Min	Max	Std. Dev.	Mean	Min	Max	Std. Dev.
q32_1	High level of risk and uncertainty toleration	**3,63**	1,00	5,00	1,26	**3,95**	2,00	5,00	1,08	**3,63**	2,00	5,00	1,12
q32_2	Tendency towards cooperation and trust	**3,58**	1,00	5,00	1,35	**3,58**	1,00	5,00	1,22	**3,53**	1,00	5,00	1,22

The total impact from the group "Reputation of a particular country" (Figure 4.3) 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.

Table 4.15 provide information how particular factors impact different market sides. 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 perspective. Both factors have above moderate influence on total market activity.

Table 4.15.

The factors related to the group "Reputation of a particular country" weigh

No	q33 Reputation of a particular country factors	Factor's influence on the VC supply				Factor's influence on the VC demand				Factor's influence on the total VC market activity			
		Mean	Min	Max	Std. Dev.	Mean	Min	Max	Std. Dev.	Mean	Min	Max	Std. Dev.
q33_1	Public image of a particular country	**3,95**	1,00	5,00	1,03	**3,11**	1,00	5,00	0,99	**3,37**	1,00	5,00	1,01
q33_2	Lack of restrictions/warnings from international organizations	**3,74**	2,00	5,00	1,05	**2,58**	1,00	4,00	0,96	**3,21**	1,00	5,00	1,23

4.2. 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 ran. The measurements were done on four levels: i) on metagroup level; ii) on group level; iii) on factors level and also iiii) between these levels. The results of the correlations on all levels are in the Appendix 12. The results of the correlation rank test on the metagroups level are in Table 4.16.

Table 4.16.

Spearman's correlation matrix of the metagroups

	q1 VC market players	q2 Environment	q3 Embedded factors
q1 VC market players	1,000	.541*	0,313
q2 Environment	.541*	1,000	.774**
q3 Embedded factors	0,313	.774**	1,000

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Correlation is nonsignificant

The results indicate strong statistically significant positive correlation between the metagroups q2 “Environment” and q3 “Embedded factors”. Also, positive correlation between the metagroups q1 “VC market players” and q2 “Environment” is observed. No direct correlation between q1 “VC market players” and q3 “Embedded factors” is observed. Still, analysis of the data on factors’ group level (Table 4.17) shows that one of the groups from q1 metagroup (q13 “Factors related to entrepreneurs”) has statistically significant positive correlation with one of the groups from the q3 metagroup (q32 Culturally determined social norms).

Table 4.17.

Spearman's correlation matrix of factors' groups

	q11 Factors related to VC firms	q12 Factors related to investors in VC funds	q13 Factors related to entrepreneurs	q21	q22	q23	q24	q25	q26 Macroeconomic conditions	q31	q32	q33
q11 Factors related to VC firms	1,000	.544*	.480*	0,366	0,267	0,321	0,238	0,327	0,432	0,123	0,304	0,052
q12 Factors related to investors in VC funds	.544*	1,000	.556**	.434*	0,241	0,222	0,118	0,071	0,235	-0,157	0,216	0,065
q13 Factors related to entrepreneurs	.480*	.556**	1,000	.751**	.780**	.543*	.446*	.773**	.536*	0,321	.605**	0,245
q21 Legal environment	0,366	.434*	.751**	1,000	.750**	.774**	.510*	.685**	.639**	0,411	.497*	0,355
q22 Goverment policies	0,267	0,241	.780**	.750**	1,000	.765**	.608**	.825**	.562**	.613**	.648**	0,370
q23 Infrastructure	0,321	0,222	.543*	.774**	.765**	1,000	.754**	.727**	.694**	.598**	.647**	.642**
q24 Environment for innovation	0,238	0,118	.446*	.510*	.608**	.754**	1,000	.704**	.510*	.467*	.571**	.620**
q25 Resources	0,327	0,071	.773**	.685**	.825**	.727**	.704**	1,000	.539*	.564**	.722**	0,360
q26 Macroeconomic conditions	0,432	0,235	.536*	.639**	.562**	.694**	.510*	.539*	1,000	.579**	.433*	0,319

q31 Geographical location	0,123	-0,157	0,321	0,411	.613**	.598**	.467*	.564**	.579**	1,000	.635**	.452*
q32 Culturally determined social norms	0,304	0,216	.605**	.497*	.648**	.647**	.571**	.722**	.433*	.635**	1,000	.611**
q33 Reputation of a particular country	0,052	0,065	0,245	0,355	0,370	.642**	.620**	0,360	0,319	.452*	.611**	1,000
**. Correlation is significant at the 0.01 level (2-tailed).												
*. Correlation is significant at the 0.05 level (2-tailed).												

The correlation rank test results also highlight why providing public support for VC market development only as a funding for VC market is not sufficient. Factor q22_5 "Providing public funding for VC funds" has correlation only with few factors from all (73) factors list. The factors with whom q22_5 has statistically significant correlation are in Table 4.18.

Table 4.18.

Factor q22_5 "Providing public funding for VC funds" significant correlations

		q11_5_3 Existence of local VC firms in a market	q11_7_3 Existence of publicly co-financed VC firms in a market	q11_10_3 Existence of experienced VC firms in a market	q12_3_3 High experience and capacity in VC investments of governmental agency responsible for public	q13_1_3 High number of entrepreneurs seeking for VC	q13_4_3 High risk tolerance and partnership acceptance and trust of entrepreneurs/potential entrepreneurs	q13_7_3 Previous experience in entrepreneurship of entrepreneurs/potential entrepreneurs	q21_6_3 Broad limits for VC funds (size of the investment; geography; focus; lifespan of the fund; risk profile)	q23_7_3 Absence of other available capital for entrepreneurs
q22_5_3 Providing public funding for VC funds	Corr. Coeff.	.693**	.724**	.456*	.520*	.481*	.506*	.496*	.606**	.714**
	Sig. (2-tailed)	0,000	0,000	0,038	0,016	0,027	0,019	0,022	0,004	0,000

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 from 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).

Exception is factor "Factors related to investors in VC funds", where correlation between supply and demand side, and supply and total market activity is with no statistical significance. For the factor "Reputation of a particular country" correlation between supply and demand side calculated by Spearman coefficient is doubtful. The correlation was measured by Spearman and Pearson correlation coefficients to provide robustness of the conclusions. No substantial differences in the correlation coefficients obtained by the two methods. The correlation tables are provided in Appendix 13.

Because of the positive correlation of the factors between all dimensions the author proposes to estimate the factors importance based on its highest rating in any of the market sides. For example, the factor's "Reputation of the particular country" impact mean value for the supply side is 3,79, for the demand side – 2,83 and for total market activity – 3,29. The authors propose the total ranking between the factors and factors influence to base on the highest rating of the factor in any of the market sides - 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 4.19.

Table 4.19.

Factors with substantial impact on the VC market listed in the order of importance inside 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
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 between entrepreneurs/potential entrepreneurs
q13_4	High risk tolerance and partnership acceptance and trust of entrepreneurs/potential entrepreneurs
q13_2	General awareness between 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, labor 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 on 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. cleantech; sustainability)

Factors' group - q22 Goverment policies

q22_5	Providing public funding for VC funds
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 Latvian and similar countries VC market development. The number and structure of the factors' groups (12) and the metagroups (3) are the same as after the Literature analysis.

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 Importance performance matrix (Figure 4.4).

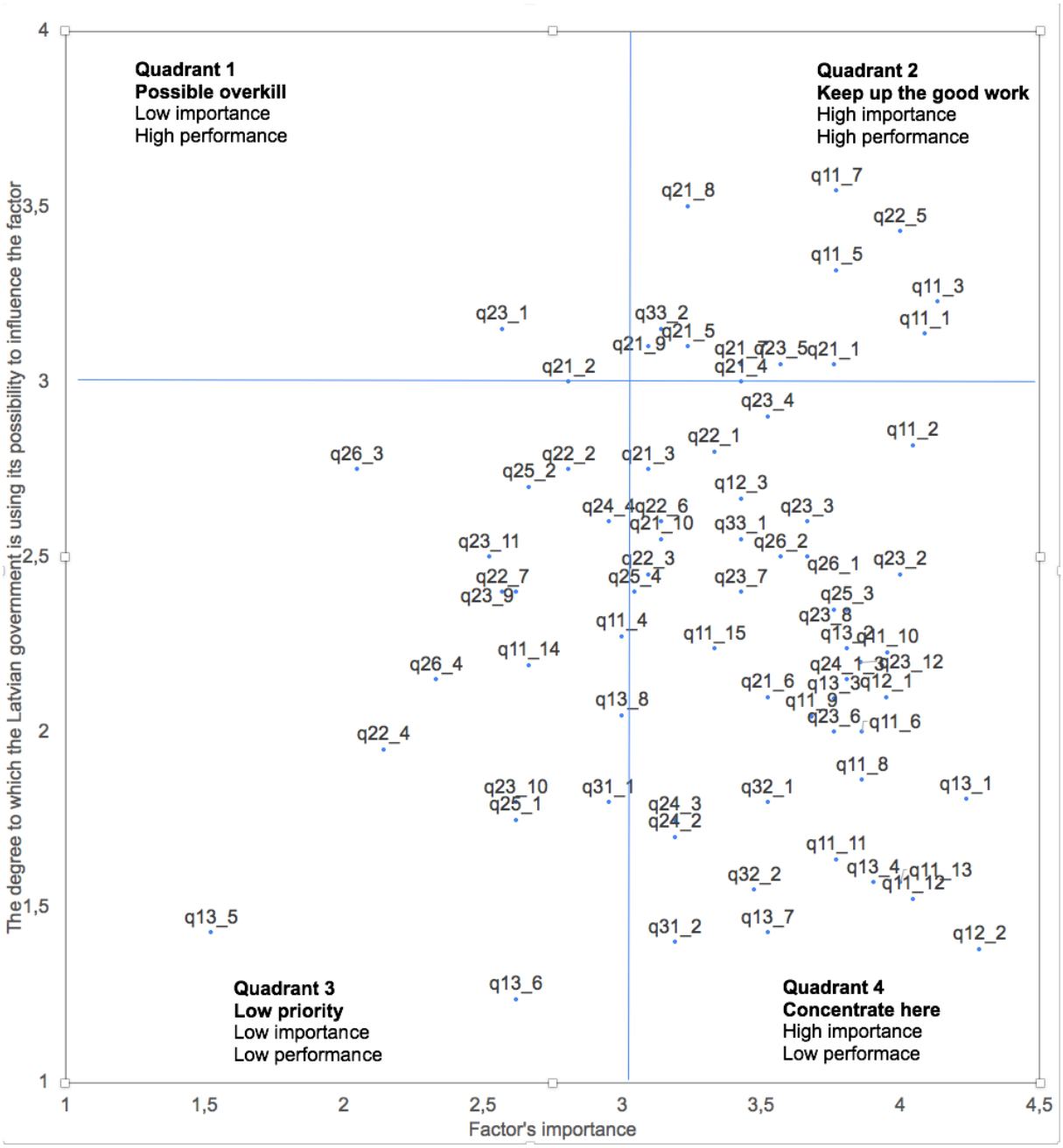

Figure 4.4 The factors importance performance matrix

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.

Table with factors numbers explanations is in Appendix 14.

Quadrant 1 shows factors which per mean rating of the experts are not so important for the market development, but the government provide influence on them 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: Q23_1 Well developed public infrastructure (Transportation systems, communications) and Q21_2 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 varying 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 provide influence on them below moderate. These factors are: Q13_5 Dominant gender of entrepreneurs/potential entrepreneurs – male; Q26_3 High unemployment; Q22_4 Outsourcing of public services; Q26_4 High interest rates; Q23_11 Existence of alternative IPO and listing regulations for SMEs with less stringent standards; Q22_7 Similarity between domestic and foreign policy; Q23_9 Low transaction costs. Surprisingly, the "Existence of alternative IPO and listing regulations for SMEs with less stringent standards" is between the factors with low importance. The experts, which completed the survey during the personal interviews with the author, explained that local stock exchange in the case of the VC is not usually regarded as the place for the listing. For those companies whose exits are designed through IPO, the foreign stock exchanges are regarded as the destination.

Most of the factors are in Quadrant 4, where those, who have a significant impact on the market development, but the government uses the possibility to influence the factors below moderate degree. Also, there are 13 factors in Quadrant 2. The factors with high importance and substantial beneficial influence from the government are in Quadrant 2.

4.3 Self-sustainable VC market development model for Latvia

The importance performance analysis and correspondence between factors allow to conclude that the model created after the literature qualitative content analysis (1st Chapter) is correct in the circumstances of Latvia. Therefore, the public support to develop self-sustainable VC market should be provided on factors' impact 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 Figure 4.5.

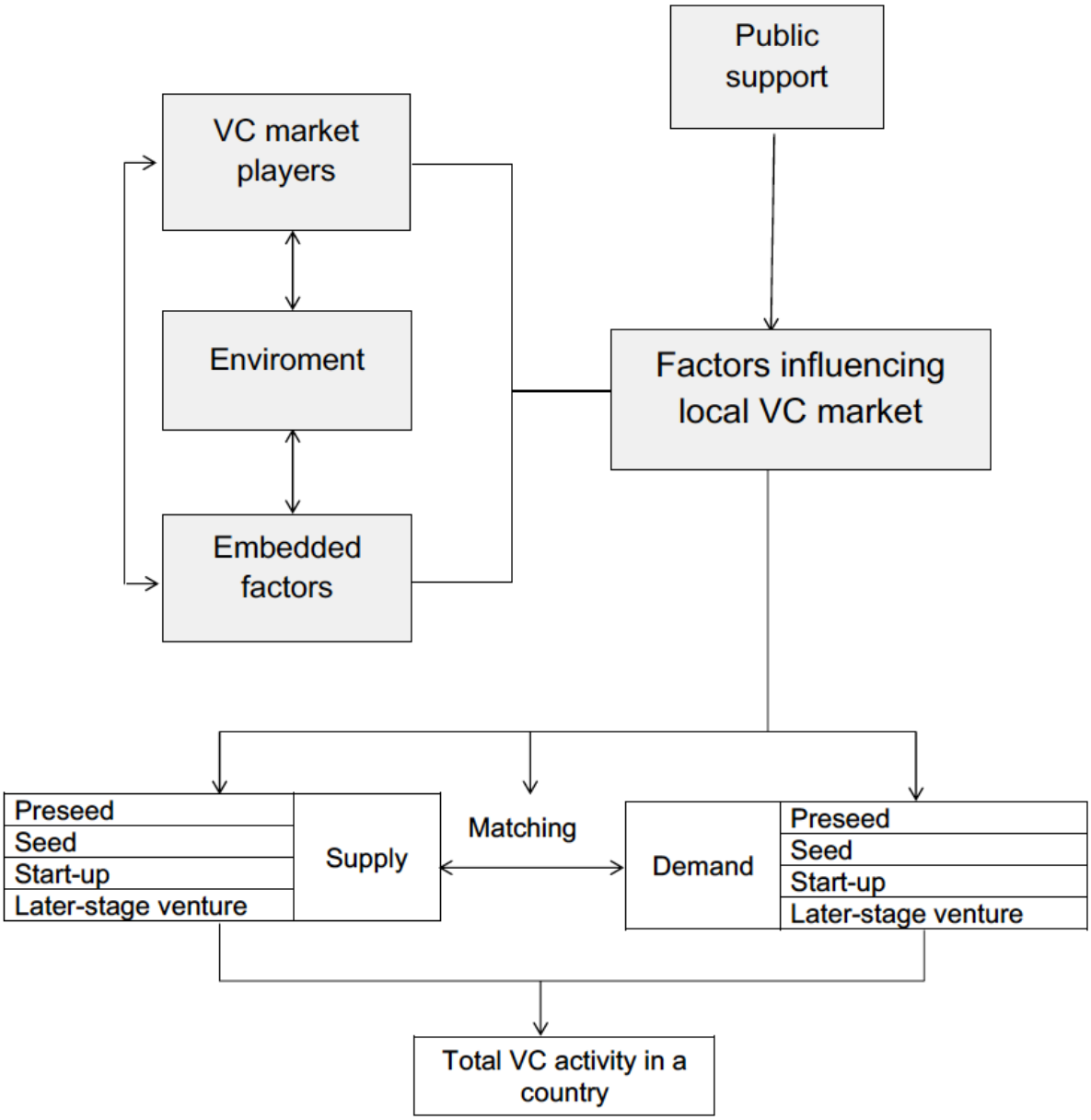

Figure 4.4 Self-sustainable VC market development model for Latvia

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

The study revealed that 63 factors are important for VC market development in Latvia and countries with similar socio-economic, cultural and political environment and small internal markets.

The most important factors from factors group "Factors related to VC firms" are "High investment returns of VC firms"; "Existence of foreign VC firms in a market"; "High total amount of available capital from VC firms in a market"; "Existence of publicly co-financed VC firms in a market". The appearance of these factors as most important is not surprising. Previous

studies (Cipollone & Giordani, 2019; R. Harrison, 2018; R. T. Harrison et al., 2020; Hellmann & Thiele, 2019) confirm the relevance of these factors in all VC markets, even more mature

The most important factors from factors group "Factors related to investors in VC funds" are "Diversified and robust institutional investor base" and "Existence of successful entrepreneurs from prior generations". This result also is consistent with previous studies (R. Harrison, 2018; Migendt et al., 2017).

The most important factors from factors group "Factors related to entrepreneurs" are "High number of entrepreneurs seeking for VC" and "Awareness of the added value from VC between entrepreneurs/potential entrepreneurs". This finding is also unsurprising and consistent with previous studies (Cipollone & Giordani, 2019; Weigand, 2019).

The most important factors from factors group "Legal environment" are "Internationally harmonized and stable regulation for securities, bankruptcy, labor and tax" and "Broad limits for VC funds (size of the investment; geography; focus; lifespan of the fund; risk profile)". The first factor is found to be important also in mature markets (Lerner, 2009). The broad limits of VC funds are recommendation constantly put forward by VC specialists (Lerner et al., 2005) when advising design of public support for VC programmes.

The most important factors from factors group "Government policies" are "Providing public funding for VC funds" and "Programmes encouraging entrepreneurship". The importance of governmental inflows in VC funds and support with entrepreneurship encouragement programmes is admitted by the previous studies (Owen & Mason, 2019; Standaert & Manigart, 2018).

The most important factors from factors group "Infrastructure" are "High development of ICT industry" and "Developed VC ecosystem with consultants and business angels". This finding is also in conformity with previous studies (R. T. Harrison et al., 2020; Juha & Kari, 2017).

The most important factor from factors group "Environment for innovation" is "High level of technology innovation". This factor is admitted to be important for VC market also in other unmatured markets (Ning, Y., Xu, G., & Long, 2019).

The most important factor from factor group "Resources" is "Availability of technically skilled entrepreneurs and personnel". Surprisingly, but "High diversity of economically active persons (nationality, gender)" was not ranked as important in the study.

The factors from factors group "Macroeconomic conditions" are "High GDP growth rate" and "High export level". These factors are admitted to be important for VC market also in previous studies (Baldock, 2015; Ning, Y., Xu, G., & Long, 2019).

From factors group "Geographical location" as predicted by the previous studies (Prohorovs & Pavlyuk, n.d.) the factor "Close location to the countries with high VC activity" is important. "Close location of a particular place to the country's core economical regions" has only moderate importance which could be explained by small size of Latvia.

From factors group "Culturally determined social norms" "High level of risk and uncertainty toleration" and "Tendency towards cooperation and trust" both are important.

From factors group “Reputation of a particular country” “Public image of a particular country” is important. “Lack of restrictions/warnings from international organizations” is more important for the supply side than the demand side of the VC market.

The factors are grouped into twelve factors’ groups and three metagroups: i) VC market participants; ii) environment; iii) embedded characteristics. In each of the factors’ groups and metagroups are factors with strong impact on the VC market development. The results confirm necessity stressed by other authors (Lerner et al., 2005; Martin et al., 2005) to skip away from just providing public funding to VC funds to developing overarching governmental policy for the development of the self-sustainable VC market. The conceptual model of VC market activity development dimensions proposed by the authors and the factors with substantial impact list could be a useful tool for politicians for further governmental support design. The public support should be provided on all metagroups dimensions, but focusing on the factors with the biggest influence.

CONCLUSIONS AND RECOMMENDATIONS

1. The features of a self-sustainable VC market (a status which governments should help the market to reach) are: i) a balance exists between demand for such capital and its supply; ii) 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 them strong support; iii) there is a pipeline of sufficiently good quality investible businesses for VCFs; iv) 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: i) 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; ii) 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; iii) there isn't a pipeline of sufficiently good quality investible businesses for VCFs; iv) the market has not reached critical mass for further organic growth without public support. As of mid-2021, no private capital VC funds are raised in Latvia.
3. A qualitative content analysis of the scientific literature show 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 (as 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. An Importance-Performance Matrix Analysis shows that the factor "Providing public funding" is only one of many factors with a high impact upon VC market development.
5. Government support with public funding for VC funds (influencing the beneficial effect from the 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 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, the factor "Existence of alternative IPO and listing regulations for SMEs with less stringent standards" was rated to be a factor with below moderate importance. 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 an IPO is the selected method for investors to exit, 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. 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 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. 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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APPENDICES

Appendix 1 Responses of the experts regarding self-sustainable VC market characteristics

22 experts of the Latvian VC market by direct emails were asked to agree on self-sustainable - VC market characteristics delivered from the scientific literature.

The experts were chosen based on Latvian Private Equity and Venture Capital Association data as being deeply involved in the VC market in Latvia and knowing all significant market participants. The approached experts were: VC fund managers active in Latvia, public agencies responsible for VC programmes in Latvia/Baltics representatives (ALTUM, EIF), policymakers in charge of VC programmes, Limited partners or investors in VC funds, representatives of start-up community or serial entrepreneurs.

14 from approached experts responded during 23.-10.10.2021. either by emails or during telephone calls. The responses or transcripts of the telephone calls are provided below.

Experts	**Characteristics of the VC market status which governments should help to achieve 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.**
Expert 1	Agree
Expert 2	Manuprāt pāris no tām lietām makes sense, bet tajā pašā laikā ir ļoti teorētiskas un praksē tikpat kā neizmērāmas (īpaši 1. un 3.), ņemot vērā riska kapitāla īpatnību, ka viss pieprasījums nav "vienāds", kā arī investīciju kvalitāte ir ļoti subjektīvs termins. Līdz ar to par pazīmēm, pēc būtības līdzīgi kā tu rakstīji, bet es skatītos no praktiskākas puses lai tās varētu vērtēt/mērīt: - lielākā daļa LPs riska kapitāla fondos ir privāti vai profesionāli/institucionāli investori (ne EU $$, izņemot EIF) ar tendenci šai proporcijai augt - ir novērots vismaz viens pilns investīciju cikls, kur veiksīga startapa founderi/early employees ir saņēmuši līdzekļu no exit/secondary sale, kurus iegulda atpakaļ startapos. - jaundibinātu startup skaitam ir tendence augt (svarīgāk nekā piesaistītais finansējums, jo tas ir backward looking pēc būtības) - ir kā minums nosegtas pre-seed un seed investīciju stadijas (varētu kvantificēt cik daudz dealiem būtu aptuveni jānotiek katrā no stadijām konkrētās valsts

	gadījumā, ņemot par piemēru citas attīstītas ekosistēmas, rēķinot per capita). Tātad jābūt tik daudz kapitālam pieejamam šajos fondos / tam jāatbilst viņu stratēģijai lai šo nosegtu. - ir tendence (un droši vien kāds minimālais robežlielums) investīcijām tikt laika gaitā vairāk veiktām konkrētajā valstī reģistrētajā uzņēmumā (nevis piemēram US/UK ar meitu lokālajā tirgū)
Expert 3	Visumā piekrītu. Ieteiktu papildināt ar būtisku uzstādījumu par VC market iekļaušanos kopējā innovation ekosistēmā. Tas ir it īpaši svarīgi, ja runa ir par publiskā sektora lomu, jo tieši tās sfēras, kas ir blakus VC (science, pre-seed – – incubation&acceleration, talent import, entrepreneurship education) visvairāk ir atkarīgas no valsts politikas.
Expert 4	Agree
Expert 5	1) Riska kapitāls būtībā nav homogēns tirgus, bet gan jumta termins vairākiem pietiekami neatkarīgiem finanšu produktiem/tirgiem, kurus lietderīgi analizēt atsevišķi, jo „self-sustainability" līmenis katrā atšķirsies. Var analizēt sīki - VC, growth, buyout, mezzanine, var analizēt divos lielos blokos – tehnoloģijas riska finansēšana (VC) un general business riska finansēšana (growth, buyout, mezzanine). 2) „Self-sustainability" būtībā demonstrē tikai viena vienīga pazīme – tirgus dalībnieku spēja nopelnīt privātajiem investoriem pieņemamu atdevi (risk-adjusted returns). Ja šī pazīme izpildās, tad privātie investori labprāt nodrošinās visu nepieciešamo finansējumu, un tirgus var funkcionēt bez valsts atbalsta. Piemēram 90.gados Baltijā vēl nefunkcionēja hipotekāro kredītu tirgus, tad ar ASV valdības atbalstu 1994.gadā izveidoja hipotekārās kreditēšanas uzņēmumu Baltic-American Entreprise Fund, tas izsniedza hipotekāros kredītus un izplatīja labo praksi. Šobrīd hipotekāro kredītu tirgus ir self-sustainable. Te ir aprakstīts mazliet https://pressroom.ifc.org/all/pages/PressDetail.aspx?ID=20384 3) Te gan svarīga atruna, ka „self-sustainability" nav vienīgais mērķis, raugoties no valsts pozīcijām. Agrīnajam galam, īpaši akseleratoriem, ir arī būtiska sociāla loma ievilkt vairāk cilveku uzņēmējdarbībā un vairot jaunuzņemumu skaitu, attiecīgi valstij var būt pamatoti to finansēt arī pie privātajiem investoriem nepieņemami zemas finanšu atdeves.Vēlīnais gals gan tuvāk stāstam par hipotekārajiem kredītiem. To uzsver arī Eiropas Komisija, sk piemēram 3.punktu. https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52014XC0122(04)&from=EN 4) Te ir svaigs Eiropas Investīciju Fonda slaids par šo tēmu.
Expert 6	Svarīgi saprast par kādu tirgu ir runa (eksperti self-sustainability vērtējumam no kurienes): Eiropas vai US. US tirgus atziņas nav pārāk relevantas mums. ES eksperti mums daudz tuvāki. ES nekad nesasniegs to līmeni, kas US. ES vienmēr būs vajadzīgs atbalst no valdības. Arī ES jāskatās vai attīstītie tirgi, vai nē. Svarīgi, lai tiktu izveidota sistēma. Tas nav izdarāms īsterminā - vismaz 20 gadi nepieciešami, 2, 3 fondu paaudzēm jāpaiet. Publiskais atbalsts ES vienmēr būs vairāk nepieciešams kā US.
Expert 7	Mans isais redzejums par sustainable VC ekosistemu ir zemak. Pietam butu janoskir, par kuru VC ekosistemas dalu runajam, jo piemare, tada lieta ka Technolgy Transfer / pre-see spin-outs from Universities, iespejams, ka vienmer vajadzes valdibas atbalstu vai nu grantu vai subsidetu riska investiciju forma.

	Bet ja runajam par tadu klasiski VC modeli seed/series-A to Series C/D/E/F 1. Ir pietiekams augstas kvalitates dealflow un ir kompetenti GPs kas spej atsijat pareizas idejas 2. Ir pietiekams daudzums ar VC funding, kas atakrigs no ta… 3. vai ir pietiekami daudz LPs kas gatavi investet…kas atkarigas no ta vai… 4. …VC fondi spej demonstret pietiekami labu track record… 5. …kas atkarigs no punkta #1 mineta Valdibas atbalsts manuprat ir svarigs 2 veidos: - Jabut labia augstakai izglitibai STEM (un entrepreneurship daleji ari) - Valdibai ir javeido Fondu-Fonds, lai atblastitu pirmas paris generation ar VC fondiem ka cornerstone LP
Expert 8	Man self-sustainable būs tāds tirgus, kas var pastāvēt bez valsts atbalsta (jau minēts), kur ir "dabīgs" pieprasījums un piedāvājums, kur šis pieprasījums/piedāvājums ir "strukturāls", t.i. ir pamatots iemels domāt, ka tāds pastāvēs pēc 5, 10 un 20 gadiem, tiek sasniegti ienesīguma mērķi (sarežģītāk definējams), un apjomu ziņā tas ir pietiekami būtisks pret IKP vai kādu citu mērauklu. No šīm lietām, liela daļa pārklājas ar Tevi atsūtīto un tas, ko es uzsvērtu vairāk ir pieprasījuma/piedāvājuma strukturāla ilgtspēja un gana nozīmīgs apjoms pret IKP. Ja Tu mini riskantāko VC kompāniju finansēšanu tad man automātiski prasās arī kaut kas par VC lifecycle kopumu.
Expert 9	Agree
Expert 10	Agree
Expert 11	Man liekas, kad ir (1) adekvāts VC funding supply (adekvāts = profesionāls, zinošs, VC konceptam atbilstošs) + (2) adekvāts demand for VC funding (adekvāts = ir labs startupu pipeline, kuriem tiešām vajag $$$ un kuri tiešām ir gatavi to absorbēt un augt) + (3) adekvāta likumdošanas bāze, kura sakārto attiecības starp VC un startupiem (adekvāta = draudzīga, samērīga un VC/startup izaugsmi veicinoša), tad tik iešām var sasniegt to tirgu, kurš būtu self-sustainable, un valsts loma tajā būtu jau minimāla.
Expert 12	Es kopumā piekristu. Pāris komentāru zemāk. Lielākais izaicinājums ir termins "tirgus". Riska kapitāla tirgus zaudē robežas. Mēs Superhero Capital esam Baltijā un runājam par to, ka tas kopumā kļūst nebūtiski Zoom laikmetā. Change Ventures fokusējas uz Baltijas founderiem, lai arī kur viņi būtu. Un mūsdienās mēs satiekam kompānijas, kuras sēž Latvijā, ir reģistrētas Igaunijā un piesaista naudu Somijā. Un šis notiek dažādākās kombinācijās. Bet, ja mēs runājam par valsts līmeni un tieši agrīnās stadijas finansējumu, tad tavi punkti ir ļoti precīzi.
Expert 13	1. pazīme ļoti svarīgi, lai kvalitatīvs pieprasījums un atbilstoši intensīvs attīstīto valstu praksei, kur uz 1 investīciju saņēmēju ir 400 pieprasītāji. Tāpat svarīgi, lai otrā pusē finanšu lifts veidotos, sākot no pašas agrīnākās stadijas, ko finansē FFF+BA. Sākotnējo stadiju pilnībā nenodrošina akceleratori. Savukārt no inkubatoriem vispār neviens uzņēmums tālākai VC finansēšanai nav radies. 4.pazīme ļoti svarīgi, jo valsts atbalsts kropļo tirgu. Nepieciešams valsts atbalsts BA administratīvo izmaksu segšanai
Expert 14	Tirgu saukt kā self-sustainable varētu piekrist.

	Pazīmju saraksts arī ir labs un uz to tiešām ir vērts tiekties, bet tomēr man šķiet, ka tā ir "neiespējamā misija" tirgiem, kuri ir mazi - tātad tām valstīm, kurām ekonomikas ir salīdzinoši mazas. Mazas ekonomikas vienmēr ir mazāk self-sustainable, līdz ar to arī tirgi manto šo iezīmi. Mazām valstīm raksturīga specifikācija, līdz ar to nevar nodrošināt pietiekamu diversifikāciju. Tāpat, rodoties kādai jaunai nozarei, piemēram kā AI, investoriem būtu vajadzīgs laiks, lai saprastu nozares raksturlielumus. Šķiet, ka lielās ekonomikās tirgum to būtu iespējams izdarīt ātrāk. Tāpat lielu lomu tajā visā spēlē ekomomikas briedums un uzkrātais kapitāls. Attīstības valstīm šādu Tevis doto tirgus aprakstu būtu grūtāk sasniegt, dēļ tā, ka ekonomika nav vēl ģēnerējusi pietiekami lielus uzkrājumus, kurus varētu ieguldīt jaunos izaicinošos projektos.

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Appendix 5 Succession of the Latvian VC Fund managers and the funds raised

Name of the VC Fund manager	Funds raised in 2004-2006 planning period	Funds raised in 2007-2013 JEREMIE	Funds raised in 2007-2013 planning period	Funds raised in 2014-2020 planning period	Funds raised without public support	Comments
SIA ZGI Capital (previous name - Zaļās gaismas investīcija) *	**ZGI fonds**	No	ZGI-3	ZGI-4	ZGI-nano	ZGI-nano before its dissolvement madeand later eixited from only one investment (Naco Technologies)
AS Eko Investors*	Otrais **Eko fonds**	No	No	No	No	-Has a litigation with ALTUM -Investment Director became a founder of the next generation's fund manager
SIA TechVentures Fondu Vadības Kompānija*	**INVENTO**	No	No	No	No	A partner became active member of Latvian Startup Ecosystem
BaltCap AIFP, SIA	No	BaltCap Latvia Venture Capital Fund	No	No	No	The oldest VC manager in the Baltic States. Had other possibilities to raise funds and because of overwhelming administrative burden of Latvian public VC support decided to not participate in further planning periods.
Imprimatur Capital FUND Management AIFP, SIA*	No	Imprimatur Seed fund and Imprimatur Start-up fund	No	No (won a tender for a fund, but was not succesful in fundraising of the private share)	No	Has a partner who was an investment director in another VC fund manager from 2004-2006 planning period
Expansion Capital AIFP, SIA*	No	No	Expansion Capital Fund	INEC1 AIF and INEC2 AIF	No	
FlyCap AIFP*	No	No	FlyCap Investment Fund I	FlyCap Mezzanine Fund II AIF	No	

Buildit Latvia AIFP, SIA*	No	No	No	Buildit Latvia Pre-Seed Fund and Buildit Latvia Seed Fund	No	
Commercialization Reactor Fund AIFP, SIA*	No	No	No	Commercialization Reactor Pre-SeeFund and Commercialization Reactor Seed Fund	No	Has a partner who was an investment director in another VC fund manager from 2007-2013 planning period
Overkill Ventures AIFP, SIA*	No	No	No	Overkill Ventures Fund I and Overkill Ventures Fund II	No	

* Established in a year when an appropriate planning period tender for VC Fund managers was announced.

Data obtained from:

4. Regarding planning period 2004-2006:

https://www.esfondi.lv/upload/04-kohezijas_politikas_nakotne/dp_aktivitates/2dp/2OP_11022014_ENG_with_amendments.pdf
https://m.esfondi.lv/jaunumi/nacionalas-programmas-riska-kapitala-finansejums-ietvaros-ir-izveidoti-tris-riska-kapitala-fondi
https://www.db.lv/zinas/altum-ar-eko-investoru-tiesajas-par-es-naudas-atmaksu-467462

5. Information about VC Fund managers from The Financial and Capital Market Commission https://www.fktk.lv
6. Information about VC Fund managers historical names, structures and partners from firmas.lv, Latvian company database holder
7. Information about staff of the VC fund managers from information on the internet.
8. Regarding planning period 2007-2013 -

https://www.esfondi.lv/upload/2007-2013_nosleguma_zinojums/0_2_op_fir_2007-2013_2017.pdf

9. Regarding planning period 2014-2020 -

https://www.esfondi.lv/2020.gads and www.altum.lv

Appendix 6 Investments in portfolio companies by Latvian VCFs

Nr. p.k.	Uzņēmums		Fonda nosaukums	Kopējais fonda ieguldījuma apjoms (EUR) 7=5+6	Līguma noslēgšanas datums	
	Nosaukums	Reg.Nr.				
1	2	3	4	7	8	
1	Primekss Group SIA	40003328876	BaltCap Latvia Venture Capital Fund KS	1 400 000	25/10/2010	E
2	Oobelisk SIA	40103358114	BaltCap Latvia Venture Capital Fund KS	205 000	22/12/2010	E
3	Eurolcds SIA	41203040030	BaltCap Latvia Venture Capital Fund KS	2 752 500	21/06/2011	E
4	AGroup SIA	40003986259	BaltCap Latvia Venture Capital Fund KS	1 838 247	05/07/2011	E+QE
5	Vendon SIA	40103422387	BaltCap Latvia Venture Capital Fund KS	1 460 019	30/12/2011	QE
6	Clusterpoint SIA	40003850104	BaltCap Latvia Venture Capital Fund KS	1 780 774	14/03/2012	E
7	EKJU SIA	40003051329	BaltCap Latvia Venture Capital Fund KS	1 500 000	28/03/2012	E
8	Amateks SIA	40003576806	BaltCap Latvia Venture Capital Fund KS	950 000	13/08/2012	E+QE
9	Blue Bridge Technologies SIA	40003932716	BaltCap Latvia Venture Capital Fund KS	800 000	17/05/2013	E
10	Post Service SIA	50003599251	BaltCap Latvia Venture Capital Fund KS	300 000	24/05/2013	E
11	Post Service Kurzeme SIA	42103050328	BaltCap Latvia Venture Capital Fund KS	1 767 000	24/05/2013	E+QE
12	BoxNet SIA	40103378962	BaltCap Latvia Venture Capital Fund KS	583 000	24/05/2013	E
13	Stenders SIA	40003563248	BaltCap Latvia Venture Capital Fund KS	2 500 000	30/10/2013	E
14	LightSpace Technologies SIA	40103758550	BaltCap Latvia Venture Capital Fund KS	200 000	01/12/2014	E
15	Pure Chocolate	40003900797	BaltCap Latvia Venture Capital Fund KS	1 400 000	01/07/2015	E+QE
16	Naco Technologies SIA	40103288480	Imprimatur Capital Technology Venture Fund KS	600 443	20/05/2011	E
17	Blue Bridge Technologies SIA	40003932716	Imprimatur Capital Technology Venture Fund KS	600 000	23/12/2011	E
18	MolPort SIA	40003881547	Imprimatur Capital Technology Venture Fund KS	699 997	14/11/2012	E+QE
19	NeoZeo SIA	40103577297	Imprimatur Capital Technology Venture Fund KS	380 000	16/12/2013	E

20	Sonarworks SIA	40103611667	Imprimatur Capital Technology Venture Fund KS	999 998	20/12/2013	E+QE
21	Hypermancer SIA	40103663419	Imprimatur Capital Technology Venture Fund KS	600 000	30/06/2014	E
22	Data Visualization Software Lab SIA	40103658672	Imprimatur Capital Technology Venture Fund KS	900 000	21/11/2014	E+QE
23	LightSpace Technologies SIA	40103758550	Imprimatur Capital Technology Venture Fund KS	624 730	22/12/2014	E+QE
24	Conelum SIA	40103589915	Imprimatur Capital Technology Venture Fund KS	160 000	22/12/2014	E+QE
25	Naco Technologies SIA	40103288480	Imprimatur Capital Seed Fund KS	199 799	18/08/2010	QE
26	e-Tag SIA	40103174352	Imprimatur Capital Seed Fund KS	100 000	08/12/2010	QE
27	MolPort SIA	40003881547	Imprimatur Capital Seed Fund KS	100 000	10/12/2010	QE
28	Blue Bridge Technologies SIA	40003932716	Imprimatur Capital Seed Fund KS	100 000	31/01/2011	QE
29	PR Applications SIA	50103239881	Imprimatur Capital Seed Fund KS	40 000	25/03/2011	QE
30	Clusterpark SIA	50103442421	Imprimatur Capital Seed Fund KS	200 000	06/10/2011	QE
31	Baltic Embedded SIA	40103489045	Imprimatur Capital Seed Fund KS	164 700	08/12/2011	QE
32	Advanced Vector Analytics SIA	40103420102	Imprimatur Capital Seed Fund KS	105 000	25/05/2012	QE
33	NeoZeo SIA	40103577297	Imprimatur Capital Seed Fund KS	200 000	23/08/2012	QE
34	Sonarworks SIA	40103611667	Imprimatur Capital Seed Fund KS	200 000	30/11/2012	QE
35	Spatial Initiatives SIA	40103627225	Imprimatur Capital Seed Fund KS	200 000	31/01/2013	QE
36	Data Visualization Software Lab SIA	40103658672	Imprimatur Capital Seed Fund KS	200 000	12/04/2013	QE
37	Reach.ly SIA	40103371057	Imprimatur Capital Seed Fund KS	50 000	21/06/2013	Loan
38	Hypermancer SIA	40103663419	Imprimatur Capital Seed Fund KS	200 000	30/07/2013	QE
39	EvOLED SIA	40103681804	Imprimatur Capital Seed Fund KS	50 000	11/08/2013	Loan
40	Maxtraffic SIA	40103334830	Imprimatur Capital Seed Fund KS	50 000	02/09/2013	Loan
41	Froont SIA	40103670923	Imprimatur Capital Seed Fund KS	50 000	02/09/2013	Loan
42	Conelum SIA	40103589915	Imprimatur Capital Seed Fund KS	200 000	16/09/2013	QE
43	ThermCERT LV SIA	41203047452	Imprimatur Capital Seed Fund KS	200 000	05/12/2013	QE
44	Fastr Books SIA	40103576037	Imprimatur Capital Seed Fund KS	50 000	06/11/2013	Loan
45	Maintenel Autom. (Werk Trek SIA)	40103726536	Imprimatur Capital Seed Fund KS	50 000	08/11/2013	Loan
46	BioArm SIA	40103496579	Imprimatur Capital Seed Fund KS	50 000	11/11/2013	Loan

47	Rent Mama (RM Travel SIA)	40103729852	Imprimatur Capital Seed Fund KS	50 000	14/11/2013	Loan
48	Asteria Education SIA (Funderful)	50103611391	Imprimatur Capital Seed Fund KS	50 000	03/12/2013	Loan
49	Buzztale SIA	40103742530	Imprimatur Capital Seed Fund KS	50 000	17/12/2013	Loan
50	Nano Optometrics SIA	50103739091	Imprimatur Capital Seed Fund KS	50 000	17/12/2013	Loan
51	Fitness App	40103729918	Imprimatur Capital Seed Fund KS	50 000	17/12/2013	Loan
52	Mahydy SIA	50103740071	Imprimatur Capital Seed Fund KS	50 000	18/12/2013	Loan
53	Safevox SIA	40103725649	Imprimatur Capital Seed Fund KS	50 000	20/12/2013	Loan
54	LED Chemicals SIA	40103743165	Imprimatur Capital Seed Fund KS	50 000	17/01/2014	Loan
55	NFC Team SIA	40103457088	Imprimatur Capital Seed Fund KS	50 000	17/02/2014	Loan
56	MightyFingers SIA	40103694457	Imprimatur Capital Seed Fund KS	50 000	26/02/2014	Loan
57	EvOLED SIA	40103681804	Imprimatur Capital Seed Fund KS	146 573	28/02/2014	QE
58	Reach.ly SIA	40103371057	Imprimatur Capital Seed Fund KS	150 000	27/03/2014	QE
59	Lightspace technologies SIA	40103758550	Imprimatur Capital Seed Fund KS	200 000	10/04/2014	QE
60	UCORS SIA	40103778754	Imprimatur Capital Seed Fund KS	50 000	15/04/2014	Loan
61	Froont SIA	40103670923	Imprimatur Capital Seed Fund KS	150 000	28/04/2014	QE
62	Tech Radical SIA	40103582423	Imprimatur Capital Seed Fund KS	50 000	30/04/2014	Loan
63	Branch track SIA	50103777981	Imprimatur Capital Seed Fund KS	50 000	14/05/2014	Loan
64	Fastr Books SIA	40103576037	Imprimatur Capital Seed Fund KS	150 000	22/05/2014	E
65	The Game Corporation Latvia SIA	40103791019	Imprimatur Capital Seed Fund KS	200 000	22/05/2014	QE
66	Koatum SIA	40103785402	Imprimatur Capital Seed Fund KS	50 000	30/06/2014	Loan
67	EDURIO (Feedster) SIA	50103808891	Imprimatur Capital Seed Fund KS	50 000	04/08/2014	Loan
68	Scorefellas SIA	40103808921	Imprimatur Capital Seed Fund KS	50 000	06/08/2014	Loan
69	Snowision SIA	40103813462	Imprimatur Capital Seed Fund KS	50 000	15/08/2014	Loan
70	Underwater Optical Technologies SIA	40103830265	Imprimatur Capital Seed Fund KS	50 000	25/09/2014	Loan
71	Tungsten SIA	40103832247	Imprimatur Capital Seed Fund KS	50 000	02/10/2014	Loan
72	InSelly SIA	40103831881	Imprimatur Capital Seed Fund KS	50 000	14/10/2014	Loan
73	Trip.center SIA	40103844424	Imprimatur Capital Seed Fund KS	50 000	26/11/2014	Loan
74	Certes Technologies SIA	40103709220	Imprimatur Capital Seed Fund KS	50 000	11/12/2014	Loan
75	Ringbe SIA	40103860931	Imprimatur Capital Seed Fund KS	50 000	19/01/2015	Loan
76	Maintenel Automation SIA	40103726536	Imprimatur Capital Seed Fund KS	150 000	13/02/2015	QE
77	Airdog SIA	53603054411	Imprimatur Capital Seed Fund KS	169 862	25/02/2015	QE

78	STROPS technologies	40103882290	Imprimatur Capital Seed Fund KS	50 000	01/04/2015	Loan
79	Playgineering	40103898906	Imprimatur Capital Seed Fund KS	50 000	21/05/2015	Loan
80	Health Lab (Cheek Up)	40103885348	Imprimatur Capital Seed Fund KS	50 000	30/06/2015	Loan
81	Koatum SIA	40103785402	Imprimatur Capital Seed Fund KS	60 000	07/05/2015	QE
82	NanoOptoMetrics SIA	50103739091	Imprimatur Capital Seed Fund KS	35 000	07/05/2015	QE
83	InSelly SIA	40103831881	Imprimatur Capital Seed Fund KS	150 000	14/08/2015	QE
84	Edurio	50103808891	Imprimatur Capital Seed Fund KS	120 000	31/08/2015	QE
85	Playgineering SIA	40103898906	Imprimatur Capital Seed Fund KS	150 000	09/06/2016	QE
86	Certes Technologies SIA	40103709220	Imprimatur Capital Seed Fund KS	100 000	30/06/2016	QE
87	AirBoard	42103073439	Imprimatur Capital Seed Fund KS	50 000	27/07/2015	Loan
88	AdapLab Oil&Gas	40103914331	Imprimatur Capital Seed Fund KS	50 000	31/07/2015	Loan
89	Branch track SIA	50103777981	Imprimatur Capital Seed Fund KS	150 000	31/08/2015	QE
90	WiFi	40103930251	Imprimatur Capital Seed Fund KS	50 000	22/09/2015	Loan
91	Practican	40103930976	Imprimatur Capital Seed Fund KS	50 000	24/09/2015	Loan
92	Vortex oil Engineering	40103830250	Imprimatur Capital Seed Fund KS	50 000	24/09/2015	Loan
93	Anatomy Next	40103937758	Imprimatur Capital Seed Fund KS	50 000	02/11/2015	Loan
94	PAYYAP Retail	40103952649	Imprimatur Capital Seed Fund KS	50 000	18/12/2015	Loan
95	Studio Dig IT (Finch)	40103830496	Imprimatur Capital Seed Fund KS	50 000	19/01/2016	Loan
96	Agility Sports	40103939034	Imprimatur Capital Seed Fund KS	50 000	28/01/2016	Loan
97	Nordigen Solutions	40103982535	Imprimatur Capital Seed Fund KS	50 000	14/04/2016	Loan
98	Fragmentic SIA	40103985565	Imprimatur Capital Seed Fund KS	50 000	09/05/2016	Loan
99	Go VR SIA	50103964531	Imprimatur Capital Seed Fund KS	50 000	23/05/2016	Loan
100	Notakey SIA	40103993632	Imprimatur Capital Seed Fund KS	50 000	23/05/2016	Loan
101	Orocon SIA	40103986344	Imprimatur Capital Seed Fund KS	50 000	22/06/2016	Loan
102	Captomatic SIA	40103928789	Imprimatur Capital Seed Fund KS	50 000	30/06/2016	Loan
103	Custom 3D Tech SIA	40203004350	Imprimatur Capital Seed Fund KS	50 000	09/08/2016	Loan
104	Toneboard SIA	40203023120	Imprimatur Capital Seed Fund KS	50 000	06/10/2016	Loan
105	Anatomy Next	40103937758	Imprimatur Capital Seed Fund KS	150 000	20/12/2016	QE
106	Robotic Solutions	40103840761	Imprimatur Capital Seed Fund KS	50 000	16/01/2017	Loan
107	Printify Development	40103913868	Imprimatur Capital Seed Fund KS	50 000	20/02/2017	Loan

108	Plus Pedal	40203039583	Imprimatur Capital Seed Fund KS	50 000	06/03/2017	Loan
109	Funderful	40103812556	Imprimatur Capital Seed Fund KS	95 287	05/04/2017	QE
110	Hackmotion	40203060220	Imprimatur Capital Seed Fund KS	50 000	06/04/2017	Loan
111	FOCUSD	40103926082	Imprimatur Capital Seed Fund KS	50 000	28/04/2017	Loan
112	Lokalise	50203064421	Imprimatur Capital Seed Fund KS	50 000	02/05/2017	Loan
113	Capsulink	40203065105	Imprimatur Capital Seed Fund KS	50 000	08/05/2017	Loan
114	Solfeg.io	40203060042	Imprimatur Capital Seed Fund KS	50 000	02/06/2017	Loan
115	ENME	40203072662	Imprimatur Capital Seed Fund KS	50 000	16/06/2017	Loan
116	Arbitrum	40203076787	Imprimatur Capital Seed Fund KS	50 000	22/06/2017	Loan
117	Art Fairs Service SIA	40103755624	ZGI-3	280 000	01/02/2014	E+QE
118	Steel Constructor MM SIA	40103340860	ZGI-3	200 000	01/05/2014	QE
119	Scandivac SIA (Uldis Biķernieks)	40003033200	ZGI-3	150 000	01/05/2014	QE
120	Rubber products SIA	40103291527	ZGI-3	194 000	01/08/2014	QE
121	ECOLUTIONS SIA	40103684800	ZGI-3	200 000	01/11/2014	QE
122	Orions Loģistika SIA	50003879811	ZGI-3	100 000	01/11/2014	QE
123	Square Audio SIA	44103081218	ZGI-3	50 000	01/12/2014	E
124	Latvāņi SIA	45401010204	ZGI-3	500 000	01/04/2015	QE
125	Ērenpreiss Original SIA	40103287837	ZGI-3	140 000	01/06/2015	E+QE
126	Mārupes Metālmeistars	50003428031	ZGI-3	1 125 000	03/08/2015	E+QE
127	Dardedze hologrāfija	40003270251	ZGI-3	894 600	20/07/2015	QE
128	Uprent	40103628470	ZGI-3	200 000	03/08/2015	QE
129	Baltic Dairy Board	43603036823	ZGI-3	1 000 000	15/06/2015	E+QE
130	Creamware	40103704007	ZGI-3	200 000	04/12/2015	QE
131	Steel Constructor MM SIA	40103340860	ZGI-3	150 000	25/10/2016	QE
132	Rānda	40003218805	ZGI-3	300 000	24/11/2015	QE
133	CS Games	40103938043	ZGI-3	51 000	26/11/2015	QE
134	Biotehniskais centrs SIA	40003280438	ZGI-3	200 000	22/08/2016	E+QE
135	Mobilly SIA	40003654405	ZGI-3	700 000	11/10/2016	E
136	PLG Medical SIA	40103920200	ZGI-3	480 000	21/09/2016	QE
137	Banga Ltd SIA	41203031343	ZGI-3	275 000	10/10/2016	QE

138	Kool Latvija SIA	40203022089	ZGI-3	1 500 000	31/10/2016	E+QE
139	Riga port Service SIA	40203017478	ZGI-3	400 000	18/10/2016	QE
140	Nordic Group SIA	40103177946	ZGI-3	190 000	25/10/2016	QE
141	Mailigen SIA	40103708475	FlyCap Investment Fund I	364 997	20/05/2014	E+QE
142	PolyLab SIA	40103787761	FlyCap Investment Fund I	125 000	18/08/2014	E
143	Prakse.LV SIA	40103463807	FlyCap Investment Fund I	55 000	14/10/2014	QE
144	bio2you SIA	40103243404	FlyCap Investment Fund I	245 000	15/10/2014	E+QE
145	Latgales Granulas SIA	52403034911	FlyCap Investment Fund I	400 000	13/11/2014	E+QE
146	Arsenal Industrial SIA	40103815302	FlyCap Investment Fund I	1 500 000	27/11/2014	E+QE
147	Cannelle Bakery (Matss) SIA	40003146530	FlyCap Investment Fund I	370 020	15/12/2014	QE
148	Tepix SIA	40103165612	FlyCap Investment Fund I	615 500	13/01/2015	QE
149	MolPort SIA	40003881547	FlyCap Investment Fund I	200 000	18/02/2015	E
150	RCG Lighthouse SIA	40103672303	FlyCap Investment Fund I	705 000	02/03/2015	E+QE
151	AirDog LLC	53603054411	FlyCap Investment Fund I	501 726	12/03/2015	E
152	Grobiņa AS	40003017297	FlyCap Investment Fund I	1 000 000	29/05/2015	QE
153	LOR Klīnika SIA	40103816030	FlyCap Investment Fund I	290 000	29/06/2015	E
154	HomeTV Pro	40103535630	FlyCap Investment Fund I	500 000	02/07/2015	E+QE
155	Baltu veterinārija	40103629372	FlyCap Investment Fund I	335 000	07/09/2015	E+QE
156	AS HansaMatrix (Hanza Elektorics)	40003454390	FlyCap Investment Fund I	1 499 677	01/12/2015	E
157	Nemco SIA	40103970678	FlyCap Investment Fund I	1 000 000	01/04/2016	E+QE
158	Purified SIA	40103747345	FlyCap Investment Fund I	290 540	01/06/2016	E
159	Sonarworks SIA	40103611667	FlyCap Investment Fund I	250 000	08/07/2016	E
160	Wiksna Wood SIA	44103039780	FlyCap Investment Fund I	523 000	11/08/2016	QE
161	NMS Laboratorija SIA	40003269835	FlyCap Investment Fund I	509 999	29/09/2016	E
162	Bambusa pasaule SIA	40203018859	FlyCap Investment Fund I	225 000	04/10/2016	E+QE
163	TapCore SIA	40203021115	FlyCap Investment Fund I	250 000	05/10/2016	E
164	MyClinic Riga	40203024408	FlyCap Investment Fund I	450 000	26/10/2016	QE
165	Scanhouse SIA	50103234691	EXPANSION CAPITAL FUND	258 000	30/04/2014	E+QE
166	Krasta Motors SIA	40103622957	EXPANSION CAPITAL FUND	199 996	15/08/2014	E+QE
167	Angel Glass Design SIA	40003709756	EXPANSION CAPITAL FUND	100 000	05/09/2014	E+QE
168	SFM Latvia SIA	40103318408	EXPANSION CAPITAL FUND	175 000	31/10/2014	QE

169	Ake loģistika SIA	40103689583	EXPANSION CAPITAL FUND	625 000	08/12/2014	E
170	SFM Jelgava SIA	40103830621	EXPANSION CAPITAL FUND	935 000	29/12/2014	E+QE
171	Rukis Wood SIA	54103096501	EXPANSION CAPITAL FUND	200 000	29/12/2014	E+QE
172	Monetizator SIA	40103744993	EXPANSION CAPITAL FUND	800 000	15/12/2014	E+QE
173	Baltic Wild SIA	50103803451	EXPANSION CAPITAL FUND	175 100	23/12/2014	E+QE
174	SH Capital SIA	50103754071	EXPANSION CAPITAL FUND	80 000	22/12/2014	E+QE
175	AIM Systems SIA	40103823371	EXPANSION CAPITAL FUND	175 000	26/01/2015	E
176	Muižnieks SIA	44103060771	EXPANSION CAPITAL FUND	100 000	29/01/2015	QE
177	Baltic Floating Structures SIA	40103675969	EXPANSION CAPITAL FUND	199 000	27/02/2015	QE
178	Veiters korporācija SIA	40003687196	EXPANSION CAPITAL FUND	480 000	12/03/2015	QE
179	Package Ice SIA	41203052580	EXPANSION CAPITAL FUND	200 000	09/04/2015	QE
180	Valmieras tipogrāfija Lapa SIA	44103002862	EXPANSION CAPITAL FUND	200 000	09/04/2015	QE
181	Airdog Inc	53603054411	EXPANSION CAPITAL FUND	140 187	20/04/2015	E
182	GMT SIA	40103184685	EXPANSION CAPITAL FUND	150 041	08/05/2015	E+QE
183	Smart meter SIA	40103391617	EXPANSION CAPITAL FUND	185 000	19/06/2015	E+QE
184	Lakijs SIA	41503034620	EXPANSION CAPITAL FUND	197 845	21/06/2015	E+QE
185	Balt Brand	40103670425	EXPANSION CAPITAL FUND	1 433 250	18/08/2015	E
186	Rienzi	40003920740	EXPANSION CAPITAL FUND	200 000	11/09/2015	E+QE
187	Gas Powered Rail Latvia	40103927463	EXPANSION CAPITAL FUND	195 500	25/09/2015	QE
188	LGT Operators	40103842442	EXPANSION CAPITAL FUND	449 840	26/11/2015	E
189	Viduskurzemes AAO	58503015521	EXPANSION CAPITAL FUND	1 016 000	07/10/2015	E
190	Senulat	40103939212	EXPANSION CAPITAL FUND	1 500 000	03/02/2016	E
191	Baltspan SIA	44103104224	EXPANSION CAPITAL FUND	347 000	21/04/2016	E+QE
192	RRKP būve SIA	45403010533	EXPANSION CAPITAL FUND	280 000	20/06/2016	E+QE
193	TC Holding SIA	40003382726	EXPANSION CAPITAL FUND	200 000	17/08/2016	QE
194	Stonex SIA	42403033596	EXPANSION CAPITAL FUND	150 000	16/09/2016	QE
195	CWP SIA	40103582122	EXPANSION CAPITAL FUND	1 400 000	27/09/2016	E+QE
196	Captomatic SIA	40103928789	EXPANSION CAPITAL FUND	20 000	18/10/2016	QE
197	Lielupes industriālais parks SIA	40203025579	EXPANSION CAPITAL FUND	700 000	25/10/2016	E+QE
198	Sindas Kaltes SIA	45403046367	EXPANSION CAPITAL FUND	500 000	28/10/2016	E+QE
199	Cito Pluss SIA	50003843091	EXPANSION CAPITAL FUND	120 000	31/10/2016	E+QE

Appendix 7 Questionnaire regarding VAA activities of Latvian VCFs

Section I		
1. Please fill in the table below. Use judgement and approximations where precise data would be difficult to assemble		
Category	Respon se	Comments, if necessary
Firmwide (AIFM)		
a) Capital under management (if several funds under management, then total amount of these funds)		
b) The proportion of public money in the total amount under management		
c) Number of years in the venture capital business		
d) Number of individuals currently responsible for monitoring and assiting portfolio companies		
Partner level		
Nonpartner level		
e) Number of individuals currently responsible only for monitoring portfolio investments		
Partner level		
Nonpartner level		
f) Number of portfolio investments for which typical individual is currently responsible		
Partner level		
Nonpartner level		
g) Number of Boards of directors on which typical individual serves		
Partner level		
Nonpartner level		
h) Number of new investments per year (mean value during last 5 years; exclude follow-on investments)		
i) Period (years) you would expect to hold typical investment		
j) The share of the syndicated investments (% from total amount of the investments)		
k) Does the firm have specific stage focus (Seed, Start-up, Later stage venture). If yes, please write in the stage.		
Respondent Only		

l) Number of years in venture capital business		
m) Previous experience:		
Consulting experience (Number of years)		
Financial experience (Number of years)		
Business experience (management function) (Number of years)		
Entrepreneurial expierence (Number of years)		
Academic experience (Number of years)		

n) Number of portfolio investments for which you are personally responsible by role played:	Lead investor			Nonlead		
	Seed	Start-up	Later stage venture	Seed	Start-up	Later stage venture
o) Number of boards of directors on which you serve						

2. Roughly speaking, what percentage of your working hours over the course of a year do you devote to **monitoring** portfolio companies? (Check one.)		
Less than 5%		
5-15%		
15-30%		
30-45%		
45-60%		
60-75%		
75-90%		
3. Roughly speaking, what percentage of your working hours over the course of a year do you devote to **assisting** portfolio companies? (Check one.)		
Less than 5%		
5-15%		
15-30%		
30-45%		
45-60%		
60-75%		
75-90%		
4. Would you describe your involvement in value adding activities for portfolio companies as typical for a managers of your firm? If not, please explain the main difference.		
Section II		

1. For approximately what percentage of your portfolio companies would you describe your role as essentially passive (only contributing capital and monitoring)?		
0%		
15%		
30%		
45%		
60%		
75%		
90%		

2. For companies in which you play an active role, please answer the following question: In addition to contributing capital, what are the forms of assistance you offer to portfolio companies? Please rank these services in order of their importance marking as 1st the most important. For approximately what proportion of your portfolio companies do you in fact provide each form of assistance? (If you perform a service listed below, check the appropriate box, i.e., "I perform this service for between _% and _% of my portfolio companies." If you do not perform the service, leave the boxes blank.)		Frequency			
	Rank	**0-25 %**	**25-50 %**	**50-75 %**	**75-100 %**
Form of assistance					
Introductions to potential customers and suppliers					
Management and key employees (for example technical) recruitment					
Help obtaining additional financing					
Strategic planning					
Operational planning					
Assitance in the establishing a portfolio company's structure and developing it					
Assitance in the drafting and negotiating main contracts with customers/ suppliers and staff					
Provide advisory services (managerial, strategic, legal, technical and marketing advices excluding above mentioned)					
Executing the tasks of a portfolio company's staff member					
Knowledge sharing through access to VCs' developed network of the portfolio companies and others VC ecosystem members					
Other (please list)					

3. For the following types of investments estimate the extent of your contact. Respond with reference to the	Lead investor	Nonlead

portfolio companies for which you are personally responsible.	Seed	Start-up	Later stage venture	Seed	Start-up	Later stage venture
Visits per year						
Length of typical visit (hours)						
Annual hours on-site						
Phone conversations per month						
Length of typical conversation (min.)						
Annual telephone hours						
Other communication (emails, messages etc) number per month						

Section III

1. Consider companies with which you have been associated that have fallen seriously short of their objectives, so far short as to endanger the company's continued independent existence. For a maximum of three such companies, identify which of the following factors were major contributors to their difficulties and then rank the contributing factors in order of importance marking as 1st the most important.		Company		
	Rank	No. 1	No. 2	No. 3
Contributing Factor				
Management problems				
Innefective Senior management				
Ineffective functional management (i.e. finance, marketing, etc.)				
Market problems				
End user market failed to develop as expected				
Company failed to capture share due to:				
Poor channel selection/channel resistance				
Competition				
Poor product/market fit				
Product problems				
Development delayed or unsuccesful				
Manufacturing failure				
Poor product performance				
Inadequate quality control				
Other (please list)				

2. Have you ever initiated the removal of company managers? If yes, how many times and which managers?	Number of times	
	Initiated Removal	Agreed to

		Removal
CEO		
Functional Managers (e.g. Marketing)		
Others (please list)		
3. Have you ever assumed a magement rofe in a portfolio company? What role or roles have you assumed? How long did you remain in the role (s)?		

Section IV

1. Specific innovative technologies/tools you use to save your time necessary for the assistance to the portfolio companies?

Related to	Yes	Please describe the tool if possible	Impact of this tool on decrease of the necessary time (in percents)
Introductions to potential customers and suppliers			
Human resource management/recruitment			
Looking for additional financing			
Strategic planning			
Operational planning			
Performance management			
Knowledge sharing			
Others			

Appendix 8 Investments in industries by VC fund managers

Manufacturing	**1st VCF**	**2nd VCF**	**3rd VCF**	**4st VCF**	**5ft VCF**
High-technology	€2,749,292	€2,001,403	€140,187	€50,000	€2,952,500
Medium-high technology	€1,527,016	€370,000	€1,778,791	€1,070,000	€2,500,000
Medium-low-technology	€249,799	€0	€624,000	€1,319,000	€2,350,000
Low technology	€50,000	€1,472,780	€3,424,945	€2,969,600	€2,650,000

Services	**1st VCF**	**2nd VCF**	**3rd VCF**	**4st VCF**	**5ft VCF**
High-tech knowledge-intensive services	€7,525,287	€1,419,997	€380,000	€251,000	€6,462,040
Knowledge- intensive financial services	€0	€0	€800,000	€700,000	€0
Knowledge-intensive market services	€0	€0	€0	€200,000	€205,000
Other knowledge-intensive services	€100,000	€1,249,999	€0	€190,000	€0
Less knowledge- intensive market services	€800,000	€4,580,500	€5,664,836	€2,380,000	€0
Other less knowledge- intensive services	€0	€0	€0	€0	€2,067,000

Total	**1st VCF**	**2nd VCF**	**3rd VCF**	**4st VCF**	**5ft VCF**
Manufacturing	4,576,107	3,844,183	5,967,923	5,408,600	10,452,500
Services	8,425,287	7,250,496	6,844,836	3,721,000	8,734,040
Waste collection	0	0	1,016,000	0	0
Agriculture	0	1,000,000	0	0	0
Construction	0	0	258,000	350,000	0
	13,001,394	12,094,679	14,086,759	9,479,600	19,186,540

Appendix 9 List of the sources for the public interventions data set

Data obtained from:

1. Regarding planning period 2004-2006:

https://www.esfondi.lv/upload/04-kohezijas_politikas_nakotne/dp_aktivitates/2dp/2OP_11022014_ENG_with_amendments.pdf

https://m.esfondi.lv/jaunumi/nacionalas-programmas-riska-kapitala-finansejums-ietvaros-ir-izveidoti-tris-riska-kapitala-fondi

https://www.db.lv/zinas/altum-ar-eko-investoru-tiesajas-par-es-naudas-atmaksu-467462

2. Information about VC Fund managers from The Financial and Capital Market Commission https://www.fktk.lv

3. Information about VC Fund managers historical names, structures and partners from firmas.lv, Latvian company database holder

4. Regarding planning period 2007-2013 -

https://www.esfondi.lv/upload/2007-2013_nosleguma_zinojums/0_2_op_fir_2007-2013_2017.pdf

5. Regarding planning period 2014-2020 -

https://www.esfondi.lv/2020.gads and www.altum.lv

Appendix 10 Impact from the limiting factors on VC fund managers activities

Impact from the limiting factors on the fund managers activities in 2007-2013 planning period

Factors	1st fund manager	2nd fund manager	3rd fund manager	4th fund manager	Mean value of the answers	Standard deviation
Restrictions on investments (limits on geography, allowed financial instruments; financial status and stages of a portfolio company; max amount of one investment)	4	4	5	4	4.3	0.4
Small size of funds	1	3	3	5	3.0	1.4
ALTUM rights to influence a fund investment decisions (exceeding typical LPs rights)	2	2	4	1	2.3	1.1
Reporting obligations towards ALTUM and Financial Market commission	3	2	3	3	2.8	0.4
Imperfections of the infrastructure and legislation affecting VC market	4	3	3	1	2.8	1.1
Lack of the experience and capacity of the governmental agency responsible for the programmes (ALTUM)	2	2	5	2	2.8	1.3

Impact from the limiting factors on the accelerator fund managers activities (2014-2020 planning period)

Factors	5th fund manager	6th fund manager	7th fund manager	Mean value of the answers	Standard deviation
Restrictions on investments (limits on geography, allowed financial instruments; financial status and stages of a portfolio company; max amount of one investment	1	5	3	3.0	1.6
Small size of funds	4	3	3	3.3	0.5
ALTUM rights to influence a fund investment decisions (exceeding typical LPs rights)	5	4	3	4.0	0.8
Reporting obligations towards ALTUM and Financial Market commission	2	3	4	3.0	0.8
Imperfections of the infrastructure and legislation affecting VC market	4	2	2	2.7	0.9
Lack of the experience and capacity of the governmental agency responsible for the programmes (ALTUM)	2	4	2	2.7	0.9

Impact from the limiting factors on the other fund managers (except accelerator) activities in 2014-2020 planning period

Factors	1st fund manager	2nd fund manager	3rd fund manager	4th fund manager	Mean value of the answers	Standard deviation
Restrictions on investments (limits on geography, allowed financial instruments; financial status and stages of a portfolio company; max amount of one investment)	4	4	5	3	4.0	0.7
Small size of funds	1	2	2	5	2.5	1.5
ALTUM rights to influence a fund investment decisions (exceeding typical LPs rights)	2	2	5	4	3.3	1.3
Reporting obligations towards ALTUM and Financial Market commission	2	2	3	3	2.5	0.5
Imperfections of the infrastructure and legislation affecting VC market	4	2	2	1	2.3	1.1
Lack of the experience and capacity of the governmental agency responsible for the programmes (ALTUM)	1	2	5	3	2.8	1.5

Appendix 11 Questionnaire. Assessment of the factors influencing Venture Capital market development in the countries with underdeveloped markets

Dear expert,

The responses will serve as the basis:
- to determine whether government policies can influence the various factors;
- to measure to what degree the Latvian government is exercising any possibility to influence the factors.

Rating	Meaning of the rating
1	No influence / no possibility
2	Little influence / little possibility
3	Moderate influence / moderate possibility
4	Strong influence / strong possibility
5	Extreme influence / extreme possibility

Factors	Subfactors	Subfactor's influence on VC supply	Subfactor's influence on VC demand	Subfactor's influence on the total VC market activity	Possibility for a government to influence the subfactor	Influence of Latvian government policies on the subfactor
1.1. Total amount of available capital from VC firms in a market	1.1.1. High amount of available capital from VC firms	4 (high current amount of VC capital increases demand for VC and it increases LPs willingness to invest in VC funds+ it also evidences that LPs are active in this market)	5 (high amount of available VC capital increases demand for VC)	4	4 (government can invest public resources in local VC funds + improve environment for private VC funds and LPs to invest in VC)	3 (establishment of public VC funds)

Meta-groups	Subfactors	Subfactor' s influence on the VC supply	Subfactor' s influence on the VC demand	Subfactor' s influence on the total VC market activity	Possibility for a government to influence the subfactor	Influence of Latvian government policies on the subfactor
1. VC market players	**1.1. Factors related to VC firms**					
	1.1.1. High total amount of available capital from VC firms in a market					
	1.1.2. High competition between VC firms in a market					
	1.1.3. Existence of VC firms in all stages in a market					
	1.1.4. Specialization of VC firms					
	1.1.5. Existence of local VC firms in a market					
	1.1.6. Existence of foreign VC firms in a market					
	1.1.7. Existence of publicly co-financed VC firms in a market					
	1.1.8. Existence of private VC firms in a market					
	1.1.9. High reputation of VC firms in a market					
	1.1.10. Existence of experienced VC firms in a market					
	1.1.11. Substantial added value from VC firms					
	1.1.12. High investment returns of VC firms					
	1.1.13. Successful growth of VC firms' portfolio companies					
	1.1.14. Low risk profile of VC firms (financial instruments used by VC firms; investment strategies)					
	1.1.15. High risk profile of VC firms (financial instruments used by VC firms; investment strategies)					
	1.2. Factors related to investors in VC funds					
	1.2.1. Diversified and robust institutional investor base					
	1.2.2. Existence of successful entrepreneurs from prior generations					
	1.2.3. High experience and capacity in VC investments of governmental agency responsible for public VC investments					
	1.3. Factors related to entrepreneurs					

	1.3.1. High number of entrepreneurs seeking for VC					
	1.3.2. General awareness between entrepreneurs/potential entrepreneurs about VC					
	1.3.3. Awareness of the added value from VC between entrepreneurs/potential entrepreneurs					
	1.3.4. High risk tolerance and partnership acceptance and trust of entrepreneurs/potential entrepreneurs					
	1.3.5. Dominant gender of entrepreneurs/potential entrepreneurs – male					
	1.3.6. High net worth of entrepreneurs seeking for VC					
	1.3.7. Previous experience in entrepreneurship of entrepreneurs/potential entrepreneurs					
	1.3.8. Technical or MBA education of entrepreneurs/potential entrepreneurs					
2. Envinronment	**2.1. Legal environment**					
	2.1.1. Internationally harmonized and stable regulation for securities, bankruptcy, labor and tax					
	2.1.2. Reduction in labour regulation					
	2.1.3. Easiness to hire foreign employees					
	2.1.4. Flexible policies regarding risk evaluation and broad limits for investments in VC funds for investors in VC funds					
	2.1.5. Tax application on investors in VC funds not VC funds level					
	2.1.6. Broad limits for VC funds (size of the investment; geography; focus; lifespan of the fund; risk profile)					
	2.1.7. Entrepreneur friendly tax system					
	2.1.8 Little administrative burden for starting a business					
	2.1.9. Easiness for foreigners to start a business					
	2.1.10. Government policies and regulations beneficial for particular kind of investments (i.e. cleantech; sustainability)					
	2.2. Goverment policies					
	2.2.1. Programmes encouraging entrepreneurship					
	2.2.2. Programmes raising awareness about financial instruments					
	2.2.3. Support for technology transfer and RD					
	2.2.4. Outsourcing of public services					
	2.2.5. Providing public funding for VC funds					

	2.2.6. Raising awareness about VC					
	2.2.7. Similarity between domestic and foreign policy					
	2.3. Infrastructure					
	2.3.1. Well developed public infrastructure (Transportation systems, communications)					
	2.3.2. High development of ICT industry					
	2.3.3. Existence of local business clusters, well developed industries					
	2.3.4. Existence and availability of research facilities					
	2.3.5. Existence of local technical universities					
	2.3.6. Active capital market providing exit possibilities					
	2.3.7. Absence of other available capital for entrepreneurs					
	2.3.8. Possibility to get additional funding for next rounds/further growth					
	2.3.9. Low transaction costs					
	2.3.10. Lack of other high yield investments for investors in VC funds					
	2.3.11. Existence of alternative IPO and listing regulations for SMEs with less stringent standards					
	2.3.12. Developed VC ecosystem with consultants and business angels					
	2.4. Environment for innovation					
	2.4.1. High level of technology innovation					
	2.4.2. High level of demand for new products					
	2.4.3. High level of demand for particular products/technologies					
	2.4.4. High level of state R&D investments					
	2.5. Resources					
	2.5.1. High diversity of economically active persons (nationality, gender)					
	2.5.2. High student rate					
	2.5.3. Availability of technically skilled entrepreneurs and personnel					
	2.5.4. Availability of economically competent individuals					
	2.6. Macroeconomic conditions					
	2.6.1. High GDP growth rate					
	2.6.2. High export level					
	2.6.3. High unemployment					
	2.6.4. High interest rates					
	3.1 Geographical location					

3. Embedded factors	3.1.1. Close location of a particular place to the country's core economical regions					
	3.1.2. Close location to the countries with high VC activity					
	3.2. Culturally determined social norms					
	3.2.1. High level of risk and uncertainty toleration					
	3.2.2. Tendency towards cooperation and trust					
	3.3. Reputation of a particular country					
	3.3.1. Public image of a particular country					
	3.3.2. Lack of restrictions/warnings from international organizations					

Please identify to which of the respondent's groups do you belong (several options if appropriate):

Position (including former position)	**Yes/No**	**Experience in years: More than 10 years/ 5-10 years/Less than 5**	**Origins of the company/institution: Latvian/ Other country/ International organization**
VC firm manager			
Start-up community representative and or serial entrepreneur			
Investor in VC funds			
Policy maker			
Public agency representative			

Thank you very much for your valuable contribution and time!

[1] The Web of Science database was used to find appropriate studies. 111 articles were selected as covering factors influencing the VC market.

Appendix 12 Correlations between factors, factors' groups and metagroups

The appendix is in the attached file.

Appendix 13 Correlations between factors exposure on the supply, demand side and matching

		q11_1	q11_2	q11_3
q11_1	Pearson Correlation	1	.676**	.822**
	Sig. (2-tailed)		,001	,000
	N	21	21	21
	Spearman's rho Correlation Coefficient	1,000	.621**	.793**
	Sig. (2-tailed)		,003	,000
	N	21	21	21
q11_2	Pearson Correlation	.676**	1	.759**
	Sig. (2-tailed)	,001		,000
	N	21	21	21
	Spearman's rho Correlation Coefficient	.621**	1,000	.697**
	Sig. (2-tailed)	,003		,000
	N	21	21	21
q11_3	Pearson Correlation	.822**	.759**	1
	Sig. (2-tailed)	,000	,000	
	N	21	21	21
	Spearman's rho Correlation Coefficient	.793**	.697**	1,000
	Sig. (2-tailed)	,000	,000	
	N	21	21	21

		q12_1	q12_2	q12_3
q12_1	Pearson Correlation	1	,322	,369
	Sig. (2-tailed)		,155	,100
	N	21	21	21
	Spearman's rho Correlation Coefficient	1,000	,357	,325
	Sig. (2-tailed)		,112	,150
	N	21	21	21
q12_2	Pearson Correlation	,322	1	.588**
	Sig. (2-tailed)	,155		,005
	N	21	21	21
	Spearman's rho Correlation Coefficient	,357	1,000	.588**
	Sig. (2-tailed)	,112		,005
	N	21	21	21
q12_3	Pearson Correlation	,369	.588**	1
	Sig. (2-tailed)	,100	,005	
	N	21	21	21
	Spearman's rho Correlation Coefficient	,325	.588**	1,000
	Sig. (2-tailed)	,150	,005	
	N	21	21	21

		q13_1	q13_2	q13_3
q13_1	Pearson Correlation	1	.586**	.787**

	Sig. (2-tailed)		,005	,000
	N	21	21	21
	Spearman's rho Correlation Coefficient	1,000	.577**	.818**
	Sig. (2-tailed)		,006	,000
	N	21	21	21
q13_2	Pearson Correlation	.586**	1	.642**
	Sig. (2-tailed)	,005		,002
	N	21	21	21
	Spearman's rho Correlation Coefficient	.577**	1,000	.611**
	Sig. (2-tailed)	,006		,003
	N	21	21	21
q13_3	Pearson Correlation	.787**	.642**	1
	Sig. (2-tailed)	,000	,002	
	N	21	21	21
	Spearman's rho Correlation Coefficient	.818**	.611**	1,000
	Sig. (2-tailed)	,000	,003	
	N	21	21	21

		q21_1	q21_2	q21_3
q21_1	Pearson Correlation	1	.880**	.949**
	Sig. (2-tailed)		,000	,000
	N	21	21	21
	Spearman's rho Correlation Coefficient	1,000	.880**	.946**
	Sig. (2-tailed)		,000	,000
	N	21	21	21
q21_2	Pearson Correlation	.880**	1	.931**
	Sig. (2-tailed)	,000		,000
	N	21	21	21
	Spearman's rho Correlation Coefficient	.880**	1,000	.930**
	Sig. (2-tailed)	,000		,000
	N	21	21	21
q21_3	Pearson Correlation	.949**	.931**	1
	Sig. (2-tailed)	,000	,000	
	N	21	21	21
	Spearman's rho Correlation Coefficient	.946**	.930**	1,000
	Sig. (2-tailed)	,000	,000	
	N	21	21	21

		q22_1	q22_2	q22_3
q22_1	Pearson Correlation	1	.886**	.872**
	Sig. (2-tailed)		,000	,000
	N	21	21	21
	Spearman's rho Correlation Coefficient	1,000	.849**	.821**
	Sig. (2-tailed)		,000	,000
	N	21	21	21
q22_2	Pearson Correlation	.886**	1	.882**
	Sig. (2-tailed)	,000		,000
	N	21	21	21
	Spearman's rho Correlation Coefficient	.849**	1,000	.836**
	Sig. (2-tailed)	,000		,000

	N	21	21	21
q22_3	Pearson Correlation	.872**	.882**	1
	Sig. (2-tailed)	,000	,000	
	N	21	21	21
	Spearman's rho Correlation Coefficient	.821**	.836**	1,000
	Sig. (2-tailed)	,000	,000	
	N	21	21	21

		q23_1	q23_2	q23_3
q23_1	Pearson Correlation	1	.855**	.881**
	Sig. (2-tailed)		,000	,000
	N	21	21	21
	Spearman's rho Correlation Coefficient	1,000	.865**	.907**
	Sig. (2-tailed)		,000	,000
	N	21	21	21
q23_2	Pearson Correlation	.855**	1	.888**
	Sig. (2-tailed)	,000		,000
	N	21	21	21
	Spearman's rho Correlation Coefficient	.865**	1,000	.866**
	Sig. (2-tailed)	,000		,000
	N	21	21	21
q23_3	Pearson Correlation	.881**	.888**	1
	Sig. (2-tailed)	,000	,000	
	N	21	21	21
	Spearman's rho Correlation Coefficient	.907**	.866**	1,000
	Sig. (2-tailed)	,000	,000	
	N	21	21	21

		q24_1	q24_2	q24_3
q24_1	Pearson Correlation	1	.735**	.806**
	Sig. (2-tailed)		,000	,000
	N	21	21	21
	Spearman's rho Correlation Coefficient	1,000	.813**	.865**
	Sig. (2-tailed)		,000	,000
	N	21	21	21
q24_2	Pearson Correlation	.735**	1	.863**
	Sig. (2-tailed)	,000		,000
	N	21	21	21
	Spearman's rho Correlation Coefficient	.813**	1,000	.822**
	Sig. (2-tailed)	,000		,000
	N	21	21	21
q24_3	Pearson Correlation	.806**	.863**	1
	Sig. (2-tailed)	,000	,000	
	N	21	21	21
	Spearman's rho Correlation Coefficient	.865**	.822**	1,000
	Sig. (2-tailed)	,000	,000	
	N	21	21	21

		q25_1	q25_2	q25_3
q25_1	Pearson Correlation	1	.891**	.920**
	Sig. (2-tailed)		,000	,000
	N	21	21	21
	Spearman's rho Correlation Coefficient	1,000	.865**	.932**
	Sig. (2-tailed)		,000	,000
	N	21	21	21
q25_2	Pearson Correlation	.891**	1	.935**
	Sig. (2-tailed)	,000		,000
	N	21	21	21
	Spearman's rho Correlation Coefficient	.865**	1,000	.942**
	Sig. (2-tailed)	,000		,000
	N	21	21	21
q25_3	Pearson Correlation	.920**	.935**	1
	Sig. (2-tailed)	,000	,000	
	N	21	21	21
	Spearman's rho Correlation Coefficient	.932**	.942**	1,000
	Sig. (2-tailed)	,000	,000	
	N	21	21	21

		q26_1	q26_2	q26_3
q26_1	Pearson Correlation	1	.808**	.831**
	Sig. (2-tailed)		,000	,000
	N	21	21	21
	Spearman's rho Correlation Coefficient	1,000	.837**	.787**
	Sig. (2-tailed)		,000	,000
	N	21	21	21
q25_2	Pearson Correlation	.808**	1	.796**
	Sig. (2-tailed)	,000		,000
	N	21	21	21
	Spearman's rho Correlation Coefficient	.837**	1,000	.799**
	Sig. (2-tailed)	,000		,000
	N	21	21	21
q26_3	Pearson Correlation	.831**	.796**	1
	Sig. (2-tailed)	,000	,000	
	N	21	21	21
	Spearman's rho Correlation Coefficient	.787**	.799**	1,000
	Sig. (2-tailed)	,000	,000	
	N	21	21	21

		q31_1	q31_2	q31_3
q31_1	Pearson Correlation	1	.504*	.747**
	Sig. (2-tailed)		,020	,000
	N	21	21	21
	Spearman's rho Correlation Coefficient	1,000	.472*	.727**
	Sig. (2-tailed)		,031	,000
	N	21	21	21
q31_2	Pearson Correlation	.504*	1	.823**

	Sig. (2-tailed)	,020		,000
	N	21	21	21
	Spearman's rho Correlation Coefficient	.472*	1,000	.819**
	Sig. (2-tailed)	,031		,000
	N	21	21	21
q31_3	Pearson Correlation	.747**	.823**	1
	Sig. (2-tailed)	,000	,000	
	N	21	21	21
	Spearman's rho Correlation Coefficient	.727**	.819**	1,000
	Sig. (2-tailed)	,000	,000	
	N	21	21	21

		q32_1	q32_2	q32_3
q32_1	Pearson Correlation	1	.802**	.846**
	Sig. (2-tailed)		,000	,000
	N	21	21	21
	Spearman's rho Correlation Coefficient	1,000	.840**	.867**
	Sig. (2-tailed)		,000	,000
	N	21	21	21
q32_2	Pearson Correlation	.802**	1	.818**
	Sig. (2-tailed)	,000		,000
	N	21	21	21
	Spearman's rho Correlation Coefficient	.840**	1,000	.800**
	Sig. (2-tailed)	,000		,000
	N	21	21	21
q32_3	Pearson Correlation	.846**	.818**	1
	Sig. (2-tailed)	,000	,000	
	N	21	21	21
	Spearman's rho Correlation Coefficient	.867**	.800**	1,000
	Sig. (2-tailed)	,000	,000	
	N	21	21	21

		q33_1	q33_2	q33_3
q33_1	Pearson Correlation	1	.542*	.765**
	Sig. (2-tailed)		,011	,000
	N	21	21	21
	Spearman's rho Correlation Coefficient	1,000	,385	.670**
	Sig. (2-tailed)		,085	,001
	N	21	21	21
q33_2	Pearson Correlation	.542*	1	.707**
	Sig. (2-tailed)	,011		,000
	N	21	21	21
	Spearman's rho Correlation Coefficient	,385	1,000	.666**
	Sig. (2-tailed)	,085		,001
	N	21	21	21
q33_3	Pearson Correlation	.765**	.707**	1
	Sig. (2-tailed)	,000	,000	
	N	21	21	21

	Spearman's rho Correlation Coefficient	.670**	.666**	1,000
	Sig. (2-tailed)	,001	,001	
	N	21	21	21

**. Correlation is significant at the 0.01 level (2-tailed).

Appendix 14 The explanation of the Importance Performance matrix

Quadrant	The meaning of the quadrant and the colour of the factors belonging to the quadrant in the table below
Quadrant 1	**Possible overkill** Low importance High performance
Quadrant 2	**Keep up the good work** High importance High performance
Quadrant 3	**Low priority** Low importance Low performance
Quadrant 4	**Concentrate here** High importance Low performance

The number of the factor and its title	**The quadrant where the factor appears**
1.1.1. High total amount of available capital from VC firms in a market	Quadrant 2
1.1.2. High competition between VC firms in a market	Quadrant 4
1.1.3. Existence of VC firms in all stages in a market	Quadrant 2
1.1.4. Specialization of VC firms	Quadrant 3
1.1.5. Existence of local VC firms in a market	Quadrant 2
1.1.6. Existence of foreign VC firms in a market	Quadrant 4
1.1.7. Existence of publicly co-financed VC firms in a market	Quadrant 2
1.1.8. Existence of private VC firms in a market	Quadrant 4
1.1.9. High reputation of VC firms in a market	Quadrant 4
1.1.10. Existence of experienced VC firms in a market	Quadrant 4
1.1.11. Substantial added value from VC firms	Quadrant 4
1.1.12. High investment returns of VC firms	Quadrant 4
1.1.13. Successful growth of VC firms' portfolio companies	Quadrant 4
1.1.14. Low risk profile of VC firms (financial instruments used by VC firms; investment strategies)	Quadrant 3
1.1.15. High risk profile of VC firms (financial instruments used by VC firms; investment strategies)	Quadrant 4
1.2.1. Diversified and robust institutional investor base	Quadrant 4
1.2.2. Existence of successful entrepreneurs from prior generations	Quadrant 4
1.2.3. High experience and capacity in VC investments of governmental agency responsible for public VC investments	Quadrant 4
1.3.1. High number of entrepreneurs seeking for VC	Quadrant 4
1.3.2. General awareness between entrepreneurs/potential entrepreneurs about VC	Quadrant 4
1.3.3. Awareness of the added value from VC between entrepreneurs/potential entrepreneurs	Quadrant 4
1.3.4. High risk tolerance and partnership acceptance and trust of entrepreneurs/potential entrepreneurs	Quadrant 4
1.3.5. Dominant gender of entrepreneurs/potential entrepreneurs – male	Quadrant 3
1.3.6. High net worth of entrepreneurs seeking for VC	Quadrant 3

1.3.7. Previous experience in entrepreneurship of entrepreneurs/potential entrepreneurs	Quadrant 4
1.3.8. Technical or MBA education of entrepreneurs/potential entrepreneurs	Quadrant 3
2.1.1. Internationally harmonized and stable regulation for securities, bankruptcy, labor and tax	Quadrant 2
2.1.2. Reduction in labour regulation	Quadrant 1
2.1.3. Easiness to hire foreign employees	Quadrant 4
2.1.4. Flexible policies regarding risk evaluation and broad limits for investments in VC funds for investors in VC funds	Quadrant 2
2.1.5. Tax application on investors in VC funds not VC funds level	Quadrant 2
2.1.6. Broad limits for VC funds (size of the investment; geography; focus; lifespan of the fund; risk profile)	Quadrant 4
2.1.7. Entrepreneur friendly tax system	Quadrant 2
2.1.8 Little administrative burden for starting a business	Quadrant 2
2.1.9. Easiness for foreigners to start a business	Quadrant 2
2.1.10. Government policies and regulations beneficial for particular kind of investments (i.e. cleantech; sustainability)	Quadrant 4
2.2.1. Programmes encouraging entrepreneurship	Quadrant 4
2.2.2. Programmes raising awareness about financial instruments	Quadrant 3
2.2.3. Support for technology transfer and RD	Quadrant 4
2.2.4. Outsourcing of public services	Quadrant 3
2.2.5. Providing public funding for VC funds	Quadrant 2
2.2.6. Raising awareness about VC	Quadrant 4
2.2.7. Similarity between domestic and foreign policy	Quadrant 3
2.3.1. Well developed public infrastructure (Transportation systems, communications)	Quadrant 1
2.3.2. High development of ICT industry	Quadrant 4
2.3.3. Existence of local business clusters, well developed industries	Quadrant 4
2.3.4. Existence and availability of research facilities	Quadrant 4
2.3.5. Existence of local technical universities	Quadrant 2
2.3.6. Active capital market providing exit possibilities	Quadrant 4
2.3.7. Absence of other available capital for entrepreneurs	Quadrant 4
2.3.8. Possibility to get additional funding for next rounds/further growth	Quadrant 4
2.3.9. Low transaction costs	Quadrant 3
2.3.10. Lack of other high yield investments for investors in VC funds	Quadrant 3
2.3.11. Existence of alternative IPO and listing regulations for SMEs with less stringent standards	Quadrant 3
2.3.12. Developed VC ecosystem with consultants and business angels	Quadrant 4
2.4.1. High level of technology innovation	Quadrant 4
2.4.2. High level of demand for new products	Quadrant 4 Quadrant 4
2.4.3. High level of demand for particular products/technologies	Quadrant 4
2.4.4. High level of state R&D investments	Quadrant 3
2.5.1. High diversity of economically active persons (nationality, gender)	Quadrant 3
2.5.2. High student rate	Quadrant 3
2.5.3. Availability of technically skilled entrepreneurs and personnel	Quadrant 4
2.5.4. Availability of economically competent individuals	Quadrant 4
2.6.1. High GDP growth rate	Quadrant 4
2.6.2. High export level	Quadrant 4
2.6.3. High unemployment	Quadrant 3
2.6.4. High interest rates	Quadrant 3
3.1.1. Close location of a particular place to the country's core economical regions	Quadrant 3

3.1.2. Close location to the countries with high VC activity	Quadrant 4
3.2.1. High level of risk and uncertainty toleration	Quadrant 4
3.2.2. Tendency towards cooperation and trust	Quadrant 4
3.3.1. Public image of a particular country	Quadrant 4
3.3.2. Lack of restrictions/warnings from international organizations	Quadrant 2