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VENTURE CAPITAL IN HUNGARY: PROVISION OF ASSISTANCE TO HUNGARY-BASED INVESTEE FIRMS

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ABSTRACT

This study presented evidence on the role of venture capital finance in entrepreneurial processes and development of resources and capabilities of Hungary-based investee firms from management and public policy perspectives. Its results indicated that venture capitalists were an important source of external knowledge for Hungary-based early-stage firms. The processes of post-investment assistance are important knowledge-sharing processes, since they entail efficient and timely transfer of valuable information among market participants, with implications for innovativeness, time-to-market, competitive advantage, competitiveness and performance of early-stage firms.

An important aspect of this study is its blended research methodology, applying both an initial quantitative and a follow-on qualitative investigation of processes of post-investment assistance of venture capitalists and their implications, which complemented one another. This blended research approach added robustness to this study and its conclusions.

With regard to public policy considerations, this study offered a comparative analysis of the assistance provided by private and government venture capitalists to Hungary-based investee firms. This study indicated that differences in qualities of Hungary-based private and government venture capital-backed firms were emphasized by a different treatment effect of private and government venture capital finance.

The evolution of Hungarian venture capital market has had a unique, discontinuous and, at times, volatile trajectory. The most recent policy shift in Hungary, which triggered the oversupply of government venture capital finance since 2016, was sharply in contrast to the 'market principle' that played a central role in the policies stimulating the expansion of Hungarian entrepreneurial sector in the aftermath of the global financial recession. By 2020, the relative size of Hungary-based government venture capital-backed sector became one of the largest in Europe.

This study indicated that there were many anticipated and unanticipated economic and societal consequences of the expansion of government venture capital in Hungary that required further research. The collected data indicated that the expansion of government venture capital finance had a number of negative outcomes, led to displacement of entrepreneurial processes and was ineffective in supporting innovative firms. Activities of Hungary-based government venture capitalists were not limited to fixing financing gaps and providing finance to firms systematically unattractive to private venture capitalists. Instead, government venture capital was oversupplied, inflating the expectations of entrepreneurs, while its availability was counterproductive in improving competitiveness of the entrepreneurial sector in Hungary. The collected data suggested that further expansion of government venture capital could enhance already prevalent market failures of Hungarian entrepreneurial sector.

The study highlighted the complexity of organizing resources for early-stage firms, where management perspectives and a private sector business experience had a critical role. Government venture capital sector was characterized by a limited access to the labour market of experienced talent and inefficient processes. The collected information indicated that government venture capitalists were less efficient in post-investment monitoring of Hungary-based investee firms, relative to private venture capitalists, due to lacking a sufficient number of experienced managers and efficient processes to monitor and assist high number of investee firms, which they were committed to invest in, by the policy directive.

An important aspect of the scholarly contribution of this study is its eclectic approach to studying venture capital finance, which utilizes perspectives from management, strategy, organizational behaviour, public policy and economics.

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CHAPTER 1: INTRODUCTION

Venture capital is one of primary sources of financing for young entrepreneurial ventures (Gompers & Lerner, 2001). Venture capitalists are institutional intermediaries with comparative advantage on capital market (Amit et al., 1998) and unique knowledge and capabilities to select, provide financing and contribute to development of young entrepreneurial ventures (Sapienza et al., 1992).

A number of academic studies and case-studies highlighted that venture capitalists had a critical role in development of resources and capabilities of early-stage firms and competitiveness of entrepreneurial sectors. The academic scholarship suggested that early-stage firms had a high absorptive capacity to "value new, external information, assimilate it, and apply it to commercial ends" (Cohen & Levinthal, 1990). Despite often being described in terms of high uncertainty, information asymmetry, agency and transaction costs, young entrepreneurial firms have high economic and societal value, due to their positive externalities. A number of studies examined the positive contribution of venture capitalists to innovation and economic development. Being a widespread form of entrepreneurial finance, venture capital is believed to contribute to economic growth, agglomeration and development of competitive economy.

This study presents evidence on the role of venture capital finance in entrepreneurial processes and development of resources and capabilities of Hungary-based investee firms from management and public policy perspectives.

The studies of Kaplan and Strömberg (2001) and Gompers et al. (2020) offer a comprehensive framework of decision process of venture capitalists, which consists of pre-investment activities (sourcing, evaluating and selecting investments), structuring of investments and post-investment activities.

The extensive review of the academic scholarship indicated that assistance of venture capitalists was one of the key variables determining the economic performance and

competitiveness of venture capital-backed firms and entrepreneurial sector. The processes of post-investment assistance are important knowledge-sharing processes in economy, since they entail efficient and timely transfer of valuable information among participants, with implications for innovativeness, fast time-to-market, competitive advantage and performance of early-stage firms. The study of Gompers et al. (2020) indicated that the value creation of pre-investment project selection of venture capitalists was marginally higher, than the value creation of their post-investment assistance provided to investee firms.

The studies of Karsai (2013), (2018) and Milicsevics et al. (2020) indicated that a transformation of Hungarian venture capital market took place in the aftermath of the global financial recession of 2008. Post-global financial recession policies triggered the expansion of venture capital market and emergence of domestic venture capitalists with resources and capabilities needed for overcoming high agency, information asymmetry and transaction costs of Hungary-based early-stage firms, which emerged in a unique cultural, institutional and economic setting. Despite crowding-in of private investment and expansion of the Hungary-based private venture capital-backed sector, the studies highlighted the persistence of market failures of Hungarian entrepreneurial sector, such as poor entrepreneurial capabilities and skills and high information asymmetry costs (Szerb et al., 2019).

The objective of this study was to examine processes of assistance of venture capitalists, based on the data collected from Hungary-based investee firms and venture capitalists active in Hungary, and to outline some implications of these processes, contributing to the scholarship by country-specific evidence about assistance provided by venture capitalists to Hungary-based investee firms.

Initially, the quantitative element of this study offered an analysis of the selected forms of assistance provided by venture capitalists to Hungary-based investee firms in three categories:

i) provision of strategic assistance,

ii) provision of assistance in professionalization and

iii) provision of relational capital.

A subsequently conducted follow-on qualitative research added a new level of contextualization to the findings of the quantitative research, by providing an additional understanding of the results of the initial quantitative research and new insights about entrepreneurial processes in Hungary, as well as new contexts for examining the processes of post-investment assistance of venture capitalists and their implications. This blended research approach provided a more robust set of findings, than did initial quantitative research alone.

Even though only 0.1% of firms based Hungary were backed by venture capital (Milicsevics et al., 2020), the assistance of venture capitalists provided to investee firms was indicative of the level of capital market development (Sapienza et al., 1996) and of quality of entrepreneurial sector.

This study makes an important contribution to public policy. The important contribution of this study was in collecting empirical data about activities of private and government venture capitalists, offering comparative analysis of processes in private and public venture capital-backed sectors in Hungary.

Due to positive externalities of early-stage entrepreneurial firms, governments are keen to intervene in entrepreneurial processes (Lerner, 2002; 2009). Government venture capitalists may mitigate the gap in financing of early-stage entrepreneurial firms and foster innovation. Government venture capital finance can, furthermore, contribute to economic growth, agglomeration and development of innovative entrepreneurial sector by providing finance to early-stage entrepreneurial ventures with a high likelihood of creating positive externalities. Besides improving the gap in financing, the policy-driven expansion of government venture

capital financing can improve entrepreneurial processes and the quality entrepreneurial sector as a whole.

This study provided insights about consequences of the expansion of government venture capital finance for Hungary-based investee firms and its entrepreneurial sector. The results of this study indicated that even though government possibly had important structural roles in fostering innovation and entrepreneurship, there were many anticipated and unanticipated economic and societal consequences of the expansion of government venture capital finance in Hungary that required further research.

1.1 Structure of the Study

Chapter 2 offered a conceptual framework for this study. The research provided extensive review of academic scholarship of relevance for this research endeavour: i) scholarship in assistance of venture capitalists was discussed in Chapter 3, together with selected management scholarship of relevance for this study ii) scholarship in government venture capital finance was discussed in Chapter 4 and iii) scholarship examining Hungarian venture capital market was discussed in Chapter 5, highlighting the complexity of entrepreneurial processes and need for eclectic approach to studying venture capital finance, where perspectives from management, strategy, organizational behaviour, public policy and economics were relevant.

The objective of Chapter 3 was to present earlier research and scholarship in post-investment value-added activities of venture capitalists, offering comprehensive analysis of the academic scholarship in the mentioned field. This chapter also discussed the selected scholarship in management, strategy and organizational behaviour of relevance for analysis of assistance of venture capitalists.

Chapter 4 reviewed the scholarship in government venture capital finance. Potential implications of policy-driven expansion of government venture capital for entrepreneurial

processes in Hungary are significant, given the size of the Hungary-based government venture capital-backed entrepreneurial sector, as of 2020 representing one of the largest in Europe with 31% of investee firms backed by government venture capital.

Chapter 5 discussed unique properties of Hungarian venture capital market by reviewing the scholarship about the evolutionary trajectory and characteristics of venture capital finance in Hungary. Hungarian venture capital market was considered to be a nascent market. Its development trajectory was discontinuous and volatile. Hungary's most recent policy perspectives on expansion of government venture capital financing were in sharp contrast to the 'market principle' that played the central role in European policies in venture capital finance that contributed to the expansion of Hungarian entrepreneurial sector in the aftermath of the global financial recession of 2008.

Chapter 6 discussed the objectives, samples and methodologies of this study, while Chapter 7 discussed limitations of this study.

Chapter 8 provided discussion of the results of this study, while Chapter 9 offered conclusions of the study.

CHAPTER 2: CONCEPTUAL FRAMEWORK

The objective of this chapter was to provide the conceptual framework for the doctoral dissertation. This chapter offered the conceptual basis for reviewing the scholarship in provision of assistance by venture capitalists and other relevant management perspectives discussed in Chapter 3 of this study. It furthermore provided the conceptual basis for reviewing the scholarship in government venture capital finance and relevant public policy perspectives, discussed in Chapter 4 of this study, as the objective of the research was to examine the implications of expansion of government venture capital finance in Hungary.

Young entrepreneurial ventures are characterized by multiple strategic and operational uncertainties and high risk of default, which often can be mitigated by timely assistance. Venture capital, being one of the primary sources of capital for early-stage firms (Gompers & Lerner, 2001) is instrumental in entrepreneurial processes, while post-investment assistance of venture capitalists could create significant value (Gompers et al., 2020) and mitigate many of the risks of early-stage firms.

This chapter will proceed by highlighting some selected properties of early-stage entrepreneurial firms and venture capital finance. In Sections 2.2 and 2.3, the research will introduce the concept of venture capital finance. In Sections 2.4 and 2.5, the research will introduce the forms of policy intervention in entrepreneurial finance that aim at improving outcomes of early-stage firms.

2.1 Properties of Early-Stage Entrepreneurial Firms

In this chapter, the study outlined a set of risks typically associated with early-stage firms as: agency, business and transactions risk. By focusing on the activities of venture capitalists that mitigate business and transactions risk of early-stage firms, the quantitative research examined a number of different forms of assistance provided by venture capitalists to

Hungary-based investee firms, while the qualitative research offered additional contextualization of the findings of the quantitative research.

2.1.1 Agency Risk

Early-stage entrepreneurial firms are characterized by multiple uncertainties, which often result in conflicts between the firms' founders – the entrepreneurs – and investors. Under classical principal-agent theory of Holmstrom (1979), unobservable intentions and efforts of entrepreneurs and investors enhance the uncertainty of early-stage firms, as motivations of entrepreneurs and investors may diverge. This risk of conflicts is known as the agency risk or internal risk (Kaplan & Strömberg, 2004).

The diffusion of ownership and control between entrepreneurs and investors enhances the risk of opportunism of entrepreneurs (Sapienza & Gupta, 1994). Entrepreneurs are likely to possess superior information about projects relative to the investors in the project and this information gap is known as information asymmetry. The agency risk that entrepreneurs' behaviour may hurt investors is therefore inherent in the structure of early-stage entrepreneurial firms (Jansen & Meckling, 1976).

In an agency relationship, investors, also known as "principals" delegate work to entrepreneurs, also known as "agents" to make decisions and execute tasks. As this study indicated, investors provided various forms of assistance and governance to professionalize entrepreneurs and develop their managerial capabilities, provided that entrepreneurs made sufficient effort for the project to succeed.

There are two forms of information asymmetry that can lead to adverse outcomes for the early-stage firm: i) entrepreneurs may provide self-serving information during the selection process and ii) entrepreneurs may pursue self-serving actions with adverse outcomes for the project (Amit et al., 1998). By taking advantage of information asymmetry, an entrepreneur

may intentionally misrepresent information about the firm to an investor and may continue to do so throughout the firm's life-cycle. Information asymmetry may incentivize entrepreneurs to misrepresent the quality of their ideas throughout the firms' life-cycle (Amit et al., 1998). The opportunism of entrepreneurs may have adverse outcomes and may incur costs to multiple actors, giving rise to moral hazard (Knockaert & Vanacker, 2013). Moral hazard occurs when entrepreneurs have incentives to act in their self-interest towards producing outcomes that incur costs to other shareholders (Amit et al., 1998).

The potential risk of self-serving attitude of entrepreneurs has implications for the organization of early-stage firms. Even in the absence of opportunism of entrepreneurs, information asymmetry pertains to the firm's strategic planning and operational activities, as there is a high likelihood of a disagreement between entrepreneurs and investors over the optimal strategic and operational decisions (Sapienza & Gupta, 1994).

In absence of appropriate institutional and governance mechanisms, the self-serving attitude of entrepreneurs may lead to the aggregation of low-quality ventures on the market and adverse selection (Akerlof, 1970; Amit et al., 1998). Venture capitalists have an instrumental role in entrepreneurial processes, as they improve market failures, by leveraging their unique resources and capabilities in pre-investment and post-investment activities.

Early-stage firms are characterized by insufficient public information and lack of market control. Early-stage firms are not validated by third-parties such as credit-rating agencies, auditors, financial institutions and professional industry associations. Lack of market control contributes to the likelihood of entrepreneurs misrepresenting the quality of their ideas, even in the absence of self-serving attitude.

The absence of self-serving attitude does not mitigate the risk that entrepreneurs may take suboptimal decisions with adverse outcomes for the firm. Lacking managerial

competences, entrepreneurs often take suboptimal decisions. Managerial competences are one of the major concerns of investors (Ruhnka & Young, 1987) and weak senior management of early-stage firms is among the most frequent causes of firms' default according to venture capital investors (Gorman & Sahlman, 1989).

2.1.2 Business Risk

Fundamental to the management theory is a distinction between and operational activities and this distinction can be applied to entrepreneurship. One of the most distinct characteristics of early-stage firms are multiple strategic and operational uncertainties. Young entrepreneurial ventures are characterized by uncertainty in product and process design, development trajectory, market potential of their products and services etc. (Utterback & Abernathy, 1975). The source of strategic uncertainties of early-stage ventures are often related to the lack of customers, poor understanding of customer needs and product features to be developed and poor competitive analysis (Christensen & Raynor, 2003). Some of the sources of operational uncertainties of early-stage firms are lack of managerial skills and competences of firms' founders and absence of organizational capabilities for entering into transactions, knowledge transfer and collaboration.

A business risk is the risk of a default from a strategic planning or operational implementation of the project. The school of management known as competitive strategy highlighted that all firms, and early-stage firms in particular, were associated with high uncertainty of returns due to competitive environment (Porter, 1980). The product-process life-cycle theory of Utterback and Abernathy (1975) indicated that early-stage firms faced many critical choices that predetermined their outcomes.

Schools of management offer general understanding of potential outcomes of strategic and operational decisions of entrepreneurs. For the competitive strategy, the risk of achieving competitive advantage was determined by the firm's strategic positioning (Porter, 1980). For

the resource-based theory of the firm, the risk of achieving competitive advantage was determined by the firm's organization of resources (Penrose, 1959; Barney 1991). According to the framework known as relational view of the firm, a competitive advantage is achieved by repeated and enduring knowledge-sharing among firms.

The central concept of management theory reviewed in Chapter 3 was that specialization of firm's assets was necessary for competitive advantage and superior performance (Amit & Schoemaker, 1993). There is a theoretical and empirical evidence indicating that specialized assets reduce the business risk of firms and improve their economic performance. The schools of management reviewed in Chapter 3 indicated that firms strived to develop unique resources and capabilities that confer competitive advantage and superior economic performance.

Resources and capabilities are defined by this study as critical assets of a firm. The concept of resources includes factors of production such as labour, fixed assets, intangible assets, financial resources and third-party relationships for knowledge transfer, collaboration and commercial transactions. A capability of a firm is its ability to organize and utilize resources at a level of coordinated, repeated and reliable activity or routine. The management scholarship indicated that capabilities of firms such as core competencies (Prahalad & Hamel, 1990), dynamic capabilities (Eisenhardt & Martin, 2000) and routines (Nelson & Winter, 1882) conferred competitive advantage.

A number of studies have examined the contribution of venture capitalists to organisation of resources and capabilities in venture capital-backed firms, highlighting the positive impact of venture capital on firms' growth (Bertoni et al., 2011).

2.1.3 Transaction Risk

According to Williamson (1979), uncertainty, frequency of transactions and specialized assets determined the likelihood that the firm would enter into market transactions

with the third-parties. Early-stage firms are unlikely to have specialized assets in contrast to incumbent firms, which assets have evolved from numerous transactions with the third-parties over a long period of time. Unique resources and capabilities of incumbent firms had a signalling value for potential transaction partners to enter into exchange (Spence, 1974).

Early-stage firms are unlikely to have specialized assets needed for exchange and often there is no publicly available information on their resources and capabilities. Moreover, early-stage firms are not validated by third-parties such as credit-rating agencies, auditors, financial institutions and professional industry associations and are characterized by numerous strategic and operational uncertainties. In absence of unique resources and capabilities that have a signalling value, early-stage firms strive to develop specialized assets by: i) entering into opportunity-based transactions, ii) pursuing in-house development or iii) seeking reputable partners that validate them on the market.

The most likely form of transactions of early-stage ventures are opportunity-based. Early-stage ventures commonly enter into transactions with the third-parties from networks of social relationships of their founders and employees. Prevalence of opportunity-based transactions of early-stage firms contributes to spatial aggregation of early-stage ventures and emergence of entrepreneurial ecosystems. Positive externalities of innovative firms and aggregation of investors also contribute to the spatial aggregation of early-stage ventures (Gompers et al., 2005).

This study indicated that venture capitalists had an instrumental role in entrepreneurial processes due to assisting transactions of Hungary-based early-stage firms by i) signalling to the third-parties to enter into the exchange with early-stage firms, ii) introducing early-stage firms to prospective transaction partners and iii) providing assistance in development of specialized assets of early-stage firms.

In the next two sections, the research introduces the concept of venture capital finance and discusses the selected paradigms and relevance of this market of entrepreneurial finance for early-stage firms.

2.2 Venture Capital Finance

In the research, the terms 'venture capital investor' and 'venture capitalist' are used to identify organizational form of investors with qualities and unique resources and capabilities to provide capital and assistance to investee firms. Venture capitalists manage and invest the capital of 'venture capital funds', raised from private and public sources.

In this study, the terms 'investee firm', 'portfolio firm' and 'venture capital-backed firm' are used to identify organizational entities that are funded by venture capitalists. As this study will indicate, besides funding, venture capitalists provide assistance and different forms of capital to investee firms.

Venture capitalists are institutional intermediaries with comparative advantage on financial market (Amit et al., 1998) and unique resources and capabilities to select, provide capital and contribute to the development of young entrepreneurial ventures (Sapienza et al., 1992). Similarly to corporations, venture capitalists raise finance from external sources that are invested in investee firms in form of equity and debt. Yet, their unique ownership and governance structure, unique and specialized assets acquired in unique cultural, institutional and economic settings, distinguish them from other financial investors on the capital market, such as angel investors and corporate investors.

Decision processes of venture capitalists start with pre-investment activities (sourcing, evaluating and selecting investments), and are followed structuring of investments and eventually post-investment activities (Kaplan & Strömberg, 2001; Gompers et al., 2020) Pre-investment activities and structuring of investments precede value-added activities of venture

capitalists and each of the mentioned phases of decision process have importance for value creation (Kaplan & Strömberg, 2001; Gompers et al., 2020). The objective of the so-called value-added activities of venture capital investors is to improve outcomes of investee firms. Such value-added activities are: strategic and operational consulting, senior management recruitment, coaching, provision of relational capital, access to qualified workforce and other market resources (Gorman & Sahlman, 1989; Sahlman, 1990; Sapienza, 1992; Lerner, 1995; Sapienza et al., 1996; Gompers & Lerner 1998; Gompers & Lerner 1999; Kaplan & Strömberg, 2003, 2004; Sorensen 2007; Luukkonen et al., 2013; Gompers et al., 2020).

In the next few subsections, the research discusses some selected properties of this market of entrepreneurial finance for early-stage firms.

2.2.1 Relevance of Management Theory in Venture Capital Finance

The studies of Kunze (1990), Sapienza et al. (1992), Hellmann and Puri (2002) and Gompers et al. (2020) described venture capitalists by their active involvement in investee firms. A number of academic studies and case-studies highlighted that venture capitalists had a critical role in development of resources and capabilities of early-stage firms (Timmons & Bygrave, 1986; Amit et al., 1990; Sapienza et al. 1992; Hsu, 2006; Lindsey, 2008). Venture capital industry contributed to the development of many successful firms, such as: Apple, Intel and Microsoft.

The comparative advantage of venture capitalists was the result of their unique investment activity in specific sectors and markets (Gompers et al., 2009). To improve investment performance, rather than diversifying across industries and markets, venture capitalists increase their industry-specific and market-specific exposure and activity (Gompers et al., 2009). Although portfolio diversification theory may be a successful strategy in passive investing, venture capitalists are active investors that improve the outcomes of their firms by their active involvement. They strive to reduce a risk of default of early-stage firms by active

provision of assistance to investee firms that entails transfer of valuable information that they acquire in specific sectors and markets. Venture capitalists are often described as information and resource intermediaries in the entrepreneurial processes as they organize various forms of resources for investee firms. The critical knowledge-sharing process between venture capitalists and investee firms is the process of assistance that entails efficient and timely transfer of valuable information between venture capitalists and investee firms, where venture capitalists have the role of 'knowledge brokers'.

The study of Cowling (2003) indicated that entrepreneurs recognized the need for external sources of capital and assistance. Early-stage firms are constrained by the lack of capital and complementary assets and their success is dependent on resources and capabilities of external parties. Early-stage investee firms have high absorptive capacity to "value new, external information, assimilate it, and apply it to commercial ends" (Cohen & Levinthal, 1990).

2.2.2 Life-Cycle of Venture Capital Finance

The life-cycle model of venture capital finance is one of the most relevant paradigms in venture capital finance for understanding the objectives of assistance provided by venture capitalists.

Post-investment activities of venture capitalists have a dynamic nature, as development of investee firms occurs in stages. Early-stage firms are likely to be incubated locally, as domestic venture capitalists have better knowledge needed for mitigating risks of early-stage firms from a specific institutional, cultural and economic setting, relative to cross-border venture capitalists and corporate investors (Devigne et al., 2013). The comparative advantage of domestic venture capitalists is due to their specialized and unique experiences of firms embedded in a specific context.

Domestic venture capitalists have a critical role in mitigating information asymmetry and agency costs of early-stage ventures (Devigne et al., 2013). The cross-border venture capitalists and corporate investors are likely to have knowledge to add value to investee firms in later stages of their life-cycle – for instance during the internationalization and cross-border expansion - due to their knowledge of the international market, international network of contacts and experience that has evolved from their cross-border activities.

The model of venture capital finance's life-cycle highlights that venture capitalists strive to provide specific forms of assistance throughout investee firms' life-cycle in order to improve their qualities. Venture capitalists have an objective to improve capital market attractiveness and exit performance of their investee firms. The provision of assistance reduces the information asymmetry and agency costs of prospective new investors in investee firms with resources and capabilities to create value in later stages of investee firms' life-cycle. Venture capitalists can also worsen the outcomes of investee firms, if the provided assistance is inconsistent with the needs of investee firms or if they lack an exit orientation.

The conclusion of the life-cycle model of venture capital is that value-added activities of venture capitalists are specific to the investee firms' life-cycle stage, yet, to create value throughout investee firms' life-cycle, venture capitalists must have exit orientation.

2.2.3 Structure of Venture Capital Market

The structure of venture capital market is a specific characteristic of venture capital market that is determined by unique cultural, institutional and economic factors. A unique development trajectory and historic legacy are relevant determinants of the structure of venture capital market. Different structures of venture capital markets of the USA and European countries are the consequence of historic financing gaps. Studies have also identified substantial differences in the development trajectory and characteristics of venture capital markets of European countries.

While the emergence of institutional venture capital finance in the USA dates back to 1940-s, the first institutional venture capitalists appeared in Europe in 1980-s, initially targeting mature firms in stable growth sectors of the economy - what was to become known as private-equity finance (Bertoni et al., 2013). The private-equity was a form of finance for mature firms, somewhat different from venture capital, which was an early- and growth-stage finance. Since 1980-s, the gap between European countries and the USA has narrowed in legal and institutional framework by adoption of investor protection regulation and capital market reforms (Bertoni et al., 2013). In Hungary, the process of reforms lasted until late 2000-s when the conditions for incorporating private venture capitalists in Hungary were finally provided (Kállay & Jáki, 2019).

To close the gap in entrepreneurial finance, European policy intervention in entrepreneurial finance made government funding available to private venture capitalists (Leleux & Surlemont, 2003). One of distinct features of venture capital finance in Europe have been widespread sources of government funding for venture capital investors. The two most important forms of European policy intervention in venture capital have been i) the initiatives and programs for funding of private venture capitalists from government sources and ii) policy intervention of expanding government venture capital finance. Based on the ownership and governance structure of venture capitalists, this study made a distinction between private and government venture capitalists, eventually indicating that ownership and governance structure of venture capitalists is a relevant determinant of their pre-investment and post-investment activities.

Besides distinguishing venture capitalists by their ownership and governance structure, the academic scholarship differentiated venture capital investors based on a number of qualities, such as: financial resources, value-added activities, investment objectives, investment patterns and investment horizons. A number of studies looked into differences among venture capital

investors in terms of their investment strategy, investment pattern (Bertoni et al., 2014) and investment life-cycle (Sapienza & Gupta, 1994; Mayer et at., 2005), highlighting distinct structural characteristics and development patterns of venture capital markets and entrepreneurial ecosystems. In Chapter 4, this study discusses how ownership and governance structure has implication for some of the mentioned qualities.

Despite significant heterogeneity of venture capitalists, numerous studies indicate that ownership and governance structure of venture capitalists determines their differences. However, a number of other investee firm-specific and venture capitalist-specific factors are relevant, as they provide broader context for analysis of value-added activities.

2.2.4 Ownership and Governance Structure of Venture Capitalists

A number of studies in venture capital examined differences among venture capitalists from perspectives of ownership and governance, as ownership and governance structure of venture capitalists is a critical determinant of their resources and capabilities (Da Rin et al., 2011). Based on the ownership and governance structure, two general categories of venture capitalists can be identified: 'independent venture capitalists', also known as 'private venture capitalists' and 'captive venture capitalists'.

Independent venture capitalists are characterized by the structure that separates a general partner, which can exist in form of a natural or legal person, and limited partners – private and institutional investors. Independent venture capitalists are created through a negotiating process among a number of independent actors. In contrast, captive venture capitalists are subsidiaries of a parent organization (Bertoni et al., 2014). While independent venture capitalists raise capital from a number of investors to pursue specific investment strategy during a limited life-span of 6 to 14 years, investment strategy of captive venture capitalists is determined by their parent organization or statute (Leleux & Surlemont 2003).

Captive venture capitalists are further differentiated by the identity of their parent organization into 'corporate venture capitalists', 'bank-affiliated venture capitalists' and 'government venture capitalists' or 'government venture capitalists'. A number of studies highlighted differences between independent and captive venture capitalists (Gompers & Lerner, 2000; Hellmann, 2002; Maula et al., 2005). While some academic studies indicated that different categories of venture capitalists were complementary (Maula et al., 2005), other studies highlighted that captive venture capitalists were inferior forms of venture capitalists to the extent that they were incompatible (Alperovych et al., 2015).

A number of academic studies conducted a comparative analysis of independent and government venture capitalists in order to explore microeconomic and macroeconomic implications of policy intervention in venture capital finance. The results of comparative studies are relevant source of information for countries willing to accelerate the process of venture capital market development through the supply of government venture capital. The objective of this study is to indicate implications of policy-driven expansion of government venture capital in Hungary, by examining the processes of assistance of private and government venture capitalists and their implications.

2.3. Venture Capital as a Factor of Production

A critical actor in the organization of production in early-stage entrepreneurial ventures is an entrepreneur. A number of studies highlighted that the entrepreneur was a distinct factor of production from labour (Reid, 1995; Cowling 2003). Entrepreneurs screen for unexplored opportunities that can be exploited by combining tangible and intangible resources (Kirzner, 1973) and superior and creative decisions (Penrose, 1959).

A number of studies highlighted that production in young entrepreneurial firms was labour intensive, due to the absence of processes (Utterback & Abernathy, 1975) and capital constrains (Stiglitz & Weiss, 1981; Gomez-Mejia et al., 1990; Cowling, 2003). Early-stage

entrepreneurial ventures do not have assets and records of economic performance that can serve as collaterals for providers of credit.

Venture capitalists are one of the primary source of finance to early-stage firms on the capital market. Moreover, they are often the preferred source of finance, relative to entrepreneurs' networks of relationships, due to a number of positive effects of venture capital finance on investee firms. The study of Cowling (2003) indicated that entrepreneurs recognized the value of external resources and assistance. Due to observable benefits to productivity and economic performance, venture capital is considered as a factor of production in early-stage entrepreneurial ventures.

A number of studies highlighted that venture capital investment made a positive contribution to investee firms' market validation, growth, innovativeness, development of complementary assets, competitiveness and performance. This section discusses the effects of venture capital finance on investee firms: its selection effect, treatment effect and financial effect make a positive contribution to early-stage firms and improve their fundamental characteristics.

2.3.1 Selection Effect of Venture Capital Finance

Venture capitalists have unique capabilities to select young entrepreneurial ventures that have the highest likelihood of success (Amit et al., 1998) and with inherently superior characteristics to realize returns (Sorensen, 2007). When selecting prospective investee firms, venture capitalists profile firms in terms of their intrinsic qualities, creating the so-called selection effect on the chosen projects. As it will be indicated in the next chapter, the presence of venture capitalists in investee firms sends positive signals to the market about prospects of selected investee firms (Stuart et al., 1999; Davila et al., 2003). Due to their comparative advantages and unique resources and capabilities, venture capitalists provide legitimation,

reputation and certification (Stuart et al., 1999), endorsement (Stuart et al., 1999) and validation (Grilli & Murtinu, 2013; 2014) to investee firms.

Positive selection effect of venture capital finance is the result of a process of matching between investee firms and venture capital investors that is not random. Superior projects are likely to be uncovered by venture capitalists with superior qualities, while inferior projects are likely to be left to less experienced and endowed venture capitalists. A substantial amount of projects is unlikely to pass through the selection process at any venture capitalist. The process of matching and selection is also determined by the heterogeneity of venture capitalists and by their specific resources and capabilities.

The results of this study contributed to understanding why categories of private and government venture capitalists had different selection effect on investee firms. The studies in venture capital indicated that government venture capitalists provide limited legitimation, reputation and validation of their investee firms. The ownership and governance structure of venture capitalists are considered to be relevant determinants of the selection effect of venture capital finance.

The academic studies in venture capital finance conducted on the sample of USA-based firms identified a positive selection effect of venture capital investment on USA-based investee firms (Sorensen, 2007; Chemmanour et al., 2008). The study of Bertoni et al. (2011) highlighted that positive selection effect of venture capital investments in selected European countries was negligible. The absence of positive selection effect of venture capital finance on European investee firms is likely the result of oversupply of government venture capital in European countries. In some European countries, venture capitalists systematically do not select superior projects for financing according to the study of Bertoni et al. (2011).

2.3.2 Treatment Effect of Venture Capital Finance

Some of the positive effects of venture capital investment cannot be attributed to validation that venture capitalists provide to investee firms, but to the invested capital and activities of providing assistance to investee firms. The pioneering studies in venture capital finance identified a positive relationship between economic performance of early-stage entrepreneurial ventures and assistance of venture capitalists (Sapienza, 1992).

The comparative analysis of new technology-based firms provided by the study of Bertoni et al. (2011) indicated that, despite negligible selection effect of venture capital finance on European investee firms, European venture capital-backed firms had higher employment and sales growth, relative to the firms that were not backed by venture capital.

Venture capital finance therefore has a positive treatment effect on investee firms that exceeds its legitimation and validation effects. Under the assumption of efficient matching between venture capitalists and investee firms, venture capitalists with valuable industry-specific and market-specific knowledge will be offered superior projects to select from and their investment decisions would likely have superior selection and treatment effect on the investee firms they select.

The study of Hsu (2004) identified that venture capitalists with valuable industry- and market-specific resources and capabilities were preferred investors in firms, relative to the venture capitalists that offered better funding terms. Venture capitalists that add value to investee firms have a larger market of potential projects to select from (Sorensen, 2007). As venture capitalists acquire reputation, resources and capabilities to add value to investee firms over a period of their activity, they are differentiated by their specific experiences, resources and capabilities, which have relevance for the treatment effect on their investee firms and their investment performance (Gompers et al., 2009).

The presence of venture capital investors in young entrepreneurial firms has significant selection effect on the firms, due to sending positive signals to the market that contributes to positive perceptions of investee firms' prospective customers, suppliers and labour. Yet, research in venture capital finance was primarily focused on examining the treatment effect of venture capital finance on investee firms, analysing specific activities of venture capital investors of relevance for development of early-stage entrepreneurial ventures and their outcomes.

2.3.3 Financial Effect of Venture Capital Finance

Howell (2017) indicated that R&D grants had a financial effect on early-stage entrepreneurial ventures, as they reduced their R&D financing constraints, technological uncertainty and cost of external finance, enabling proof-of-concept and prototyping work of early-stage entrepreneurial ventures. The policy of expanding early-stage entrepreneurial finance by relocation of sources of funding to younger ventures and first-time applicants had a positive effect on ventures' patents, revenue, survival and attractiveness for providers of capital (Howell, 2017).

Venture capitalists provide external finance to early-stage entrepreneurial ventures facing financing constraints by long product development cycles, capital intensive processes and operating activities. The scholarship has highlighted that venture capital finance alleviated financial constraints. Yet, venture capital is only one form of external finance available to early-stage firms. Howell (2017) indicated that R&D grants were effective policy tools of expanding early-stage entrepreneurial finance.

Venture capital finance reduces the firms' dependence on their operating cash-flows to finance their operating activities (Bertoni et al, 2013) and improves financial strength of early-stage ventures to invest in product development, inventory and working capital, process development, manufacturing capabilities, marketing and sales activities. Venture capital-

backed firms had higher growth of employment and sales, relative to other firms, as their financial constrains were reduced by external sources of capital (Bertoni et al., 2013). Venture capital investment allowed investee firms to acquire resources and capabilities at a rapid pace and achieve fast time-to-market (Hallmann & Puri, 2000).

Venture capital investment offers early-stage firms the access to resources and capabilities that substantially improve the likelihood their success, as the selection, treatment and financial effects of venture capital finance on investee firms often occur simultaneously. While venture capital investment improves the financial strength of early-stage investee firms, the selection effect of venture capital finance contributes to validation of firms on the market where they enter into commercial contracts, labour contracts and partnerships and the treatment effect results in improvement in organization of their resources and capabilities.

Due to a number of positive effects of venture capital finance on early-stage ventures, policy intervention in entrepreneurial finance took a number of trials at enhancing the selection, treatment and financial effects of venture capital finance on early-stage ventures.

2.4. Forms of Policy Intervention in Venture Capital Market

Due to positive externalities of early-stage firms, governments are keen to intervene in entrepreneurial processes (Lerner, 2002; 2009). A knowledge transfer and diffusion of innovation, associated with activities and externalities of early-stage firms, creates social and economic benefits and fosters economic development (Gompers & Lerner, 2001). A positive externality is an external positive benefit of individual activities on third parties and society.

Venture capital is associated with high positive externalities as venture capital-backed firms are innovative firms, often from high-growth sectors of the economy. Venture capital, thus, contributes to the agglomeration of entrepreneurs and firms that internalize innovation. Due to spill-overs of venture capital-backed firms, venture capital is widely believed to

contribute to the economic growth, agglomeration of high-quality firms and development of innovative economy (Kortum & Lerner, 2000; Gompers & Lerner, 2001).

The public policy aims to intervene in entrepreneurial processes, given the mentioned benefits. The academic scholarship identified a number of factors that determine entrepreneurial processes, such as: psychology of entrepreneurs, managerial skills, education, availability of entrepreneurial finance, market conditions, access to information, positive externalities and aggregation (Gompers et al., 2005; Bertoni et al., 2011; Colombo & Grilli, 2008). The aim of public policy is to improve some of the factors relevant for entrepreneurial processes and entrepreneurial finance, in order to create social and economic benefits. The success of policy intervention in meeting its aims depends on the optimal policy design and objectives (Lerner, 1999; 2002).

The study of Cumming (2007) distinguished two general forms of policy intervention in entrepreneurial processes: i) regulatory and institutional framework and ii) direct investment schemes. In addition to the mentioned forms of policy intervention, Alperovych et al. (2015) distinguished the indirect framework as the third form of policy intervention in entrepreneurial processes. This study will briefly discuss the mentioned forms of policy intervention.

2.4.1 Regulatory and Institutional Framework

The academic scholarship in regulatory and institutional framework examined the implications of taxation, government transfers and subsidies, labour legislation and public market legislation for entrepreneurial processes (Cumming & Li, 2013). A successful intervention assumes that government is well informed in order for redistribution to be optimally designed (Cumming & Li, 2013). Yet, sceptics of government intervention highlighted that intervention created distortions in the entrepreneurial processes, enhanced moral hazard and adverse selection, leading to inefficiencies and displacement of entrepreneurial activity (Cumming & Li, 2013).

The importance of taxation for entrepreneurial finance has been extensively researched in the academic scholarship. Low rates of capital gain tax improve fundraising and crowding-in of private venture capital and result in improved exit performance of investee firms (Gompers & Lerner, 1998; Cumming 2007).

Venture capitalists invest in early-stage firms with an objective of realizing financial returns. By listing the venture capital-backed firms on the public market, initial investors realize financial returns from selling their ownership in investee firms to the public. Thus, the legislation and attractiveness of the public capital market contribute to fundraising and crowding-in of private venture capital. Besides the rate of capital gain tax and public market legislation, reporting requirements of publicly listed companies, reduction in lock-up periods and corporate income tax rates also contribute to the attractiveness of public market and thus fundraising and crowding-in of private venture capital (Cumming, 2007).

Indirect frameworks of policy intervention in entrepreneurial processes can take the form of supporting local incubators for incubating young entrepreneurial ventures, facilitating knowledge transfers and other forms of exchange among young entrepreneurial ventures and incumbent firms, with an aim of supporting development of early-stage firms and improving their fundamental qualities.

2.4.2 Direct Investment Schemes

There is a burgeoning academic scholarship about the effects of direct investment schemes on entrepreneurial finance. The study of Alperovych et al. (2015) distinguished three types of direct investment schemes: i) the guarantee, ii) fund-of-funds and iii) government venture capitalists. The mentioned schemes are briefly discussed in this study.

By offering commitment to cover potential losses of private venture capitalists, the objective of government guarantees is to encourage crowding-in of private venture capital and

financing of high-risk early-stage firms (Alperovych et al., 2015). This framework of intervention is based on the principle that the selection of projects to be backed by venture capital shall be determined by market actors, rather than by the public authority.

The so-called fund-of-funds offer private venture capitalists opportunity to raise finance from public sources. Similarly to guarantees, this form of intervention is based on the principle that the selection of projects to be backed by venture capital shall be determined by market actors, who are likely to have superior capabilities for mitigating moral adverse selection risks and improving entrepreneurial processes. In Europe, the European Investment Fund ('EIF') used to be one of the most important fund-of-fund public sources in fundraising of European private venture capitalists. European private venture capitalists have been raising funds from the European Investment Fund up to the present date.

The term government venture capital is used in this study to conceptualize policy intervention in setting up and funding the funds managed by venture capitalists that are subsidiaries of government institutions. As the results of this study will demonstrate, there are substantial differences among direct investment schemes outlined in the study of Alperovych et al. (2015). The fund-of-fund scheme offers government sources of funding to private venture capitalists where government is *an investor* in the funds managed by private venture capitalists, while government venture capitalists are form of intervention where government is *the venture capitalist.* The concept of government venture capital is further discussed in Section 2.5 and Chapter 4 of this study.

As it will be highlighted in Chapter 5, the global financial recession of 2008 transformed the structure of venture capital market in Hungary. The global financial recession initially led to significant contraction in private venture capital finance, negatively affecting the entrepreneurial sector (Karsai, 2013; Bartz & Winkler, 2016; Lee et al., 2015). The successes of policy response were praised in academic scholarship to have led to increasing number of

private venture capitalists and higher participation of private investors in fundraising of private venture capitalists, leading to crowding-in of private investment (Karsai, 2018). The 'market principle' played a critical role in intervention that aimed at improving private venture capital financing gap in the aftermath of global financial recession.

Since the global financial recession of 2008, a number of macroeconomic and microeconomic studies has emerged examining the efficiency of various policy responses, often based on country-specific evidence. A number of macroeconomic and microeconomic studies reviewed in this study examined the implications of policy-driven expansion of government venture capital financing (Alperovych et al., 2015, Bertoni & Tykvová, 2015, Grilli & Murtinu, 2014).

2.5. Government Venture Capitalists

Government venture capitalists are characterized by the captive ownership and governance structure. Despite being often described as subsidiaries of government organizations, government venture capitalists have important role in development of domestic entrepreneurial sector. The policy of providing government venture capital finance strives to intervene in entrepreneurial processes by supplying venture capital to entrepreneurial sector.

The scholarly inquiry in venture capital was generally supportive of direct government intervention in entrepreneurial finance in the areas characterized by clear and identifiable systematic market failures. Government venture capital has specific microeconomic or macroeconomic objectives. However, if it becomes the widespread source of financing for a large segment of domestic entrepreneurial sector, it may cause displacement of private investment and entrepreneurial processes (Lerner, 2009; Cumming & MacIntosh, 2006; 2007; Cumming & Li, 2013).

The policy-driven expansion of government venture capital financing aims at fixing market failures from specific economic, institutional and cultural setting. Since the global financial recession of 2008, private venture capital financing gap has been considered as a market failure that can be fixed by expansion of government venture capital financing. Government venture capitalists are an important form of policy intervention in entrepreneurial finance, as they may have a number of specific objectives. The extensive academic research in government venture capital identified two general objectives of government venture capital finance: i) to mitigate market failures and ii) to facilitate economic growth and positive externalities.

One of the key objectives of government venture capital finance is to compensate for the location-specific scarcity of private venture capital. Government venture capitalists are likely to invest in geographic areas, where the supply of venture capital is scarce (Bertoni et al., 2014). To alleviate the consequences the private venture capital financing gap, government venture capitalists aim at providing finance to firms systematically unattractive to private venture capitalists in terms of industry, location, life-cycle stage or other clearly identifiable qualities.

The second objective of government venture capital outlined by the scholarship is to foster the economic growth (Bottazzi et al., 2004; Tykvová, 2006; Bertoni & Tykvová, 2015). As discussed in the previous section, entrepreneurial activity has high social value and social rate of return due to its spill-overs (Gompers & Lerner, 2001). Innovation is often captured and internalized by numerous actors in the ecosystem (Griliches, 1992). Government venture capital may contribute to the economic growth, agglomeration and development of innovative economy by providing financing to innovative entrepreneurial ventures. To foster economic development, government venture capitalists often provide financing to the firms from innovative and high-growth sectors of the economy with the highest likelihood of positive

externalities. Yet, the claim that government venture capital finance fosters entrepreneurial activity and regional development has been backed by both supportive and unsupportive evidence.

The so-called crowding-out of investment used to be the main concern of opponents of policy intervention in entrepreneurial finance. To avoid competing with private venture capitalists, government venture capitalists are likely to intervene in entrepreneurial processes where private investors are scarce (Lerner, 2002; 2009). Designing a successful policy response poses a challenge and its success is limited to specific objectives of intervention, such as targeting investee firms in specific stage of their life-cycle, geography or industry (Lerner, 2002; Cumming, 2007). The scholarship has pointed to substantial variation in the mentioned policies. For instance, the policy-driven expansion of government venture capital financing in Israel and Australia had positive outcomes, relative to the programs introduced in the UK and Canada (Cumming, 2003; 2007).

As long as the investment pattern of private venture capitalists has systematic qualities, such as preference for investee firms of certain industries, location, stages and size, there will be theoretical justification for the intervention of government in setting up and funding government venture capitalists that would provide financing to the projects systematically avoided by private venture capitalists. A distinctive characteristic of European government venture capitalists is their investment strategy of targeting early-stage ventures in specific industries and locations (Gupta & Sapienza 1992; Mayer et al. 2005; Bertoni et al., 2014).

In summary, government venture capitalists are captive policy vehicles created to implement specific policy objectives. The vast majority of country-specific studies in venture capital made limited and specific contribution to the scholarship. The specific characteristics of policy intervention are relevant for drawing conclusions about potential implications of government venture capital finance for entrepreneurial processes.

The objectives of government venture capital, both supported and unsupported by the evidence, can be summarized in the following statements:

i) Government venture capital improves market failures;

ii) Government venture capital-backed firms have positive externalities, social and economic benefits;

iii) Government venture capital finance leads to higher levels of financing per investee firm, known as micro-level additionality;

iv) Government venture capitalists provide new financing to entrepreneurial sector, known as macro-level additionality;

v) If the private venture capital financing gap is considered to be a market failure, government venture capitalists have a critical role in incubating domestic firms, provided that they successfully reduce the information asymmetry and agency costs of early-stage investee firms.

This studyconceptualizes the government venture capitalists as captive organizations incorporated as subsidiaries of government institutions for the purpose of investing in domestic firms in form of an equity and debt.

In the next chapter, the study reviews the scholarship on value-added activities of venture capitalists.

CHAPTER 3: REVIEW OF LITERATURE IN VALUE-ADDED ACTIVITIES OF VENTURE CAPITALISTS

The studies of Kaplan and Strömberg (2001) and Gompers et al. (2020) offer a comprehensive framework of decision process of venture capitalists, which consists of pre-investment activities (sourcing, evaluating and selecting investments), structuring of investments and post-investment activities. Pre-investment activities and structuring of investments precede value-added activities of venture capitalists and each of the mentioned phases of decision process have importance for value creation (Kaplan & Strömberg, 2001; Gompers et al., 2020).

The analysis of pre-investment activities and structuring of investments falls beyond the scope of this study, as such activities, often aiming at mitigating agency risks of early-stage investee firms, precede investment events. As investment structuring has been extensively discussed in academic scholarship, this study offers a brief overview of mechanisms and activities used for mitigating agency risks of early-stage investee firms, given that corporate governance mechanisms, monitoring practices and value-added activities are complementary (De Clercq & Manigart, 2007).

The primary objective of this chapter is to review various works in academic literature of relevance for analysis of post-investment activities of venture capitalists, often referred to value-added activities and to present selected management scholarship of relevance for the analysis of value-added activities.

In Section 3.1, the research will discuss mechanisms used by venture capitalists to mitigate agency risks of investee firms when structuring their investment contracts.

In Section 3.2, the research will present several influential schools of management relevant for discussion and analysis of value-added activities of assistance.

In Section 3.3, the research will define the concept of value-added activities and it will review selected studies in this scholarship.

Section 3.4 will offer a categorization of value-added activities of venture capitalists.

Section 3.5 will discuss several investor-related and firm-related variables of relevance for the provision of assistance of venture capitalists to investee firms.

3.1 Investment Mechanisms for Mitigating Agency Risks of Investee Firms

The studies of Kaplan and Strömberg (2001) and Gompers et al. (2020) highlight the role of pre-investment activities and structuring of investments in mitigating agency risks of early-stage investee firms. Venture capitalists are successful at solving principal - agent problem by connecting entrepreneurs with the sources of funding and assistance (Kaplan & Strömberg, 2001). Venture capitalists improve governance of investee firms by applying institutional and governance mechanisms that successfully address the principal – agent problem, such as: incentivizing contractual provisions (Black & Gilson, 1998; Kaplan & Strömberg, 2003), incentivizing ownership rights (Barney et al., 1989, Amit et al., 1998), performance-based compensation (MacMillan et al., 1989), investor's board participation and voting rights (Wright & Robbie, 1998; Kaplan & Strömberg, 2003) and monitoring (Gompers & Lerner, 2001, Kaplan & Strömberg, 2003, 2004, Bernstein et al., 2016).

The academic scholarship has indicated that due to different legal and institutional frameworks in which they operate and different investment objectives, venture capitalists use a variety of securities when structuring investment transactions: common equity, debt, convertible debt, preferred equity and convertible preferred equity. The securities of venture capitalists are commonly of a different class than securities of entrepreneurs, and often have voting, board and liquidation rights (Kaplan & Strömberg, 2003). Recent studies have indicated

that venture capitalists are inflexible on negotiating their voting, board and liquidation rights (Gompers et al., 2020).

During the structuring phase, venture capitalists structure venture capital contracts to ensure that their performance expectations are met (Gompers et al., 2020). The board and voting rights, also known as control rights, are rights to control decisions of the firm. The board and voting rights of venture capitalists, even when separated, are critical corporate governance mechanisms for involvement of venture capitalists in investee firms (Kaplan & Strömberg, 2003) and they are shown to increase the productivity of investee firms (Cowling, 2003). The board and voting rights of venture capitalists may extend beyond the assigned voting rights to include rights to veto any decision of investee firms. The control rights of venture capital investors are stipulated ex-ante and are often contingent on subsequent economic performance of investee firms, being commonly tied to automatic conversion provisions, which ensure that once an investee firm reaches certain level of performance and market capitalization for initial public offering, the securities of venture capitalists are automatically converted into common stock (Black & Gilson, 1998). The mentioned contractual provisions serve as an incentive to entrepreneurs to meet performance targets and make decisions that maximize outcomes for investee firms.

The agency theory suggests that entrepreneurs' compensation shall be determined by the investee firms' performance (Kaplan & Strömberg, 2003). Several studies have indicated that agency risks are lower in investee firms with the compensation based on performance metrics (MacMillan et al., 1989). The agency theory predicts that cash-flow rights should be contingent on observable metrics of performance or continuous employment when agency risk is higher. High ownership rights of entrepreneurs reduce agency risks and incentivize entrepreneurs to execute decisions that maximize ventures' outcomes (Barney et al., 1989, Amit et al., 1998; Sapienza & Timmons, 1989).

During project selection, venture capitalists place high importance on the management team, founders and their abilities and industry experience (Gompers et al., 2020). The replacement costs of finding alternative entrepreneurs are high (Sapienza, 1989) and during the structuring phase, venture capitalists often rely on contractual provisions to retain key management. One of such provisions are vesting clauses that commit entrepreneurs to continuous employment until their shares are fully vested (time vesting) or meet certain targets of economic performance (performance vesting). Such clauses create high exit barriers and strong penalties for entrepreneurs (Sahlman, 1990) and alleviate the potential hold-up problem between entrepreneurs and venture capitalists.

In order to reduce the likelihood of investee firms' default and moral hazard, venture capitalists always rely on contractual provisions that enable them to actively monitor investee firms in the post-investment phase (Beuselinck & Manigart, 2006; De Clercq & Manigart, 2007). The objective of monitoring mechanisms is to provide information to venture capitalists about operating and financial performance of investee firms (MacMillan et al., 1989; Sahlman, 1990; Wright & Robbie, 1998; De Clercq & Manigart, 2007). Such mechanisms enable venture capitalists to perform specific actions known as post-investment value-added activities. Monitoring processes are therefore are mechanisms for knowledge exchange, stipulated ex-ante, which enable venture capitalists to respond to investee firms' events and actions, often by providing assistance on how to improve the organization of investee firms' resources and capabilities.

Scholarship has distinguished between formal monitoring processes, such as board participation, and informal monitoring processes, such as reporting (Gompers, 1995), check-ups and meetings (De Clercq & Manigart, 2007). In a firm where venture capitalists have no board rights, monitoring by venture capitalists may also include periodical meetings and visits of investee firms.

In the next Section, the study will present selected management scholarship of relevance for the analysis of value-added activities.

3.2 Perspectives of Management Theory Relevant for Value-Added Activities

The central concept in the reviewed management theory is that specialization of firm's assets is a necessary condition for its competitive advantage and superior performance (Amit & Schoemaker, 1993). There is a theoretical and empirical evidence indicating that specialized assets reduce the business and transaction risk of firms and improve their economic performance. The schools of management discussed below agree that firms strive to develop unique resources and capabilities that confer competitive advantage and superior economic performance. Yet, they disagree in terms of the process of development of resources and capabilities of firms.

The perspectives of i) transaction cost theory of the firm, ii) product-process life-cycle iii) resource-based view of the firm, iv) relational view of the firm, v) social capital theory and vi) dynamic capabilities provide relevant perspectives for the analysis of assistance provided by venture capitalists to young entrepreneurial firms. High absorptive capacity of venture capital-backed firms defined as "the ability of a firm to recognize the value of new, external information, assimilate it, and apply it to commercial ends" (Cohen & Levinthal, 1990) indicates the process of assistance of venture capitalists is one of the critical knowledge-sharing processes in economy.

3.2.1 Transaction Cost Theory of the Firm

The transaction cost theory of the firm makes important contribution to our understanding of risks of young entrepreneurial ventures, despite its original intention to explain economics of decisions in established firms. The transaction cost theory is a framework for studying governance mechanisms of commercial and labour contracts on the market

(Williamson, 1979). It is, therefore, one of relevant theories for analysing the boundary of the firm and strategic and operational decisions about organization of resources of firms.

Teece (1986) attributes the success of large firms' innovation to the internal organization of unique resources and capabilities of firms within their boundaries. Early-stage firms are unlikely to have specialized assets in contrast to incumbent firms, which assets have evolved from numerous transactions with their partners over a long period of time. As early-stage firms are unlikely to have specialized assets, under this view, they are unlikely to achieve superior economic performance.

According to the transaction cost theory, bounded rationality and self-serving attitude are the main causes of opportunistic behaviour on the market (Williamson, 1973). Bounded rationality and self-serving attitude are prevalent behavioural characteristics in the circumstances of high information asymmetry and the environment characterized by high uncertainty. As indicated in Chapter 2, early-stage firms are characterized by numerous strategic and operational uncertainties, high information asymmetry and agency costs.

Uncertainty, frequency of transactions and specialized assets determine the likelihood of a firm entering into market transactions with the third-parties. According to the study of Williamson (1979), the uncertainty and specialized assets of a suppler determine the buyer' strategic decision to pursue a market-based transaction with the suppler. In an environment characterized by uncertainty, the buyer can foresee potential contingencies of a transaction and may use institutional means to mitigate the risks of the supplier's opportunism.

According to Williamson (1979) uncertainty raises the costs of market transactions. The central concept of the transaction cost theory of the firm is the concept of the transaction cost, which is a cost of an exchange of the recurring kind (Williamson, 1979). The transactions cost of a firm determines its likelihood of entering into market contracts. When the transaction costs

of an exchange with the suppler are low, the buyer will pursue market-based transaction with the suppler. Otherwise, if the transaction costs are high, the buyer will opt for in-house production (Williamson, 1979).

Under the described framework, young entrepreneurial ventures have high transaction costs relative to the incumbent firms are they unattractive partners for a market exchange (Teece, 1986; Colombo et. al., 2006). Commercial and labour contracts of young entrepreneurial ventures are described in terms of high information asymmetry, high risk of expropriation of proprietary knowledge, high dependence on external sources of financial and human capital (Stuart et al., 1999) and unstable and temporary process design (Abernathy & Utterback, 1978). It has been already highlighted that early-stage ventures are characterized by lack of market control and public information about their resources and capabilities.

In absence of unique resources and capabilities, early-stage firms strive to develop specialized assets by: i) entering into opportunity-based transactions, ii) pursuing in-house development or iii) seeking reputable partners that validate them on the market. Due to high transactions costs, early-stage ventures are more likely to enter into opportunity-based transactions than market-based transactions.

This study highlighted that venture capitalists strive to provide assistance to investee firms in transactions with the third-parties, in order for investee firms to create some form of specialized assets that would confer competitive advantage and superior economic performance. The transaction cost theory of the firm is an influential theory for understanding strategic decisions of early-stage ventures in terms of seeking reputable partners that validate them on the market such as venture capitalists and leveraging relational capital of venture capitalists for entering into transactions at low costs.

3.2.2 Product-process Life-cycle View

The product-process life-cycle model of Utterback and Abernathy (1975) is an influential framework for studying the evolution of firms and industries. Although embedded in the industrial setting of 1970-s, the model offers coherent framework for firm-level analysis of how absorptive capacity of investee firms evolves throughout their life-cycle. This model has been criticized for undermining the absorptive capacity and capabilities for innovation of incumbent firms (Horwitch & Milicsevics, 2018) and for failing to explain technological discontinuity (Tushman & Anderson 1986). Nonetheless, it has remained one of the most influential frameworks for understanding of how sources, frequency and processes of innovation evolve throughout life-cycle of firms.

Early-stage firms are characterized by high rate of product innovation and unstable and temporary processes of organization of resources. The early-stage firms' strategy is often expressed in terms of unique product and value propositions, based on the entrepreneurs' understanding of the market potential of firms' products and services in terms of size and acceptance, as well as customer preferences, needs and budget. In early stage of their life-cycle, the firms are characterized by high uncertainty about market potential of their products and services. In this stage, the strategic decisions are based on information received from external sources such as potential customers, competitors or individuals familiar with the market. Innovation is therefore based on external and diverse sources of new knowledge and discovery, while the absorptive capacity of early-stage firms to "value of new, external information, assimilate it, and apply it to commercial ends" (Cohen & Levinthal, 1990) is exceptionally high.

The validation of products of early-stage firms reduces some of their uncertainty and shifts their strategic attention to development of processes, in order for firms to meet increasing demand for their products and services. In early stage, young entrepreneurial ventures still have rudimentary organizational capabilities and face many choices about developing their processes

and products, which often have immediate effect on their productivity. This stage is characterized by high rate of product and process innovation (Utterback & Abernathy, 1975).

The product-process life-cycle model predicts that as firms mature, their capabilities become increasingly mechanistic and rigid, posing resilience to innovation due to higher efficiency, standardization of products and processes and improved quality and reliability (Utterback & Abernathy, 1975). Processes evolve into stable organizational capabilities that are increasingly specialized, integrated and subject to formal operating controls. On the demand side, customers pose resilience to innovation due to their established expectations and preferences. At this stage, the absorptive capacity of firms is diminishing, while the internal sources of information gain relevance for decision making, as firms introduce complex internal processes of decision making. The product-process life-cycle model predicts that organizational capabilities at the maturity stage create structural inertia (Tushman & O'Reilly, 1996) and constrain further innovation in products and processes, posing productivity dilemma (Abernathy, 1978). The subsequent management scholarship has criticized this model for not identifying strategic and operational processes of firms used to reconfigure firms' resources for new product and process innovation known as dynamic capabilities (Eisenhardt & Martin, 2000). This study discusses the dynamic capabilities framework due its relevance for organization and reconfiguration of resources of early-stage firms.

This study offers some insights about the evolutionary pattern of assistance of venture capitalists in investee firms, contributing to the international scholarship beyond its country-specific scope. The results of this study indicate that the pattern of assistance of venture capitalists is not equally spread across product-process life-cycle. The pattern of assistance of venture capitalists has a life-cycle, according to the results of this study.

3.2.3 Resource-based View of the Firm

The resource-based view of the firm is a theoretical school of management important for understanding the relevance of internal resources and capabilities for the existence of firms, explaining interfirm differences and competitive heterogeneity. According to this prolific theoretical school, the firm is defined by its resources and processes of organizing its resources that can confer competitive advantage (Penrose, 1959; Barney 1991). A firm has advantage over market when it deploys resources more efficiently than the market. If its resources are rare, durable, inimitable and nontradable, they are the source of competitive advantage (Barney, 1991).

The resource-based view of the firm offers theoretical understanding of competitive heterogeneity based on the differences in specialized assets that are owned and controlled by the firm. According to this school of management, the firm has a competitive advantage on the market when it has unique and durable resources that cannot be replicated or transferred. One of the disputed assumptions of this school of management is that resources that confer competitive advantage must be organized within the firm's boundaries.

There are, however, relevant aspects of the resource-based view of the firm for this study and understanding of the value of assistance provided by venture capitalists to portfolio firms. Evolutionary management theories highlight the importance of long-term learning, reconfiguration and development of resources and capabilities for achieving and maintaining durable competitive advantage. Both resource-based view of the firm and knowledge-based theory of the firm indicate that venture capital-backed firms may achieve competitive advantage from unique configuration of their resources such as: network of relationships, knowledge and experience of entrepreneurs. The knowledge of entrepreneurs is specific to the individuals and young entrepreneurial ventures are created to exploit that unique knowledge (Cable & Shane,

1997). According to knowledge theory of the firm, knowledge is the most important strategic asset of the firm (Spender, 1996).

One of the most influential studies in management - the study of Cohen and Levinthal (1990) - contributes to our understanding of asset-specificity by demonstrating that the absorptive capacity of a firm depends on its internal knowledge, which determines the firm's development trajectory. Cohen and Levinthal (1990) suggest that prior knowledge of entrepreneurs is important determinant of the firm's development path and its ability to recognize the value of new knowledge and assimilate new knowledge from external sources. This study suggests that due to unique and limited knowledge base of young entrepreneurial ventures, their absorptive capacity may be different from established firms. As a result, entrepreneurs are likely to seek external sources of knowledge such as venture capitalists and confer rights and ownership in the firm in exchange for external knowledge, assistance and governance.

Despite the relevance of the resource-based view of the firm for general understanding of interfirm differences, this theoretical framework has a number of limitations. Firstly, this theoretical framework does not inform us how firms without competitive advantage-conferring resources are organized. Moreover, this framework does not inform us about the organization of resources and capabilities in firms characterized by multiple uncertain choices. This framework does not explain how venture capitalists contribute to development of resources of venture capital-backed firm by provision of assistance from external sources.

The limitations of resource-based theory of the firm for this research are significant given the fact that venture capitalists select early-stage ventures that are unlikely to have durable competitive advantage from owned and controlled resources. As it was already indicated in Chapter 2 of this study, early-stage firms are unlikely to have specialized and complementary

assets in contrast to incumbent firms and their resources and capabilities are unlikely to confer competitive advantage on the market.

Secondly, this theoretical school does not offer appropriate framework for analysing firms with shared resources organized across several firms. Early-stage firms configure their resources through networks and opportunity-based transactions and gain competitive advantage from shared resources and capabilities that they do not own and control. As this study will indicate, venture capitalists provide relational capital to investee firms and assist their long-term collaboration, in order for investee firms to create some form of specialized assets that would confer competitive advantage and superior economic performance in the future.

Thirdly, this theoretical school of management does not explain how firms maintain competitive advantage in a dynamic and evolving environment (Eisenhardt & Martin, 2000). The study of Milicsevics et al. (2020) indicated that high number of Hungary-based venture capital-backed firms was from high-growth and high-technology sectors, where sustained competitive advantage is unlikely. In dynamic environment, it is uncertain what resources of firms will be configured to offer competitive advantage (Eisenhardt & Martin, 2000).

As further review of management theories will demonstrate, the dynamic capabilities framework offers important functional contribution to our understanding of the organization of resources of early-stage firms, while the relational view of the firm is relevant for understanding how shared resources and capabilities confer competitive advantage. This study also discussed the social capital theory due to relevance for social relationships for exchange of early-stage firms.

3.2.4 Relational View of the Firm

The study of Dyer and Singh (1998) offers relevant contribution to the management scholarship by proposing a relational view of the firm. According to this influential framework,

firms achieve competitive advantage and superior economic performance from relational activities. Contrary to the resource-based view of the firm that empathizes internalising know-how and knowledge, this influential framework suggests that systematic sharing of resources and capabilities and generating knowledge spill-overs among partners confers competitive advantage for partnering firms (Dyer & Singh, 1998). In their influential study, Dyer and Singh (1998) argue that firms create specialized assets that confer competitive advantage by investing in complementary resources and capabilities, relation-specific assets, knowledge-sharing routines and effective governance of interfirm resources.

The relevance of the relational view of the firm for this study is in its approach to knowledge-sharing processes, also known as knowledge-sharing routines. A number of studies has highlighted that innovative entrepreneurial ventures internalize the ideas of the third-parties. The relational framework suggests that partners are important sources of codified knowledge and routines for entrepreneurial ventures and that repeated and enduring interfirm knowledge-sharing with the third-parties is likely to confer competitive advantage and superior economic performance. This framework offers important contribution to understanding the aggregation of innovative firms in entrepreneurial clusters.

This framework is relevant for our understanding of how operational and strategic assistance of venture capitalists contributes to development of investee firms. Venture capitalists are external sources of information and partners of investee firms. The repeated and enduring knowledge-sharing between the investee firm, venture capitalists and their networks is likely to create some form of specialized assets of investee firms that would confer competitive advantage and superior economic performance due to complementary development of assets, investment in the assets specific to the superior networks of venture capitalists and effective assistance in knowledge transfer provided to investee firms by venture capitalists.

Knowledge is widely believed to exit in explicit and tacit form. The explicit knowledge is codified and transferable form of information, while tacit knowledge consists of ways of working together and know-how (Spender, 1996). The implicit type of knowledge may be important for development of young entrepreneurial ventures in their early-stage. The knowledge-sharing processes are a form of interfirm exchange among firms for the transfer and appropriation of both explicit and tacit knowledge (Grant, 1996; Kogut & Zander, 1992). As further discussion will highlight, two different types of knowledge will have different implications on the knowledge-sharing processes of firms.

Venture capital-backed firms' ability to derive benefits from codified and tacit knowledge of their partners depends of their absorptive capacity to recognize the value and assimilate the knowledge (Cohen & Levinthal, 1990) as well as on the assistance of venture capitalists in knowledge-transfer of investee firms. As this study will indicate, venture capitalists provide assistance to investee firms to enter into partnerships that offer durable competitive advantage to investee firms. Some of the activities of venture capitalists have the objective of assisting the transfer of tacit knowledge through joint activities with the third-parties.

3.2.5 Social Capital Theory

The relational view of the firm states that repeated and enduring exchange with the partners confers competitive advantage and superior economic performance. According to social capital theory and network theory, the membership in the network is the source of competitive advantage. As indicated, some knowledge-sharing processes enable the transfer and appropriation of tacit knowledge such as 'know-how'. Tacit knowledge-sharing processes are based on the social capital, as the transfer of tacit knowledge requires social and personal interaction (Inkpen & Tsang, 2005). The social capital is understood as a special form of relational capital.

The relevance of social capital theory for young entrepreneurial ventures is relatively high given their dependence on external resources and external networks of relationships. In Chapter 2, this study has highlighted that early-stage firms are more likely to engage in opportunity-based transactions than market-based transactions. The unique contribution of the social capital theory to this study is in highlighting the benefits of social interaction for organization of resources. The social capital theory offers important contribution to understanding of the boundary of the firm by highlighting the social nature of interfirm transactions and relationships. Nahapiet and Ghoshal (1998) indicate that organization of resources of firms without competitive advantage may have social forms and that networks have important role in the firm's productivity, as a number of studies in venture capital has indicated (e.g.: De Carvalho et al., 2008).

Due to young entrepreneurial venture's dependence on external resources and capabilities and lack of specialized assets that confer competitive advantage, the social relationships are likely to have important role in development of early-stage firms. Organization of resources of an early-stage firm is a social process, as organization of financial, human and tangible assets takes place outside the boundaries of the firm (Stuart et al., 1999). The social capital are resources embedded within, available through and derived from the network of relationships of a firm (Nahapiet & Ghoshal, 1998). Social relationships increase the collaborative capacity of an organization to enter into exchange with the third-parties and innovate (Putman, 1993).

This study analyses the value of relational capital and networks of venture capitalists in transactions, knowledge transfer and resource sharing of Hungary-based investee firms. Given that social and personal interactions are critical for sharing of tacit knowledge, this research examines some forms of assistance in social interactions of investee firms provided by venture capitalists.

3.2.6 Dynamic Capabilities Framework

Dynamic capabilities are specific strategic and operational processes used to reconfigure resources of firms into new sources of competitive advantage (Eisenhardt & Martin, 2000). The academic scholarships has identified a number of such processes relevant for firms operating in both stable and dynamic environments (Eisenhardt & Martin, 2000). The management scholarship has for instance identified that some product development and innovation processes are widespread, such as organization of cross-functional teams for product innovation (Takeuchi & Nonaka, 1986; Clark & Fujimoto, 1991). Other studies have highlighted that cross-functional and diverse teams are effective sources of strategies (Eisenhardt, 1989).

The appeal of dynamic capabilities is in their common characteristics, transferability and accessibility. Dynamic capabilities are often not unique to the organization (Eisenhardt & Martin, 2000), even though they may have unique and idiosyncratic properties as they evolve in specific organizational environment (Teece et al., 1997). They have common characteristics across firms as some processes are more effective than others for the organization of specific resources. Moreover, such processes can be appropriated and replicated from the third-parties and can be transferred and appropriated through knowledge-sharing. Such processes are often 'best practices' in partnering and alliancing, strategy making and knowledge brokering (Eisenhardt & Martin, 2000).

Dynamic capabilities are not the source of competitive advantage but they contribute to reconfiguration of resources for achieving competitive advantage. Dynamic capabilities determine the creation, evolution, combination and organization of resources for achieving competitive advantage (Kogut & Zander, 1992; Henderson & Cockburn, 1994; Teece et al., 1997; Eisenhardt & Martin, 2000). This framework therefore offers understanding of how

venture capitalists can assist the development of venture capital-backed firms and organization of their resources.

Moreover, this framework allows us to understand why venture capitalists select projects that do not have competitive advantage. The relevance of dynamic capabilities framework for this study is in the fact that specific processes are effective means of reconfiguring resources of early-stage firm for achieving superior performance. As already mentioned, the process of knowledge creation is a critical process for development of young entrepreneurial ventures. The management scholarship has highlighted that knowledge creation is effectively facilitated by external channels for transfer of knowledge between the firm and external sources of knowledge (Henderson & Cockburn, 1994; Powell et al.,1996) and combinative capabilities (Kogut & Zander, 1992).

As this study will indicate, venture capitalists have a critical role in development of processes of Hungary-based early-stage firms by providing assistance, governance and relational capital. Lastly, by locating and introducing investee firms to potential corporate customers, product licencing partners, R&D partners or suppliers, venture capitalists facilitate transactions for transfer and appropriation of dynamic capabilities by investee firms, thus contributing to development of their organizational capabilities. By entering into transactions and partnerships, venture capital-backed firms are more likely to create faster reconfigurations of resources and competitive advantage relative to other firms.

As venture capitalists specialize and acquire knowledge from many firms in specific industry, the potential contribution of venture capitalists to diffusion of dynamic capabilities among early-stage firms may be significant. Venture capitalists may furthermore influence the life-cycle of specific capabilities and their diffusion in new industries.

Even through the academic scholarship on dynamic capabilities has been mostly focused on the analysis of dynamic capabilities at established firms, the empirical evidence from established firms indicates that dynamic capabilities may be effective in reconfiguring resources of early-stage firms. The study of Brown and Eisenhardt (1997) indicates that dynamic capabilities have a life-cycle, as simple, unstable and adaptive dynamic capabilities precede more complex and stable ones. The study of Brown and Eisenhardt (1997) is a relevant empirical analysis of organizations with limited structure for experimenting with low-cost probes. The study of Helfat and Peteraf (2003) indicates that capability can undergo a number of transformations, transfers and adjustments that fully displace the capability from its origin.

The scholarship has identified a set of dynamic capabilities effective in environment of high strategic and operational uncertainty that characterizes early-stage firms. As indicated in Chapter 2, early-stage firms are characterized by strategic and operational uncertainty. The dynamic capabilities framework proposes that venture capital-backed firms can benefit from simple, unstable, adaptive and temporary dynamic capabilities that have the objective of creating new and often unpredictable outcomes (Eisenhardt & Martin, 2000). The evidence of academic studies predicts that dynamic capabilities in early-stage firms would be more adaptive and dynamic in responding to new knowledge, relative to dynamic capabilities in stable environment (Eisenhardt, 1989; Eisenhardt & Martin, 2000).

The common understanding of the schools of management discussed in this study is that venture capital-backed firms strive to create some form of specialized assets. Yet, the mentioned perspectives have different, often contradictory approach as to how firms create specialized assets that confer competitive advantage. The transaction cost theory is instrumental for understanding the strategic decisions of early-stage firms in terms of searching for validation of reputable third-parties such as venture capitalists and leveraging relational capital of venture capitalists for entering into transactions at low cost. Both resource-based view of the firm and

knowledge-based theory of the firm indicate that knowledge of entrepreneurs is a strategic, yet intangible asset. Relational view is a relevant framework for understanding that repeated and enduring knowledge-sharing between investee firms, venture capitalists and their networks is likely to create some form of specialized assets of investee firms. The management scholarship has highlighted that knowledge creation is effectively facilitated by external channels and processes for transfer of information between the firm and external sources of knowledge. Social capital theory is relevant framework for our understanding of tacit knowledge-sharing, as some forms of exchange and interaction are social. Lastly, dynamic capabilities framework is an important contribution to our understanding of the organization of resources of early-stage firms with an objective of creating new and often unpredictable outcomes.

The following Section, the research will discuss the role of venture capitalists in creation of specialized assets of venture capital-backed investee firms.

3.3 Value-Added Activities of Venture Capitalists

Value-added activities are post-investment activities of assistance, provided by venture capitalists to investee firms with an objective of improving their specific qualities. Pre-investment activities and structuring of investments precede value-added activities of venture capitalists (Kaplan & Strömberg, 2001; Gompers et al., 2020), which are less important drivers of returns (40%) relative to deal sourcing and selection (60%) (Sørensen, 2007). The study of Gompers et al. (2020) indicated that post-investment value-added activities had lower importance for value creation (84% of respondents) relative to project selection (86% of respondents). Yet, they are relevant determinant of the quality of venture capital-backed firms.

The first studies in venture capital finance emerged in the mid-1980s during the period of rapid expansion of venture capital finance and growing number of venture capital-backed firms (Timmons & Bygrave, 1986). One of the key determinants of the size of venture capital market is the number and prevalence high-quality ventures, given that venture capitalists are

attracted by high-quality firms (Gompers & Lerner, 1998). Spatial aggregation of high-quality ventures and venture capitalists coevolves within physical boundaries, due to positive externalities of entrepreneurial activity. The venture capital scholarship has emerged in geographical areas rich in venture capital finance and venture capital-backed firms.

The pioneering studies in venture capital finance examined venture capital flows (Timmons & Bygrave, 1986), investment strategies of venture capitalists (Bruno & Tyebjee, 1985) and highlighted unique activities of venture capitalists in portfolio management (Kramer, 1985; Timmons, 1985; Gorman & Sahlman, 1989). The pioneering studies indicated that specific activities of venture capitalists improved economic performance of investee firms. Besides providing financial capital to investee firms, venture capitalists provide many forms of assistance, capital and governance to investee firms.. The scholarship has eventually broadened the scope of analysis to examining various forms of assistance, capital and governance provided by venture capitalists to investee firms.

Since its inception, the scholarship in value-added activities has evolved along few lines of research. The first direction of inquiry has examined the institutional mechanisms and roles of venture capitalists in addressing corporate governance challenges and agency risks. The second direction of inquiry has examined the relevance of venture capitalists' assistance for development of investee firms. The third direction of inquiry has examined the selection effect and relevance of venture capitalists' reputation for economic performance of investee firms.

By exploring the unique industry- and market-specific experience, resources and capabilities of venture capitalists, the scholarship has highlighted that venture capital market is a diverse and heterogeneous space. Value-added activities are often specific to the institutional, cultural and economic setting. Thus, a significant scholarship in value-added activities has emerged within country-specific and descriptive limitations, examining the sample of firms within specific spatial and industry boundaries.

Using different methodologies, the pioneering empirical research in value-added activities strived to explore the relationships among variables determining the involvement of venture capitalists in investee firms and their outcomes. Due to a number of unobserved variables of relevance for performance of investee firms, the studies using descriptive methodologies have gained more interest and relevance in the scholarship.

The research question about the most efficient form and nature of value-added activities of venture capitalists for investee firms has been studied since the scholarship's inception, often based on responses collected from entrepreneurs and venture capitalists. The vast majority of studies in this scholarship have been descriptive, providing a description of the pattern of exchange between investee firms and venture capitalists.

The study of Gorman and Sahlman (1989) originally published in 1986 in the 'Frontiers of Entrepreneurship Research' was the first study in the scholarship to examine the specific forms of value-added activities, outlining six forms of assistance of venture capitalists. As early as in 1986, venture capitalists provided frequent assistance to investee firms in investor search, strategic planning, management recruitment, business planning, network activities and resolution of compensation issues (Gorman & Sahlman, 1989). It emerged from the research of Gorman and Sahlman (1989) that early venture capital investors spent more than half of their time in activities with portfolio firms.

The study of MacMillan et al. (1989) was an important milestone in this scholarship as the first study to look into correlation between activities of venture capital investors and performance of portfolio firms, examining the outcomes of twenty value-added activities of venture capitalists.

The study of Bernstein et al. (2016) indicated that on-site assistance of venture capitalists was an important determinant of investee firms' innovation success and positive

outcomes. The mentioned study offered insights into many aspects of improvement in the quality of venture capital-backed firms created by efficient monitoring and assistance of venture capitalists. The study of Bernstein et al. (2016) indicates that value of assistance provided by venture capitalists is determined by a number of firm- and investor-related determinants and has implications for investee firms' patents and patent citations, as well as investee firms' attractiveness on the capital market.

All reviewed studies indicate that assistance of venture capitalists is determined by the frequency and circumstances of knowledge-transfer between venture capitalists and entrepreneurs. The frequent exchange between venture capitalists and entrepreneurs is likely to identify needs of investee firms in a timely matter. As a result, venture capital investors often choose informal and open forms of interaction with entrepreneurs (Sapienza, 1992) or firms that are physically closer to their reach or less costly to monitor (Bernstein et al., 2016). The study of Sapienza (1992) indicates that value of assistance is enhanced by open and unstructured forms of knowledge transfer between venture capital investors and entrepreneurs.

The above-mentioned studies in venture capital finance highlighted the importance of business experience and understanding of the state of investee firms in post-investment decisions of venture capitalists. The general conclusion of the reviewed studies in this scholarship is that timely, efficient and frequent exchange between venture capital investors and entrepreneurs is likely to identify the specific needs of investee firms, thus enabling venture capitalists to provide timely assistance in improving outcomes of investee firms.

3.4 Categories of Assistance Provided by Venture Capitalists

By focusing on the activities of venture capitalists that mitigate business and transactions risk of early-stage firms, the quantitative research will examine a number of different forms of assistance provided by venture capitalists to Hungary-based investee firms in three categories of value-added activities: i) provision of strategic assistance, ii) provision of

assistance in professionalization and iii) provision of relational capital, while the qualitative research will offer additional contextualization of the findings of the quantitative research.

The mentioned framework is consistent with the classification of value-added activities offered by Hsu (2006) and it is unique for distinguishing the transaction risk as a distinct category of risk of early-stage firms. The academic scholarship has highlighted that young entrepreneurial ventures are highly dependent on resources and capabilities of external parties for entering into transactions and developing their products and organizational capabilities. Social capital and network of relationships are important factors in entrepreneurial processes, given that significant activity in the organization of financial, human and tangible assets occurs across the boundaries of firms (Stuart et al., 1999).

Academic scholars have taken various approaches to the classification of value-added activities. Luukkonen et al., (2013), for instance, distinguishes three categories of value-adding activities: management support, managerial professionalization and reputational capital development. Other management scholars (e.g.: De Clercq & Manigart, 2007) offer categorization based on the nature of activities, distinguishing strategic roles, operational roles and personal roles of venture capitalists in development of investee firms.

3.4.1 Assistance in Mitigating Business Risks of Investee Firms

According to management theory, entrepreneurial activity involves two set of activities: strategic and operational. Entrepreneurs screen for unexplored opportunities that can be exploited by unique combination of tangible and intangible resources (Kirzner, 1973). Entrepreneurial activity also requires that entrepreneurs are competent in operational activities and execution of operational tasks (MacMillan et al., 1989).

The business risk is the risk of a firm's default in implementing its strategic and operational objectives. One of distinct characteristics of early-stage firms are their multiple

strategic and operational uncertainties. The academic scholarship has indicated that venture capitalists provide strategic and operational assistance to investee firms, thus mitigating their business risk and improving the likelihood of their superior economic and exit performance. The scholarship in value-added activities has identified numerous forms of assistance provided by venture capitalists in development of investee firms' products and services (product innovation) and organizational capabilities (process innovation). The provision of assistance entails the transfer of valuable information between venture capitalists and investee firms, where venture capitalists have the role of 'knowledge brokers'.

3.4.1.1 Provision of Strategic Assistance

Venture capitalists spend considerable amount of time in advising investee firms on strategy (MacMillan et al., 1989). A number of studies has explored the role of venture capitalists as strategic advisors to their investee firms (Gorman & Sahlman, 1989; MacMillan et al., 1989; Gompers et al., 2020). Due to their industry- and market-specific experience, venture capitalists have valuable insights about potential market acceptance of investee firms' products and services. Their industry-specific experience allows them to evaluate competitiveness of strategic ideas and advice on competition. Venture capital investors often serve as a sounding board for strategic ideas and initiatives.

Venture capitalists have traditionally regarded their involvement in reviewing and formulating business strategy of portfolio firms as one of their most important functions (Gorman & Sahlman, 1989; Fried et al., 1998).

In terms of provision of strategic assistance, two main assumptions of this study are:

i) Venture capitalists provide strategic assistance to Hungary-based investee firms in development of products and services (product innovation) and strategic positioning.

ii) Categories of private and government venture capitalists are different in strategic assistance provided to investee firms in development of products and services (product innovation) and strategic positioning.

This study examines several forms of strategic assistance provided by venture capitalists to Hungary-based investee firms in development of products and services (product innovation) and positioning. In Section 8.1.1 the quantitative research will present the results of provision of strategic assistance to Hungary-based investee firms, while Section 8.3.1.1 will discuss the results of the follow-up qualitative research about strategic assistance provided by venture capitalists to Hungary-based investee firms.

3.4.1.2 Provision of Assistance in Professionalization

Commonly referred as the assistance in professionalization, operational guidance of venture capitalists has a critical role in development organizational capabilities of investee firms and individual competences of entrepreneurs (MacMillan et al., 1989; Gompers et al., 2020). Venture capitalists are familiar with best-practices, management tools and technologies from industries and markets where their investee firms compete. Involvement of venture capitalists in professionalization of investee firms mitigates some of the risks of early-stage firms and improves the likelihood of their success.

Venture capitalists assist their firms in development of reporting processes and thus contribute to the development of capabilities for data production, information governance and knowledge-sharing. They furthermore have a role of mentors when they provide assistance and governance to entrepreneurs to professionalize in terms of acquiring specific managerial competences and skills (De Clercq & Manigart, 2007).

This study takes into consideration two unique forms of assistance of relevance for professionalization of firms: i) advising on development of organizational capabilities (process

innovation) and ii) advising on joint activities with the third-parties. In terms of provision of assistance in professionalization, the quantitative research has two main assumptions:

i) Venture capitalists professionalize Hungary-based investee firms by advising on i) development of organizational capabilities (process innovation) and ii) joint activities with the third-parties.

ii) Categories of private and government venture capitalists are different in the assistance provided to Hungary-based investee firms in i) development of organizational capabilities (process innovation) and ii) joint activities with the third-parties.

This study examines several forms of assistance in professionalization provided by venture capitalists to Hungary-based investee firms. In Section 8.1.2 the quantitative research will present the results of provision of assistance in professionalization to Hungary-based investee firms, while Section 8.3.2.1 will discuss the results of the follow-up qualitative research.

3.4.2 Assistance in Mitigating Transaction Risks of Investee Firms

Absence of public information about investee firms raises their cost of searching and entering into market transactions with the third-parties. Transaction costs are higher for smaller and younger ventures relative to incumbents (Teece, 1986; Colombo et. al., 2006). A number of factors contributes to high transaction costs of young entrepreneurial ventures: high uncertainty of outcomes, weak corporate governance, weak governance of resources and absence of specialized assets. Besides high costs of entering into transactions, early-stage firms face high expropriation risks, due to weak governance of resources, weak corporate governance and financial constraints. Due to high transaction costs, early-stage ventures are unlikely enter into commercial and labour contracts on market terms.

Social capital and network of relationships have important role in entrepreneurial processes, as the organization of financial, human and tangible assets of early-stage firms occurs across their boundaries (Stuart et al., 1999). The study of Stuart et al. (1999) provides empirical evidence about the relevance of social structure of business relationships for the quality of investee firms. Studies in alliance formation (e.g. Stuart, 2000) indicate that small and technologically unsophisticated firms benefit from cooperation with established and validated partners. Partnering with reputable firms results in improves economic performance of early-stage firms due to their validation, even when the transfer of knowledge and know-how does not occur (Stuart, 2000).

Networks make positive contribution to productivity of investee firms (De Carvalho et al., 2008), as they contribute to locating and contracting suppliers and customers at low costs (Sorenson & Stuart, 2001), offering access to external information and fast time-to-market (Hallmann & Puri, 2000). Networks of venture capitalists have a critical role in the creation and development of organizational capabilities of early-stage ventures (Gompers et al., 2005). Operating activities of early-stage ventures are depended on interfirm exchanges, such as knowledge transfer (Fried & Hisrich, 1995) and learning from the third parties (Colombo et al., 2006; Hsu, 2006; Lindsey, 2008).

3.4.2.1. Provision of Relational Capital

Provision of relational capital is a value-added activity of venture capitalists of identifying and connecting investee firms with the third-parties for entering into commercial and labour contracts, commercial and strategic partnerships and capital transactions.

The academic literature in venture capital has explored the benefits of venture capitalists' networks of relationships for introducing investee firms to collaborating, strategic and commercial partners (Colombo et. al., 2006; Lindsey, 2008). Venture capitalists introduce investee firms to prospective investors (Gorman & Sahlman, 1989; Bygrave & Timmons, 1992;

Gompers et al., 2020), senior managers (Gorman & Sahlman, 1989; Hellmann & Puri, 2002; Gompers et al., 2020) and prospective customer, supplier and labour contacts (Fried & Hisrich, 1995; Gompers et al., 2020). Venture capitalists are relational investors with capabilities to locate synergies within their portfolio and to explore the benefits of intra-portfolio relationships.

In terms of provision of relational capital, the quantitative research examines the assistance of venture capitalists in: i) commercial and labour contracts, ii) commercial and strategic partnerships and iii) transactions with providers of capital, loan and credit and has two main assumptions:

i) Venture capitalists are important sources of i) customer, supplier and labour contracts ii) commercial and strategic partnerships and iii) capital, loan and credit transactions for Hungary-based investee firms.

ii) Categories of private and government venture capitalists are different in assisting i) customer, supplier and labour contracts ii) commercial and strategic partnerships and iii) venture capital and credit transactions of Hungary-based investee firms.

In Section 8.3.1 the quantitative research will present the results of provision of relational capital to Hungary-based investee firms, while Section 8.3.3.1 will discuss the results of the follow-up qualitative research about relational capital provided by venture capitalists to Hungary-based investee firms.

Table 1: The forms of assistance of venture-capitalists analysed in academic scholarship

Category of risk	Category of assistance analysed in this study	Forms of assistance analysed in academic scholarship
Business risk	i) Provision of strategic assistance ii) Provision of assistance in professionalization	- strategic guidance (Gorman & Sahlman, 1989; MacMillan et al., 1989; Gompers et al., 2020); - operational guidance (MacMillan et al., 1989; Gompers et al., 2020); - managerial competences and skills (De Clercq & Manigart, 2007). - contribution to fast time-to-market and first-mover advantage (Hellmann & Puri, 2000); - design of HR policies (Hellmann & Puri, 2002); - assistance in learning from the third-parties (Colombo et al., 2006; Hsu, 2006; Lindsey, 2008); - choice of to service providers (Fried & Hisrich, 1995).
Transaction risk	iii) Provision of relational capital	- introduction to potential collaborating, strategic and commercial partners (Colombo et. al., 2006; Lindsey, 2008).

		- introduction to potential customer, supplier and labour contacts (Fried & Hisrich, 1995; Gompers et al., 2020).), - introduction to potential senior managers (Gorman & Sahlman, 1989; Hellmann & Puri, 2002; Gompers et al., 2020); - introduction to prospective investors (Gorman & Sahlman, 1989; Bygrave & Timmons, 1992; Gompers et al., 2020).

CHAPTER 4: REVIEW OF LITERATURE IN GOVERNMENT VENTURE CAPITAL FINANCE

In course of the last two decades, many forms of policy intervention in entrepreneurial processes have been examined in academic literature. The fragmented academic scholarship examining the effectiveness of intervention in entrepreneurial finance has provided burgeoning and often fragmented evidence about the implications of policy intervention. A substantial portion of studies in policy intervention has examined specific policy responses, offering valuable but often limited contribution to the scholarship (Alperovych & Hübner, 2014). Less commonly, research in international policy has been conducted on cross-country samples of entrepreneurial firms, examining common aspects of policy intervention in venture capital market.

Due to positive externalities of innovative early-stage firms, governments are keen to intervene in entrepreneurial processes (Lerner, 2002; 2009). There are a number of policy tools in the hands of government to intervene in entrepreneurial processes. Howell (2017) indicated that R&D grants were effective policy tools of expanding early-stage entrepreneurial finance, enabling proof-of-concept and prototyping work with positive effect on ventures' patents, revenue, survival and attractiveness for providers of capital (Howell, 2017). The objective of government shall be, according to Howell (2017), to relocate sources of funding from late-stage firms to small and early-stage ventures, in order to spur innovation, technology development, spill-overs, agglomeration of high-quality firms and improve attractiveness of domestic entrepreneurial sector.

This study has indicated that one of the most widespread forms of policy intervention in entrepreneurial finance is expansion of government venture capital financing available to early-stage ventures. The term government venture capital is used in this study to conceptualize

policy intervention in setting up and funding the funds managed by venture capitalists that are subsidiaries of government institutions.

In the aftermath of the global financial recession, European policy intervention in entrepreneurial finance has made government funding available to private venture capitalists. One of distinct features of venture capital finance in Europe are widespread sources of government funding for venture capital investors. Based on the extensive literature review, this study indicated that there are two distinct categories of venture capitalists: private and government venture capitalists. Government venture capitalists are conceptualized in this study as a form of policy intervention where government is *the venture capitalist.* Distinguishing the forms of policy intervention in venture capital finance based on the ownership and governance structure offers a solution to a conceptual complexity caused by the origin of funds of venture capitalists in Europe.

Due to a number of positive effects of venture capital finance on early-stage ventures, policy-driven expansion of government venture capital financing shall aim at enhancing the selection, treatment and financial effects of venture capital finance on early-stage ventures. If government venture capitalists pursue the so-called active or 'hands-on' style of investment and provide assistance to government venture capital-backed firms, they may improve their qualities and contribute to agglomeration of high-quality firms and attractiveness of domestic entrepreneurial sector.

A number of studies has examined the effectiveness of policy-driven expansion of government venture capital financing. These analyses has been often conducted on a limited sample of government venture capital-backed firms, identified by specific properties, such as location, industry and size. Although the evidence of these studies is often limited, their objective has been to examine the outcome of a specific policy intervention, rather than to offer general conclusions. The most cited studies in this scholarship were conducted on a sample of

government venture capital-backed firms based in Canada (Cumming & MacIntosh, 2006, 2007; Cumming & Johan, 2008), Australia (Cumming, 2007; Cumming & Johan, 2009), UK and Germany (Cumming, 2003; Heger et al., 2005; Sunley et al., 2005; Bascha & Walz, 2006), Belgium (Alperovych et al., 2015), Finland (Maula et al., 2007), and on a pan-European sample of investee firms (Leleux & Surlemont, 2003, Da Rin et al., 2006). A handful amount of studies was conducted on cross-country samples of firms (Leleux & Surlemont, 2003; Da Rin et al., 2006; Luukkonen et al.,2013; Bertoni & Tykvová 2015; Cumming et al., 2017).

Based on an extensive review of the scholarship, this chapter will highlight that policy-driven expansion of government venture capital financing commonly has specific microeconomic and macroeconomic objectives. These objectives are apparent from the investment strategies of government venture capitalists. In the absence of specific objectives and targeted activity of government venture capitalists, government venture capital financing is likely to create displacement of capital and negative consequences on competitiveness and attractiveness of domestic entrepreneurial sector. While government venture capitalists strive to respond to identifiable and specific market failures, such as financing gaps, they however often displace private funding (Lerner, 2009; Cumming & MacIntosh, 2006, 2007), reduce financial profitability, operational effectiveness and competitiveness of domestic entrepreneurial sector (Grilli & Murtinu, 2014). The policy-driven expansion of government venture capital financing can therefore have far-reaching negative consequences for the entrepreneurial processes and finance.

The objective of this study was to contribute to the scholarship by country-specific evidence about the assistance provided by venture capitalists to Hungary-based investee firms. About 31% of Hungary-based investee firms is backed by the government venture capital with government venture capitalists as lead investors (Milicsevics et al, 2020). Since 2016, the policy-driven expansion of government venture capital financing has transformed the structure

of Hungarian venture capital market, with government becoming the major venture capital investor in Hungary-based venture capital-backed firms. Due to Hungarian venture capital market's unique structure, an analysis of the assistance provided by venture capitalists to Hungary-based investee firms shall also contain a comparative analysis of the assistance provided by private and government venture capitalists, contributing to the scholarship by identifying unique characteristics of assistance provided by private and government venture capitalists to Hungary-based investee firms.

The scholarship has indicated that captive governance and ownership structure of government venture capitalists has relevance for many of their inferior characteristics. Furthermore, as ownership and governance structure of venture capitalists has implications for their performance and quality of assistance provided to investee firms, this chapter discusses some evidence and conclusions from selected academic literature in government venture capital. The research will provide a comparative analysis of assistance provided by private and government venture capital investors Hungary-based investee firms in Chapter 8.

Section 4.1 offers discussion on several perspectives relevant for examining the assistance provided by government venture capitalists to investee firms. Section 4.2 reviews the scholarship analysing the assistance provided by government venture capitalists to investee firms, while Section 4.3 reviews the scholarship about the effects of policy-driven expansion of government venture capital financing on invested capital and aggregate capital flows.

4.1 Perspectives on Government Venture Capitalists

The academic scholarship has highlighted several perspectives relevant for analysing the assistance provided by government venture capitalists to investee firms. As it will be discussed in this section, the perspectives of ownership and governance structure, financial performance, investment strategy, exit strategy and resources and capabilities are relevant for

the analysis of assistance provided by government venture capitalists to Hungary-based investee firms.

4.1.1. Ownership and Governance Structure

This study has adopted the perspective of academic scholarship that ownership and governance structure of venture capitalists is their most relevant quality (Da Rin et al., 2011). The term government venture capital is used in this study to conceptualize policy intervention in setting up and funding the funds managed by venture capitalists that are subsidiaries of government institutions. In contrast, private venture capitalists have ownership and governance structure that, as least to some degree, precludes the involvement of government, regardless of the origin of their funds.

Unlike private venture capital investors that raise finance from a number of investors - both institutional and private, commonly referred to as limited partners - government venture capital investors commonly raise finance from a single source. The limited partnership structure of private venture capitalists separates the general partner and investors. The purpose of the limited partnership structure in private venture capitalists is to preclude the influence of individual limited partners. Limited partnership structure of private venture capitalists is the result of a negotiating process among number of independent actors, seeking financial returns.

In contrast, government venture capitalists are subsidiaries of government institutions. They are categorized by their captive ownership and governance structure and absence of separated ownership and control. Government venture capitalists are not incorporated as a result of a negotiating process among a number of independent actors, but in order to execute specific policy objectives (Bertoni et al., 2014). Government venture capitalists are created by a regulatory process and their activities are prescribed by regulators. Activities of government venture capitalists are often stipulated by the statute (Leleux & Surlemont 2003; Bertoni et al., 2014). In contrast to the limited partnership structure of private venture capitalists, the captive

structure of government venture capitalists does not preclude the involvement of government and it has implications for decisions of government venture capitalists.

Government venture capitalists commonly do not strive to realize financial returns but structural and strategic outcomes (Bertoni & Tykvová, 2015, Cumming & MacIntosh, 2006). Government venture capitalists are created to address local and regional economic development objectives and create positive externalities (Anselin et al., 1997; Bertoni & Tykvová, 2015; Breschi & Lissoni, 2001). Government venture capitalists often select projects based on their likelihood of positive externalities from innovation (Bertoni & Tykvová, 2015).

The review of academic scholarship suggests that ownership and governance structure of venture capitalists has relevance for a number of factors that determine investment performance of venture capitalists. Ownership and governance of government venture capitalists has direct implications for their financial performance, investment and exit strategy (Cumming & MacIntosh, 2006; 2007; Da Rin et al., 2011; Bertoni & Tykvová, 2015). The statutory structure of government venture capitalists therefore relinquishes many of the organisational advantages of private venture capitalists, such as the separation between ownership and control and profit maximization, in addition to imposing statutory contains on investment activities (Cumming & MacIntosh, 2006; 2007).

4.1.2. Financial Performance

The academic scholarship agrees that captive structure of government venture capitalists is associated with high agency costs, low returns and inferior economic performance of government venture capital-backed firms. While private venture capital investments are made based on the expectation of financial returns, the economic performance of government venture capital-backed firms and financial performance of government venture capitalists appear to be secondary considerations in the selection of projects by government venture capitalists.

Private venture capitalists are subject to contractual and financial liabilities from their limited partners (Bottazzi et. al., 2008; Alperovych et al., 2015). Private venture capitalists strive to realize superior financial performance and they select projects based on their likelihood of superior economic and exit performance (Gompers & Lerner, 2001). Profit maximization is therefore the organisational advantage of private venture capitalists.

In the absence of financial liabilities towards parent organizations and due to pressures to meet policy objectives, government venture capitalists often do not seek financial returns. As a result, the financial performance of government venture capitalists and their investee firms is often inferior relative to the performance of private venture capital investors and investee firms backed by private venture capital.

To incentivize the selection of projects of the highest quality, private venture capitalists use compensation schemes that improve the performance of investment managers (Gompers & Lerner, 1999). Private venture capitalists and their managers are incentivized to acquire resources and capabilities in order to improve their financial performance, such as knowledge and competence to provide assistance to investee firms (Bottazzi et. al., 2008; Sapineza 1992). In contrast, resources and capabilities of government venture capitalists are specific to the policy intervention and their managers often lack business experience and knowledge to improve the outcomes of investee firms.

Government venture capitalists do not incentivize the selection of projects with superior fundamental characteristics. The primary objective of government venture capitalists is to respond to a specific market failure (Lerner, 1999; 2002). The agency risks of government venture capital-backed firms are substantially higher (Leleux & Surlemont, 2003). The economic performance of government venture capital-backed investee firms and financial returns appear to be secondary considerations in the selection of projects by government venture

capitalists. Instead, the selection of projects is often led by the investee firms' likelihood of creating positive externalities, new employment and societal benefits.

4.1.3. Investment Strategy

Government venture capitalists are the most distinct category of venture capital investors in terms of investment strategy (Bertoni et al., 2014). The extensive academic research in government venture capital has identified two general objectives of government venture capital finance: i) to mitigate market failures and ii) to facilitate economic growth and positive externalities.

Private venture capital financing has systematic and localized pattern of activity within spatial and industry boundaries. The objective of government venture capital is to address market failures of private venture capital financing gap within spatial and industry boundaries (Lerner, 2002). Government venture capitalists often invest in locations where there is a venture capital financing gap (Bertoni et al., 2014). Government venture capitalists also aim at mitigating the financing gap for firms systematically unattractive to private venture capitalists, such as early-stage firms. Since the global financial recession of 2008, venture capital financing gap in Hungary and across Europe has been considered as a market failure that can potentially be alleviated by policy intervention.

The second general objective of government venture capital finance indicated by the scholarship is to foster economic development (Bertoni & Tykvová, 2015). As discussed in Chapter 2, entrepreneurial activity has high social and economic value due to its positive externalities (Griliches, 1992; Gompers & Lerner, 2001). Government venture capital finance contributes to local and regional economic growth, aggregation and development of entrepreneurial activity by providing financing to entrepreneurial ventures from innovative sectors of the economy with the highest likelihood of generating positive externalities (Gompers & Lerner, 2001).

Besides compensating for the financing gap and fostering economic growth and development, government venture capitalists foster employment (Leleux & Surlemont, 2003). In Chapter 2, it was highlighted that venture capital has a treatment effect on investee firms and that it improves their financial strength.

In contrast to the investment strategies of private venture capitalists that in search of profit maximization target innovative firms from high-growth sectors and markets, the investment strategies of government venture capitalists are often concentrated on the sectors and markets systematically unattractive to private venture capitalists. The investment activity of government venture capitalists in stable sectors of the economy is similar across European countries (Bertoni et al., 2014). The objectives of government venture capitalists are often determined in terms of regional economic development (Cumming & MacIntosh, 2007; Alperovych et al., 2015). To achieve such policy objectives, government venture capitalists select low risk projects with predictable outcomes and are more likely to invest in the firms from stable and moderate-growth industries.

The captive ownership and governance structure of government venture capitalists has relevance for their investment strategies (Da Rin et al., 2011). Not only that the captive ownership and governance structure of government venture capitalists is associated with inferior selection process and high agency costs of selection (Leleux & Surlemont 2003; Hellmann et al. 2008; Dimov & Gedajlovic, 2010), but it also has relevance for inferior assistance provided to portfolio firms. The captive ownership and governance structure of government venture capitalists allows government to make political pressures, resulting in investing in locations and industries with low quality projects (Cumming et al., 2017).

Bertoni et al., (2014) indicated that private venture capital systematically avoids early-stage ventures in favour of validated business ideas. The early-stage financing gap is common beyond the European continent, where provision of entrepreneurial financing has historically

been credit market-based (Bertoni et al, 2014). The study of Cumming (2007) conducted on the sample of firms backed by Austrians IIF program highlighted that government venture capitalists were 46% more likely to finance seed-stage firms and 27% more likely to finance early-stage firms than private venture capitalists. The evidence of this study indicates that public policy can successfully intervene in early-stage entrepreneurial finance. The objective of government venture capital is to compensate for such market failures by validating early-stage investee firms and improving their attractiveness on the capital market (Grilli & Murtinu, 2013; 2014).

The study of Cumming (2007) offers evidence that government venture capitalists are likely to target firms from specific high-growth sectors of the economy, such as biotechnology and information technology. The sectors with significant activity of government venture capitalists are commonly characterized by resource-intensive processes of product development and longer time-to-market. Due to pressures to realize financial returns within a limited investment horizon, private venture capitalist are unlikely investors in biotechnology firms. The study of Bertoni et al. (2014) indicates that government venture capitalists specifically target firms from industries such as biotechnology.

The mentioned sources indicate that besides regional economic development, government venture capitalists may also have an objective of fostering innovation in rapidly growing sectors of the economy. In innovative sectors of the economy, innovation is not fully internalized and has substantial spill-overs (Gompers & Lerner, 2001). The government programs of providing entrepreneurial finance to firms from innovative industries have the objective of fostering economic development by targeting firms from growing sectors of sectors of the economy. These objectives mean that the activities of government venture capitalists are not limited to predictable and stable sectors of the economy. In order for policy intervention to

mitigate specific financing gaps, government venture capitalists often target high-growth sectors and firms.

4.1.4. Exit Strategy

As pressures to realize financial returns from their investments are lower, government venture capital investors seldom have exit strategies that are comparable to those of private venture capitalists. Unlike private venture capital investors that have a limited lifetime, the lifetime of government venture capitalists is often unlimited (Alperovych et al., 2015). As a result, government venture capitalists have longer holding periods relative to private venture capitalists and they are often difficult to liquidate (Lerner, 2009).

The study of Cumming & Johan (2008) distinguishes five types of exit transactions of venture capitalist: i) initial public offering (also referred to as 'IPO') - listing the venture capital-backed firm on the public market, ii) acquisition of the portfolio firm by a corporate investor – selling the shares owned by venture capital investors to a corporation, iii) secondary sale – selling the shares owned by venture capital investors to new venture capital investors, iv) management buybacks – selling the shares owned by venture capital investors to the management of the investee firm and v) write-off of investment.

One of the main objectives of venture capitalists is to raise the attractiveness of their portfolio firms for the capital market and improve their exit performance. To mitigate information asymmetry and agency risks of new investors, venture capitalists provide different forms of assistance to investee firms.

Yet, not all exit transactions require similar effort in mitigating information asymmetry and agency risks. Listing the portfolio firm on the public market requires that information asymmetry and agency risks of investors are least prevalent and such exit transactions require significant effort in reducing the information asymmetry of private firms. The high cost of

preparing the investee firm for a listing on the public market is rewarded by high valuation and returns offered by the public market. The IPOs are therefore preferred exit transactions of private venture capitalists but an unlikely effort of government venture capitalists (Cumming & Johan, 2008).

Government venture capitalists are likely to have preferences for exit transactions that have lower costs than the costs of listing on the public market. Government venture capitalists are likely to prefer exit transactions that do not require significant assistance in mitigating information asymmetry and agency costs of investee firms, such as secondary sales, buybacks and write-offs (Cumming & Johan, 2008). Their exit strategy is therefore different than the exit strategy of private venture capitalists.

4.1.5. Resources and Capabilities

In the previous chapter, it was indicated that experienced managers were sources of competitive advantage for private venture capitalists due to mitigating the adverse selection and providing assistance to investee firms in improving their performance. A number of studies has indicated that experience of venture capitalists determines the selection of projects and frequency and value of assistance provided to investee firms and has direct relevance for positive outcomes (Sapienza et al., 1996; Sorensen, 2007; Bottazzi et al. 2008; Gompers et al., 2009). Venture capitalists with business experience are more likely to add value to investee firms and improve their economic and exit performance (Bottazzi et al., 2008)

As government venture capitalists often lack compensation schemes of private venture capitalists (Manigart et al., 2002), they are unattractive to managers with experience from business sectors. Government venture capitalists have difficulty in accessing and retaining labour force on the market where competitors offer incentives based on financial performance and returns. This difficulty has significant implications for the quality of investee firms given

the importance of business experience for the assistance provided to investee firms (Bottazzi et al., 2008).

The compensation of managers at government venture capitalists is not determined by financial performance of investments, resulting in high agency costs and adverse selection. Managers at government venture capitalists are often civil servants with experience from consulting, law, audit and financial sector. As a result, the selection process of government venture capitalists is akin to a credit risk evaluation process (Alperovych et al., 2015). Lack of incentives for managers to contribute to the economic performance of government venture capital-backed firms has implications for human resource policies and development of human capital of government venture capitalists. One of the factors that contribute to the success of policy intervention in venture capital is a training and professionalization of venture capital managers in early-stage investing (Cumming, 2007).

The academic studies have highlighted that government venture capitalists have a lower number of portfolio firms per manager (Alperovych et al., 2015). These figures point to a number of inferior qualities of government venture capitalists, such as lower efficiency and inferior quality of portfolio firms.

In conclusion, the discussed characteristics of government venture capitalists have implications for the assistance provided by government venture capitalists to investee firms. The next section will review the scholarship about assistance provided by government venture capitalists to investee firms. Following other studies in this scholarship, this study will provide a comparative analysis of the assistance provided by private and government venture capitalists to Hungary-based investee firms.

4.2 Provision of Assistance by Government Venture Capitalists

A significant scholarship and academic interest in government venture capital finance has been focused on the analysis of qualities of government venture capital-backed firms. Government venture capitalists aim at fixing specific market failures by provision of capital and various forms of assistance to investee firms. In Chapter 3, it was highlighted that venture capitalists provide assistance to investee firms in entering into transactions, development of products and services and managerial competences (MacMillan et al. 1989; Sapienza 1992; Sapienza et al. 1996; De Clercq and Manigart 2007; Large and Muegge 2008). In this section, this study discusses the empirical results of the studies examining the assistance provided by government venture capitalists to investee firms.

A number of studies has compared the qualities, economic and exit performance of government and private venture capital-backed firms. The general conclusion emerging from the academic literature is that private venture capitalists are more effective in improving the outcomes of portfolio firms relative to government venture capitalists in the area of idea development (Luukkonen et al., 2013), professionalization (Cumming, 2007; Luukkonen et al., 2013), exit performance (Luukkonen et al., 2013; Brander et al., 2014; Grilli & Murtinu, 2014; Cumming et al., 2017) and social capital (Luukkonen et al., 2013). According to the scholarship, private venture capitalists are a more valuable source of capital for young entrepreneurial ventures.

The findings of Maula et al. (2005), Knockaert et al. (2006), Knockaert and Vanacker (2013) and Luukkonen et al. (2013) highlight that government venture capitalists are not appropriate mechanism of policy response to the gap in financing of early-stage firms. As discussed in the previous chapter, value-added activities are one of the most critical factors for success of early-stage ventures. Academic scepticism in the ability of government to successfully intervene in the entrepreneurial processes is not surprising, given the fact that

government venture capitalists have inferior qualities that have implications for the quality of investee firms. In absence of providing necessary assistance to investee firms, government venture capital finance may not be able mitigate the gap in activities of venture capitalists.

The academic scholarship has indicated that venture capital finance has a treatment effect on portfolio firms. The evidence provided by academic literature examining value-added activities of government venture capitalists indicates that government venture capitalists may not have resources and capabilities to create a comparable treatment effect on investee firms to that of private venture capital finance. Government venture capital finance is likely to reduce the competitiveness and attractiveness of domestic entrepreneurial sector (Grilli & Murtinu, 2014).

In the following section, the research will review the scholarship analysing the assistance provided by government venture capitalists to investee firms by focusing on the areas of economic performance and productivity, innovativeness and exit performance of government venture capital-backed firms.

4.2.1 Economic Performance and Productivity

The productivity of a firm is its efficiency of converting resources into outputs such as products and services. A number of studies has examined the contribution of venture capitalists to the organisation of processes in portfolio firms, highlighting the positive impact of venture capital on the firms' growth (Bertoni et al., 2011). The comparative studies of Bertoni et al. (2011), Chemmanur et al. (2011) and Croce et al. (2013) have indicated that venture capital-backed firms have superior performance relative to other firms. These studies have offered rich evidence about the value of assistance provided by venture capitalists to investee firms.

In the previous chapter it was highlighted that venture capitalists assist investee firms in professionalization and in entering into transactions with the third-parties. Venture capitalists

provide various forms of assistance in development of investee firms' capabilities (MacMillan et al., 1989; Sahlman, 1990; Wright & Robbie, 1998; De Clercq & Manigart, 2007).

The comparative studies in productivity of investee firms have examined the economic performance of investee firms backed by government and private venture capital. The study of Alperovych et al., (2015) conducted on the sample of Belgian firms found no difference in productivity of portfolio firms backed by government and private venture capital before the first investment round, indicating that government venture capital-backed firms do not have inferior qualities prior to the first round of investment. Yet, a large portion of academic scholarship agrees that investee firms backed by government venture capital have inferior economic performance relative to the firms backed by private venture capital. The general conclusion emerging from the comparative studies is that firms backed by government venture capital have inferior productivity and economic performance relative to a comparable set of ventures (Cumming 2007; Cumming et al., 2014; Grilli & Murtinu, 2014; Alperovych et al., 2015).

The results of the study of Grilli and Murtinu (2014) indicate that government venture capitalists do not make positive contribution the growth of European high-tech firms. Moreover, the studies indicate that positive effect of government venture capital to the growth of investee firms is limited to syndicated investments with private venture capitalists. These results are supported by the study of Alperovych et al. (2015) conducted on the sample of Belgian firms, indicating that private venture capital-backed firms have higher productivity within a three-year period from the first round of investment relative to a comparable set of government venture capital-backed firms.

The results of studies on productivity of investee firms (Bertoni et al., 2011; Croce et al., 2013; Alperovych et al., 2015) indicate that venture capital financing has immediate effect on productivity of investee firms after the first round of financing. However, the sample of

government venture capital-backed firms analysed by Alperovych et al., (2015) showed declining productivity after the first round of financing, relative to the firms backed by private venture capital and even relative to the firms that were not backed by venture capital. In particular, regional investment funds reduced the productivity of their portfolio firms (Alperovych et al., 2015).

The mentioned studies indicate that adverse selection problem may not be as significant and that government venture capital-backed firms do not have inferior qualities prior to the first round of investment. However, the difference in productivity between private and government venture capital-backed firms emerges after the first round of investment. These results indicate that government and private venture capital finance have a different treatment effect on investee firms.

4.2.2 Innovativeness

Innovation is an intrinsic quality of entrepreneurial activity and has been associated with positive externalities, high social rate of return (Gompers & Lerner, 2001) and economic benefits to ventures and entrepreneurs in the ecosystem (Griliches, 1992). One of the factors contributing to the aggregation of venture capital are positive externalities of entrepreneurial activity. The activity of venture capitalists is significant in locations with high-quality entrepreneurial ventures, as venture capitalists and entrepreneurs are attracted by the presence of high-quality firms (Gompers & Lerner, 1998). The aggregation of venture capital and entrepreneurial activity leads the emergence of clusters of entrepreneurship and innovation (Kortum & Lerner, 2000)

One of the objectives of government venture capital finance is to support innovative firms that are likely to create positive externalities. To achieve this objective, government venture capitalists target investee firms with the highest likelihood of generating positive externalities. There is, however, significant difference in the assistance provided by private and

government venture capitalists with relevance for innovativeness of investee firms (Bertoni & Tykvová, 2015). The general conclusion emerging from the academic literature is that private venture capitalists provide superior assistance in product and process innovation of investee firms relative to government venture capitalists (Leleux & Surlemont, 2003; Lerner, 2009; Luukkonen et al., 2013).

The study of Bertoni and Tykvová, (2015) was an important empirical and conceptual attempt to look into the consequences of policy-driven expansion of government venture capital financing on the innovativeness of investee firms. According to the evidence collected from European biotechnology investee firms that obtained the first round of financing in the period between 1994 and 2004, government venture capital-backed firms had lower level of patenting activity relative to the firms backed by private venture capital. According to Bertoni and Tykvová, (2015), the absence of incentives of government venture capitalists to attract experienced investment managers has implications for the innovativeness of government venture capital-backed firms. The findings of the aforementioned study do not indicate that policy-driven expansion of government venture capital financing contributes to innovation and positive externalities.

4.2.3 Exit Performance

It was highlighted in the previous section that ownership and governance structure of venture capitalists affects their exit strategy, as well as their capabilities to assist investee firms in mitigating information asymmetry and agency risks of new investors.

The exit performance of investee firms is driven by many firm-specific qualities, such as their growth rate and financial performance that venture capitalists strive to improve by providing assistance to investee firms. As information asymmetry and agency risks of new investors also affect the value of investee firms, the assistance of venture capitalists has an aim of improving the attractiveness investee firms on capital and credit market.

Depending on the researched sample, the studies have indicated that government venture capitalists both increased the attractiveness of their portfolio firms for the public market (Cumming, 2007) and decreased their exit performance (Alperovych et al., 2015). Yet, the scholarship has identified only few policy interventions that were successful in improving the exit performance of government venture capital-backed firms (Cumming, 2007). The study of Bertoni et al. (2015) indicated that government venture capitalists were not able to raise the attractiveness of early-stage portfolio firms for private venture capitalists due to different investment strategy.

The inconsistent results about the effectiveness of government venture capital finance for exit performance of government venture capital-backed firms indicates that policy programs differ in outcomes. The inconsistent results also indicate that there is a significant heterogeneity among government venture capitalists in terms of their capabilities to improve the outcomes of investee firms. Cumming (2007) has indicated that entrepreneurial finance mechanisms introduced in the USA and Australia are superior to ones introduced in the UK and Canada, while Da Rin et al. (2011) has highlighted that heterogeneity of government venture capitalists is significant in Europe.

By highlighting few examples of successful policy intervention in venture capital market, the academic scholarship has indicated that government venture capitalists may improve some of the market failures associated with the private venture capital financing gap. Yet, the scholarship has also highlighted that policy responses to improving the financing gap differ in outcomes.

In the next section, the research will review the scholarship about the effects of policy-driven expansion of government venture capital financing on invested capital and aggregate capital flows.

4.3 Provision of Financing by Government Venture Capitalists

In the previous section, this study has examined the effects of policy-driven expansion of government venture capital financing on qualities of investee firms. The general conclusion emerging from the analysed literature is that the value of assistance provided by government venture capitalists is inferior relative to the value of assistance of private venture capitalists. This section reviews the scholarship about the effects of policy-driven expansion of government venture capital financing on invested capital and aggregate capital flows.

The objective of government venture capital finance is to increase the aggregate supply of entrepreneurial finance. It was highlighted in previous sections that activities of private venture capitalists lead to market failures and financing gaps (Bertoni et al., 2014). There is a number of policy tools that improve financing gaps. Howell (2017) found that R&D grants had financial effect on early-stage entrepreneurial ventures that improved their cost of capital and attractiveness for external providers of capital. Government venture capitalists are specialized in investing in projects that are unattractive to private sector and providers of capital (Bertoni et al., 2015).

Government venture capital finance has an important role in helping to solve the chicken-egg paradox of nascent capital markets (Grilli & Murtinu, 2014). The policy-driven expansion of government venture capital financing may incentivize entrepreneurial activity and accelerate the aggregation of young entrepreneurial ventures, thus contributing to crowding-in of private investment and venture capital finance. Howell (2017) indicated that grants provided to early-stage entrepreneurial ventures crowded-in private capital by creating new investment opportunities to external providers of capital. However, can government venture capital finance have the same microeconomic and macroeconomic implications for early-stage entrepreneurial sector?

A number of studies has analysed the consequences of the expansion of government venture capital finance on venture capital market (Cumming & MacIntosh, 2006; Leleux & Surlemont, 2003). The macroeconomic studies have been looking to find the evidence of additionality and investment crowding (Bertoni at el, 2011; Brander et al., 2015; Cumming & Johan, 2013; Cumming & MacIntosh, 2006; Leleux & Surlemont, 2003). Some of the consequences highlighted by the studies are crowding-out of private venture capital - decrease in private venture capital financing and private investment in venture capitalists. In contrast, the crowding-in of investment is generally considered to be a positive outcome that refers to an increase in private venture capital financing within a specific location and private investment in venture capitalists.

The academic scholarship agrees that government venture capital finance may improve the financing gap. If a venture capital financing gap can be considered as a market failure, the expansion of government venture capital financing is likely to result in an increasing number firms receiving entrepreneurial financing and in higher financing levels in investee firms. The studies have generally agreed that policy intervention in entrepreneurial finance improves financing levels in investee firms (Brander et al., 2015). To assess the potential consequences of policy intervention on additionality, the academic studies have analysed the extensive margin of portfolio firms – whether the expansion of government venture capital financing is associated with higher amount of venture capital financing (Brander et al., 2015). The results of academic studies points to the inconsistent evidence about the consequences of the expansion of government venture capital financing. The inconsistent results of studies are due to specific characteristics of domestic entrepreneurial sector, unique institutional framework and different mechanisms of policy intervention.

Due to the inferior qualities of the assistance provided by government venture capitalists to investee firms, government venture capitalists are unlikely to improve all market failures.

Moreover, they are likely to create new market failures, such as declining productivity and economic performance of domestic entrepreneurial sector. The academic literature agrees that negative consequences of the expansion of government venture capital financing can be precluded by narrowing the scope of activities of government venture capitalists to the firms that are unattractive to private investors.

The recent studies have looked into cross-border patterns of outgoing and incoming crowding-out and crowding-in of investment, distinguishing outgoing crowding-out - increase in the outflow of investment from a domestic venture capital market to foreign investee firms, and incoming crowding-out - decrease in incoming investment by cross-border venture capitalists (Dahaj & Cozzarin, 2019). The excessive supply of government venture capital financing is likely to displace private venture capitalists from domestic markets, thus creating the outgoing crowding-out of investment. The general conclusion emerging from the literature is that domestic private venture capitalists are likely to be more affected by the expansion of government venture capital financing relative to cross-border private venture capitalists (Dahaj & Cozzarin, 2019).

The academic studies have identified that policy-driven expansion of government venture capital financing can have positive consequences on private investment (Leleux & Surlemont, 2003; Cumming, 2007; Cumming & Johan, 2013; Brander et al., 2015, Dahaj et al., 2019) as well as negative consequences on private investment (Lerner, 2009; Cumming & MacIntosh, 2006, 2007). The inconsistent results indicate that expansion of government venture capital financing must be studied on country-specific samples, due to significant diversity of private venture capital finance across countries and macroeconomic circumstances. The implications of policy-driven expansion of government venture capital financing shall therefore be evaluated on case-by-case and country-specific basis.

Some negative consequences of policy-driven expansion of government venture capital financing were discovered on mature capital markets (Cumming & MacIntosh, 2006, 2007; Lerner, 2009). The study of Cumming and MacIntosh (2006, 2007) found evidence of significant crowding-out of private investment. The study of Brander et al. (2010) examined the consequences of intervention on Canada-based investee firms, indicating that policy intervention resulted in limited crowding-out of private investment and significant additionality. Lerner (2009) has been one of the most comprehensive and frequently cited studies in this scholarship. Although based on the secondary data, Lerner (2009) highlighted that government venture capital financing crowded-out investment due to competition between private and government venture capitalists.

Based on the dataset of investee firms from fifteen European countries, the study of Leleux and Surlemont (2003) was the first empirical and conceptual attempt to look into the macroeconomic consequences of policy intervention on European venture capital market. While the study of Leleux and Surlemont (2003) found evidence of additionality on European venture capital markets during the examined eight-year period, similar studies questioned the success of government venture capital finance in creating long-term benefits (Bertoni & Tykvová, 2015, Leleux & Surlemont, 2003).

A number of studies has indicated that syndicated investments of private and government venture capitalists are likely to improve outcomes of policy intervention in entrepreneurial finance. The studies have indicated that the positive effect of syndication between private and government venture capitalists is the result of complementarity between private and government venture capital finance (Brander et al., 2015; Dahaj & Cozzarin, 2019). The evidence of complementarity found by the mentioned studies indicates that market failures can be improved by syndication of private and government venture capitalists. A number of studies highlighted that the syndication of private and government venture capitalists results in

additionality and crowding-in of investment (Brander et al., 2015; Dahaj & Cozzarin, 2019). The study of Brander et al. (2015) has furthermore indicated that there was a positive association between syndicated financing as the result of policy intervention and a number of investee firms receiving venture capital financing. The results of Dahaj and Cozzarin (2019) and Brander et al. (2015) indicate that syndication of private and government venture capitalists leads to significant additionality.

In conclusion, academic scholarship agrees that government venture capital finance may improve private venture capital financing gap. But as government venture capital has inferior qualities, some negative consequences of policy-driven expansion of government venture capital financing can be precluded by narrowing the scope of activities of government venture capitalists.

In the next chapter, the research will discuss the venture capital market of Hungary by referencing a limited amount of academic studies published in English language. The discussion is the next chapter will highlight that the policy-driven expansion of government venture capital financing in recent years has transformed the structure Hungarian venture capital market, with government becoming the major venture capital investor in Hungary-based investee firms.

CHAPTER 5: VENTURE CAPITAL FINANCE IN HUNGARY

This chapter discusses the venture capital market of Hungary by referencing a limited amount of academic studies published in English language.

5.1 Country-specific Scholarship

The academic scholarship in the field of venture capital finance consists of country-specific studies. A substantial portion of academic literature is based on the data collected from developed capital markets of the USA (Cumming and Li, 2013; Lerner, 1999), Canada (Cumming & MacIntosh, 2006, 2007), Australia (Cumming, 2007; Cumming & Johan, 2009), UK and Germany (Bascha and Walz, 2006; Cumming, 2003; Heger et al., 2005; Sunley et al., 2005), Belgium (Alperovych et al., 2015), Finland (Maula et al., 2007). Only a small amount of academic studies has analysed cross-country datasets (Leleux & Surlemont; 2003; Da Rin et al., 2006; Luukkonen et al., 2013; Bertoni & Tykvová, 2015; Cumming et al., 2017).

The academic scholarship pointed to significant differences in the levels of entrepreneurial activity and venture capital financing across countries. Such differences have prevailed due to historic circumstances and unique cultural, institutional and economic settings (Cumming et al, 2007). The academic scholarship identified a number of factors that determine entrepreneurial processes, such as: psychology of entrepreneurs, managerial skills, education, availability of entrepreneurial finance, market conditions, access to information, positive externalities and aggregation (Gompers et al., 2005; Bertoni et al., 2011; Colombo & Grilli, 2008).

The academic research often examined a country-specific policy intervention in entrepreneurial finance, due to significant cross-country differences in entrepreneurial activity, quality of firms, supply of venture capital financing and forms of policy intervention. The vast majority of country-specific studies in venture capital finance have therefore made a limited

and specific contribution to the scholarship. Governments frequently intervene in entrepreneurial processes and forms of intervention are specific to the circumstances of intervention. A large portion of studies in government venture capital finance was based on limited datasets, due to limited circumstances of intervention and specific design of policy responses, offering limited contributions to the scholarship (Alperovych & Hübner, 2014).

Hungarian venture capital market and Hungarian entrepreneurial ecosystem are relatively new and under-researched in the academic scholarship. Due to Hungarian venture capital market's unique historic development and structure, this study made contribution to the scholarship by analysing processes of a little-known Hungarian venture capital market.

5.2 Venture Capital Market in Hungary

In this section, the research firstly discusses the evolution of venture capital market in Hungary. Upon that, the research provides information on the present characteristics of venture capital market in Hungary.

5.2.1 Evolution of Hungarian Venture Capital Market

The analysis of the venture capital market in Hungary has been offered by a handful amount of studies published in English language. The most important sources cited in this study are Karsai (2010), (2013), (2018), Kállay and Jáki (2019) and Milicsevics et al. (2020). Given that the mentioned studies used inconsistent methodology and conceptual definitions in analyses, they offer inconsistent findings, yet relevant information for understanding the evolutionary trajectory and characteristics of venture capital finance in Hungary.

The evolution of Hungarian venture capital market had a unique, discontinuous and volatile trajectory. Relative to Western capital markets, Hungarian venture capital market is a nascent market. Before the global financial recession of 2008, Hungary-based investee firms were exclusively backed by cross-border private venture capital. The unfavourable legal

framework provided unrealistic conditions for incorporating private venture capitalists in Hungary in the period before the global financial recession of 2008 (Kállay & Jáki, 2019). Despite high barriers to entry, starting from the late 1990-s, Hungary was the most preferred destination of cross-border investment in Central and Eastern Europe (Karsai, 2013). Hungary-based firms were flooded with private venture capital in the period before the global financial crisis. Between 1990 and 2010, 87% of the value of invested venture capital financing came from private investors (Karsai, 2013). Before the global financial recession of 2008, there were two government venture capitalists in Hungary and government venture capital financing amounted to 4.1% of the total venture capital financing available to Hungary-based firms (Kállay & Jáki, 2019).

One of the most important characteristics of pre-global financial recession Hungarian venture capital market was the gap in financing of early-stage firms. Government venture capitalists invested in few early-stage firms and strived to provide finance to the firms from stable sectors of the economy (Karsai, 2013). As private cross-border venture capitalists targeted firms in later stages of their life-cycle, there was a gap in financing of technology- and knowledge-intensive early-stage ventures (Karsai, 2013). The financing gap of innovative early-stage firms from high-growth sectors resulted in limited positive externalities, social and economic benefits of Hungary-based investee firms. The contribution of innovative venture capital-backed firms to innovation and aggregation of entrepreneurial activity was constrained by the financing gap of technology- and knowledge-intensive early-stage ventures.

The global financial recession of 2008 was a turning point in the evolution of Hungarian venture capital market. The global financial recession initially led to significant contraction in private venture capital finance, negatively affecting the entrepreneurial sector (Karsai, 2013; Bartz & Winkler, 2016; Lee et al., 2015). As private sources of venture capital finance contracted, the European Union (‘EU’) responded by expanding various policy measures to

compensate for the shrinking venture capital finance. While their policy responses were successful in improving the provision of entrepreneurial finance, soon the first disadvantages of policy intervention became noticeable. Hungarian and Central and Eastern European policy responses were characterized by inefficiency, high agency costs, small-scale funds, administrative burdens, high information asymmetry costs for regulators and regulatory capture (Karsai, 2018).

In the aftermath of the global financial recession, several forms of allocation of government sources to venture capital funds emerged in Europe. Two most important forms of intervention were i) the so-called 'Jeremie' initiative and ii) government venture capital finance. Karsai (2018) refered to the former form of allocation of government sources as the 'indirect solution' for providing government sources of funding to the funds managed by private venture capitalists, often referred to as 'hybrid funds', where government acted as the non-exclusive limited partner and private investors as general partners (Karsai, 2018). The latter form of intervention was often referred as the 'direct solution' for providing government sources of funding to the funds managed by government venture capitalists. This form of intervention was not a preferred solution for the allocation of government funding of the 'EU' (Karsai, 2018) and its design was determined on the national level of 'EU' Member States.

This study distinguished the two mentioned forms of policy intervention based on the ownership and governance structure of venture capitalists. The 'Jeremie' initiative provided a framework for government be *an investor* in the funds managed by private venture capitalists, while government venture capitalists were the form of intervention where government was *the venture capitalist.*

In the aftermath of the global financial recession, the primary sources of government funding were provided by the 'EU'. The objective of the 'Joint European Resources for Micro to Medium Enterprises' ('Jeremie') initiative introduced by the 'EU' was to offer private

venture capitalists an opportunity to raise finance from government sources. The 'Jeremie' program allowed the 'EU' Member States to allocate a portion of the 'EU''s structural funds, most commonly from the 'European Regional Development Fund' ('ERDF') in domestic firms through equity schemes.

The 'market economy investor principle' of the EU regulation that assumed that the selection of projects for venture capital financing shall be determined by the market actors rather than by the public authority was reflected in Lerner's (2009) first design guideline that participation of private venture capitalists confered benefits above those that can be created by the public authorities (Karsai, 2018). By offering the public sources to private venture capitalists, European governments were keen to improve for the financing gap created by the global financial recession. The 'market principle' of policy intervention attracted private investors to invest in 'hybrid funds' managed by private venture capitalists. The 'Jeremie' initiative led to an increasing number of 'hybrid funds' and higher participation of private investors in fundraising of private venture capitalists, creating crowding-in of private investment (Karsai, 2018).

Other initiatives of the 'EU' also provided an opportunity to private venture capitalists to raise finance from government sources. The 'European Investment Fund' (EIF'), the so-called European fund-of-funds, has been one of the most important public sources for private venture capital finance. Similarly to the 'Jeremie' initiative, this form of intervention was based on the 'market principle' that the selection of projects to be backed by venture capital shall be determined by market actors, who are likely to have superior capabilities for mitigating moral hazard and adverse selection.

Due to superior qualities and ownership and governance structure that precluded the involvement of government, private venture capitalists were able to maintain competitive advantage over government venture capitalists in selecting and assisting Hungary-based

investee firms, despite having raised venture capital finance from government sources. In Central and Eastern Europe, the most successful policy measures and instruments were led by private venture capitalists due to their superior resources and capabilities (Karsai, 2018).

In the aftermath of the global financial recession, Hungarian government allocated the highest amount of public sources to venture capital financing among the countries of the Central and Eastern Europe. Between 2007 and 2013, 46.2% of the total amount of public sources allocated for venture capital financing in the Central and Eastern Europe was allocated to Hungary-based venture capital funds (Karsai, 2018). Prevalence of government programs based on the 'market principle' crowded-in private capital and contributed to significant growth in the number of funds managed by private venture capitalists.

Yet, many requirements and restrictions of posed by public authorities, such as specific geographic scope of financing activity, restrictions on domestic financing activity, investment strategy, size of financing, number of selected projects undermined the 'market principle' in the investment decisions of venture capitalists managing 'hybrid funds'. Lerner (2009) sharply opposed such requirements and restrictions on investment decisions of private venture capitalists.

The use 'EU's' structural funds prohibited the financing of foreign firms (Karsai, 2018). The restriction on financing of foreign firms may have contributed to the acquisition of capabilities by private venture capitalists to provide assistance and improve outcomes of Hungary-based investee firms, emerging and evolving in unique economic, institutional and cultural setting. Moreover, some of the restrictions posed on financing activities of 'hybrid funds', such as the location of the seat of investee firms, were ignored by venture capitalists (Karsai, 2018).

While the selection of projects to be financed from 'hybrid funds' were often described in terms of inadequate project assessment, poor selection and inefficient investments, the policy intervention that was based on the 'market principle' contributed to the attractiveness of venture capital market for private investors and emergence of new private funds. Between 2009 and 2018, the value of venture capital financing invested in Hungary-based firms grew from 10 billion HUF to 181.5 billion HUF at the annual pace of 37.8% (Milicsevics et al., 2020). The surge in the supply of venture capital finance led to an unprecedented growth in venture capital financing invested in Hungary-based firms and a surging number of investee firms in Hungary. Between 2009 and 2018, the number of venture capital-backed firms grew at an annual pace of 31.3%, while the average value of invested venture capital finance per investee firm grew at an annual rate of 5% (Milicsevics et al., 2020).

Table 2: Value of invested capital in Hungary-based investee firms

Value of invested capital 2009 - 2018, in million HUF	Value of invested capital	Number of investee firms	Value of invested capital / inv. firm
2009	10,112	71	142
2010	17,094	91	188
2011	20,425	131	156
2012	39,940	191	209
2013	38,005	251	151
2014	59,343	306	194
2015	86,801	431	201
2016	119,585	561	213
2017	142,216	672	212
2018	181,522	824	220
CAGR (2009 - 2018)	37.8%	31.3%	5.0%

Source: Milicsevics et al. (2020)

The attractiveness of venture capital market in Hungary led to crowding-in of private investment and emergence of both 'hybrid funds' and private funds. Between 2009 and 2018, the value of venture capital financing invested in Hungary-based firms from private funds grew

from 7.6 billion HUF to 62.5 billion HUF at an annual pace of 26.4%, while the value of financing invested from 'hybrid funds' reached 97.5 billion HUF (Milicsevics et al., 2020).

Table 3: Value of invested venture capital in Hungary-based investee firms based on the sources of the fund

Value of invested capital 2009 - 2018, in million HUF	Private funds	Per investee firm	Hybrid funds	Per investee firm	Government funds	Per investee firm
2009	7,600	245	35	12	2,477	67
2010	12,636	324	739	74	3,719	89
2011	13,515	241	2,943	113	3,967	81
2012	29,394	387	6,338	109	4,208	74
2013	19,836	254	15,198	150	2,971	41
2014	22,486	281	30,743	204	6,113	82
2015	25,284	248	51,776	231	9,741	93
2016	29,321	240	77,122	244	13,141	107
2017	40,148	275	87,084	247	14,983	86
2018	62,528	326	97,531	259	21,462	84
CAGR (2009 - 2018)	26.4%	3.2%	141.3%	41.1%	27.1%	2.5%

Source: Milicsevics et al. (2020)

5.2.2 Policy Shift of 2016

As of 2020, the study of Milicsevics et al. (2020) was the most recent empirical study to provide comprehensive analysis of the Hungarian venture capital market based on the longitudinal dataset of investee firms. According to this study, as of January of 2019, there were 824 venture capital-backed firms in Hungary, representing 0.1% of Hungary-based firms.

Table 4: Hungary-based investee firms according to size

Investee firms according to size as of January 2019	Number of investee firms	% of firms within category
Micro-sized firms (0-9 employees)	651	0.09%
Small-sized firms (10-49 employees)	131	0.42%
Medium-sized firms (50-249 employees)	37	0.72%
Large-sized firms (>249 employees)	5	0.49%
Total	824	0.11%

Source: Milicsevics et al. (2020)

The aforementioned study indicated that, as of January of 2019, approximately three quarters of Hungary-based investee firms were micro-sized firms. These findings indicated that a substantial transformation of Hungarian venture capital market occurred in the aftermath of the global financial recession, characterized by an expansion in venture capital financing of early-stage firms in Hungary. As decisions of venture capitalists managing 'hybrid funds' were limited to domestic entrepreneurial sector, they specified in overcoming high agency, information asymmetry and transaction costs of Hungary-based early-stage firms – the market segment that was unattractive for private investment before the global financial recession.

The studies of Karsai (2013), (2018) and Milicsevics et al. (2020) indicate that significant transformation of Hungarian venture capital market took place in the aftermath of the global financial recession of 2008, resulting in significant growth in the number of Hungary-based early-stage firms. This study strived to collect the data from early-stage firms, with an objective of identifying the forms and value of assistance provided by venture capitalists to Hungary-based early-stage firms in reducing high business and transaction risks of early-stage firms, in light of the transformation of Hungarian venture capital market indicated in the studies of Karsai (2013), (2018) and Milicsevics et al. (2020).

The qualitative research indicated that in 2016 entrepreneurial policy in Hungary took a new turn, following the restructuring of one of country's government venture capitalists. Since 2016, the policy-driven expansion of government venture capital financing transformed the structure Hungarian venture capital market, with government becoming prevalent venture capital investor in Hungary-based investee firms. This transformation meant that investment decisions of government became prevalent investment decisions on the market. The policy-driven expansion of government venture capital financing demonstrated that Hungarian entrepreneurial finance policy shifted away from the 'market principle' that played the central role in policies stimulating crowding-in of private venture capital and expansion of Hungarian

entrepreneurial sector in the aftermath of the global financial recession of 2008. Growing amount of evidence suggested that new policy resulted in many anticipated and unanticipated economic and societal consequences that required further research.

Based on the reviewed literature, this study identified that there were two venture capitalists in Hungary categorized as government venture capitalists: Széchenyi Tőkealap-kezelő Zrt. and MFB Zrt. (including its subsidiaries, most notably Hiventures Kockázati Tőkealap-kezelő Zrt.). As of January of 2019, about 31% of Hungary-based investee firms was backed by government venture capital finance, with government venture capitalists as lead investors (Milicsevics et al., 2020).

The study of Milicsevics et al. (2020) highlighted that venture capital financing continued to occur within the boundaries of few industries, indicating that aggregation of Hungary-based investee firms occurred in specific sectors of the economy. Although conducted on the sample of venture capital-backed firms in the period between 1990 and 2010, the study of Karsai (2013) provided similar findings.

Table 5: Hungary-based investee firms according to sector

Investee firms according to sector, as of January 2019	Number of investee firms	% of investee firms
Chemicals and materials	29	3.5%
Transportation	28	3.4%
Biotech and healthcare	112	13.6%
Energy and environment	20	2.4%
Construction	19	2.3%
Consumer goods and services	103	12.5%
ICT (Information and communication technology)	286	34.7%
Real estate	48	5.8%
Agriculture	4	0.5%
Financial and insurance activities	36	4.4%
Business products and services	139	16.9%
Total	**824**	**100.0%**

Source: Milicsevics et al. (2020)

5.3 Relevance of Examining Hungarian Venture Capital Market for Scholarship

The findings of Karsai (2018) and Milicsevics et al. (2020) highlighting a remarkable success of policy intervention in entrepreneurial finance in the aftermath of the global financial recession of 2008 were based on the data on venture capital flows. The study of Milicsevics et al. (2020) indicated that Hungary-based investee firms have made increasing economic contribution to the economy in terms of employment and economic value-added. But there was a limited information about performance of venture capitalists and investee firms in Hungary to conclude that a policy intervention in entrepreneurial finance improved historic market failures. Limited information about exit performance of Hungary-based investee firms and financial performance of venture capitalists in Hungary called the quality of Hungary-based investee firms and assistance provided by private venture capitalists to Hungary-based investee firms into question. Despite crowding-in of private investment in the aftermath of the global financial recession, the studies indicated persistent market failures of Hungarian entrepreneurial sector, such as poor entrepreneurial capabilities and skills and high information asymmetry costs due to cultural traditions (Szerb et al., 2019).

The assistance of venture capitalists is one of determinants of economic and exit performance of investee firms, as well as their positive externalities, societal and economic contribution. Prevalence of high-quality firms is considered to be one of main aspects of the attractiveness of entrepreneurial sector and a determinant of private investment activity.

This study specifically analysed provision of assistance of private and government venture capitalists in the area of strategy, professionalization and relational capital. Even though only 0.1% of Hungary-based firms are backed by venture capital, the value of assistance provided by venture capitalists to investee firms provides some indication of the level of capital market development and of the quality of domestic entrepreneurial sector. Moreover, the analysis of assistance of venture capitalists is likely to indicate if the post-global financial

recession policy intervention in venture capital finance contributed to the acquisition of experience and capabilities by venture capitalists active in Hungary to improve outcomes of investee firms.

This study was the first academic attempt to collect the data and examine the value of assistance provided by venture capitalists to Hungary-based investee firms. A handful of macroeconomics and microeconomic studies investigated Hungarian venture capital market, but none of the studies researched the assistance provided to venture capital-backed firms. The conclusion about contributions of venture capitalists to Hungarian entrepreneurial processes can only be inferred from the scholarship.

Based on data collected within the framework of Global Entrepreneurship Index between 2011 and 2015, the study of Szerb et al. (2019) indicated that market failures of Hungarian venture capital market contributed to the inferior quality of Hungary-based entrepreneurial ventures. According to the study of Szerb et al. (2019), government, business and technology incubators provided limited value to Hungarian entrepreneurial sector, based on the sample of responses collected between 2011 and 2015.

In a nascent early-stage entrepreneurial market, information asymmetry and agency problems are empathized and specialized competences are needed for mitigating their costs. Hungary-based firms recognized the value of assistance in mitigating their transaction costs (Szerb et al., 2019).

In the next chapter, this study discusses its objectives, samples, variables, methodologies and limitations, while Chapter 8 provides the results of this study.

CHAPTER 6: OBJECTIVE, SAMPLE AND METHODOLOGY OF STUDY

This chapter discusses the objectives, sample, methodology, variables and design of this research. Chapter 7 discusses limitations of this research, Chapter 8 offers results and discussion of the results, while Chapter 9 offers conclusions of this study.

6.1 Objectives

An important objective of this study was to examine processes of assistance of venture capitalists, based on the data collected from Hungary-based investee firms and venture capitalists active in Hungary, and to outline some microeconomic and macroeconomic implications of these processes, contributing to the scholarship by country-specific evidence about assistance provided by venture capitalists to Hungary-based investee firms.

Earlier studies indicated that substantial transformation of Hungarian venture capital market took place in the aftermath of the global financial recession of 2008. Prevalence of government programs contributed to significant growth in the number of Hungary-based early-stage firms in the aftermath of the global financial recession of 2008. In light of the transformation of Hungarian venture capital market and entrepreneurial sector in the aftermath of the global financial recession, this study aimed at collecting empirical data needed for examining processes of assistance of venture capitalists, given that such processes have important objectives, and this is, to reduce business and transaction risks and improve the outcomes of Hungary-based early-stage firms.

Limited information about exit performance of Hungary-based investee firms presents an obstacle in examining the quality of Hungary-based investee firms and assistance provided by venture capitalists. Hungarian venture capital market is a nascent market relative to venture capital markets of Western European countries. Absence of data on value-added activities of venture capitalists is one of critical gaps in analysing entrepreneurial processes in Hungary.

Initially, the quantitative element of this study offered an analysis of the selected forms of assistance provided by venture capitalists to Hungary-based investee firms. The analysis of assistance of venture capitalists provided to investee firms identified specific roles of venture capitalists in entrepreneurial processes in Hungary. By focusing on the activities of venture capitalists that mitigate business and transactions risk of early-stage firms, this study provided analysis of value-added activities of venture capitalists in three categories:

i) provision of strategic assistance,

ii) provision of assistance in professionalization and

iii) provision of relational capital.

A subsequently follow-on qualitative research for this study added an additional level of contextualization to the findings of quantitative element of this study, by providing an additional understanding of the results of the initial quantitative research and new insights about entrepreneurial processes in Hungary, as well as new context for examining the processes of post-investment assistance of venture capitalists and their implications. According, this blended research approach adds robustness and context to the study.

The important contribution of this study is in collecting empirical data about activities of private and government venture capitalists, offering comparative analysis of processes in private and public sectors in Hungary. This study offered comparative analysis of private and government venture capitalists along every value-added activity, contributing to the international scholarship by identifying implications of policy-drive expansion of government venture capital finance in Hungary.

6.2 Samples

This study used two different research methodologies on two different samples to collect responses, measure and analyse processes and implications of assistance provided by venture capitalists to Hungary-based investee firms.

6.2.1 Quantitative Research

6.2.1.1 Sample Construction

Initially, the quantitative element of this study examined the selected forms of assistance provided by venture capitalists to Hungary-based investee firms, based on data collected through the survey administered to the founders of randomly selected Hungary-based venture capital-backed firms.

The objective of quantitative research was to collect empirical data about perceptions of entrepreneurs relating to the quality of assistance provided by venture capitalists. For an observation to represent a sample for quantitative element of this study, three following conditions must have been met:

i) As investee firm must have been domiciled in Hungary;

ii) As investee firm must have received venture capital financing in course of the last 10 years, as of date of collection of observation;

iii) As investee firm must have received venture capital financing from institutional early-stage investors, known as venture capitalists.

Based on the mentioned conditions, the research has excluded from the analysis firms in late stages of their life-cycle, commonly termed as private equity-backed investee firms. The scholarship has indicated that assistance of venture capitalists is more intensive in early-stage firms, given their dependence on external resources and capabilities for organization of their

resources. The scholarship has also highlighted that absorptive capacity of early-stage firms is higher relative to mature firms.

The research has excluded from analysis the firms backed by individual investors, commonly referred to as 'angel investors', as its objective was to analysed processes and implications of the assistance provided by intuitional investors – investors with an organizational structure.

As the survey was administered to the sample of Hungarian venture capital-backed portfolio firms randomly selected, the sample of firms was not representative of a specific sector or region of Hungary.

6.2.1.2 Population

The study of Milicsevics et al. (2020) has been the most comprehensive and the most recent analysis of the size of venture capital market in Hungary. According to the aforementioned study, as of January 1st, 2019 there were 824 firms domiciled in Hungary that were backed directly or indirectly by venture capital financing. High number of venture capital-backed firms had a holding structure, with one operating firm with operating activities within a holding structure of firms. The number of operating firms representing the population for this research is estimated at approximately 500 unique venture capital-backed firms.

According to the study of Milicsevics et al. (2020), there were 256 Hungary-based investee firms backed by government venture capitalists as lead investors (31%) and 568 investee firms with private venture capitalists as the lead investors (69%) as of January 1st, 2019. The actual number of unique investee firms in each category of venture capital is estimated to have been 30 to 40 % lower.

6.2.1.3 Responses

Consistent with the objective of quantitative research, observations were collected in the frequency of one observation per investee firm. Given the methodology and nature of the inquiry, quantitative research strived to collect data from the most credible source of information for the mentioned subject of study. The surveyed respondents needed to meet the following conditions for the observations to be taken into analysis:

i) The surveyed respondents needed to be associated with the venture capital-backed firms as founders;

ii) The surveyed respondents needed to complete the section on provided assistance by venture capitalists.

The survey has collected, among other information, the information about respondents and investee firms, in order to conclude if collected observations constituted the sample.

The responses were gathered from the founders of investee firms for several reasons. In early-stage ventures, founders perform a number of tasks in absence of specialized processes and division of labour. The founders are furthermore most likely to have extensive experience of exchange with venture capitalists and ability to implement strategic and operational decisions. As founders are central to the organization of early-stage ventures, they are the most likely source of impressions about frequency and value of assistance provided by venture capitalists. Past research in value-added activities of venture capitalists has collected comparable data from founders of investee firms, indicating that the collection of responses from founders generally increases the credibility of the data collected (e.g.: Luukkonen et al., 2013). Previous studies have also indicated that respondents, who have been working for venture capital-backed investee firms since their incorporation, were most likely to respond to the survey.

Out of 500 Hungary-based investee firms in the target population, 26 observations have been collected satisfying the mentioned conditions. This corresponds to an overall response rate of 5.2%. The sample of this research consisted of 18 private venture capital-backed firms and eight government venture capital-backed firms.

6.2.1.4 Tests of Representativeness of Responses

Tests regarding the representativeness of collected responses relative to the population have been conducted. The study of Milicsevics et al. (2020) has been used as the source of information on the population of Hungary-based investee firms.

The quantitative research has tested the data based on one variable: the sectoral (industry) distribution.

The information on industry distribution was collected based on the respondent statement of the industry of investee firms' activities, products and services. The respondents were asked to select one of the following industries:

i) agriculture

ii) biotech and healthcare

iii) business products and services

iv) chemicals and materials

v) construction

vi) consumer goods and services

vii) energy and environment

viii) financial and insurance activities

ix) ICT (Information and communication technology)

x) other

xi) real estate

xii) transportation

As survey was administered to the sample of Hungarian venture capital-backed portfolio firms randomly selected, the sample of firms was not concentrated on the specific sector. Pursuant to the information about population, the data collected demonstrates significant skewness towards several industries. To test for the representativeness of responses' sectoral distribution, the collected data was tested for goodness of fit.

Table 6: Sectoral distribution of population and sampled investee firms

Investee firms according to sector, as of January 2019	Number of investee firms	% of investee firms	Sample of investee firms	% of sampled investee firms
Chemicals and materials	29	3.5%	1	3.8%
Transportation	28	3.4%	0	0.0%
Biotech and healthcare	112	13.6%	2	7.7%
Energy and environment	20	2.4%	0	0.0%
Construction	19	2.3%	1	3.8%
Consumer goods and services	103	12.5%	2	7.7%
ICT (Information and communication technology)	286	34.7%	12	46.2%
Real estate	48	5.8%	0	0.0%
Agriculture	4	0.5%	0	0.0%
Other	0	0.0%	5	19.2%
Financial and insurance activities	36	4.4%	0	0.0%
Business products and services	139	16.9%	3	11.5%
Total	**824**	**100%**	**26**	**100%**

With the p-value =0.79 the null hypothesis that there was no significant difference between the distribution of the sample and population was not rejected. Therefore, there was no significant difference between distribution of sectors of investee firms' from the sample and

population. The collected responses were representative of the population based on industry distribution.

6.2.2 Qualitative Research

6.2.2.1 Sample Construction

A subsequently conducted follow-on qualitative element of this study provided additional insights about the processes and implications of assistance of venture capitalists for Hungary-based investee firms and entrepreneurial sector, based on the data collected through the interviews with randomly selected venture capital managers active in Hungary.

The objective of this exploratory investigation was to collect ideas and insights from venture capitalists and to provide additional context. For this purpose, interviews were conducted with randomly selected experienced venture capital managers. For an observation to represent the sample of qualitative research, two following conditions must have been met:

i) A venture capitalist must have provided financing to Hungary-based investee firms in course of the last 5 years, as of date of collection of observation;

ii) A venture capitalist must have provided financing to a Hungary-based investee firm that is not older than 10 years of age as of date of collection of observation;

iii) A venture capitalist was an institution investor.

Based on the above-mentioned conditions, the follow-on qualitative research excluded from its analysis venture capitalists investing in mature firms and Hungary-based venture capitalists, which were not actively investing in Hungary-based investee firms.

The follow-on qualitative research, furthermore, excluded its analysis individual investors, commonly referred to as ‘angel investors’, as its objective was to analyse processes of assistance provided by intuitional investors – investors with an organizational structure.

Lastly, the sample of venture capitalists was not selected based on specific features of venture capitalists, such as: investment strategy or pattern of investment.

6.2.2.2 Population

According to ownership and governance criteria, as of January 1st, 2019 there were 66 venture capitalists, two of which were government venture capitalists (3%) and 64 were private venture capitalists (97%) active in Hungary (Milicsevics et al., 2020). As of the date of this publication, there were two venture capitalists in Hungary that this study classified as government venture capitalists according to ownership and governance criteria: Széchenyi Tőkealap-kezelő Zrt. and MFB Zrt. (including its subsidiaries, most notably Hiventures Kockázati Tőkealap-kezelő Zrt.).

6.2.2.3 Responses

Observations from venture capitalists were collected in the frequency of one observation per venture capitalist. Given the nature of the inquiry and importance of experience for insights into the processes of venture capitalist assistance and properties of venture capital scene in Hungary, the research strived to collect data from the most credible sources of information. The responses were collected from venture capital managers, as they were in direct contact with investee firms and were engaged in provision of assistance and monitoring of their performance.

The surveyed respondents needed to meet the following two conditions for the observations to be taken into analysis:

i) Interviewed respondents needed to be associated with venture capitalists as fund managers;

ii) Interviewed respondents needed to have at least three full years of professional experience as venture capital managers, as of date of collection of observation.

The mentioned data was verified from the CVs of respondents. Identity of respondents was not disclosed in the publication of research data.

Out of 66 venture capitalists in the target population, eight full observations were collected, satisfying the above-mentioned conditions, corresponding to an overall response rate of 12.1%. The sample of this research consisted of seven private venture capitalists and one government venture capitalist.

6.3 Research Methodology

6.3.1 Methodologies of Previous Studies

Previous studies in this scholarship have analysed value-added activities of venture capitalists on cross-sectional data, using matched pair techniques and cross-sectional regression analysis (e.g.: MacMillan et al., 1989; Sapienza, 1992; Engel & Keilbach, 2007). Other studies have used case-study data (e.g.: Fried & Hisrich, 1995) or theoretical constructs (see: Cable & Shane, 1997). To overcome weaknesses of not being able to control for biases, as both observable and unobservable factors contribute to economic performance of investee firms, some studies used the two-step methodology known as endogenous treatment effect (Bertoni et al., 2013; Colombo & Grilli, 2005, 2010).

The study of Busenitz et al. (2004) was the first study to examine the longitudinal economic performance of venture capital-backed ventures over a period of 10 years. Yet, very few studies have analysed young entrepreneurial ventures using longitudinal datasets (e.g.: Busenitz et al., 2004; Alemany & Martì, 2005). The panel data methodology was acknowledged to have similar disadvantages as matched pair techniques and cross-sectional regression analysis, for not being able to control for biases from unobservable factors of relevance for performance of investee firms.

Several earlier studies highlighted the restrictive nature of principal - agent relationship between venture capitalists and founders of investee firms. The vast majority of prior studies examining the provision of assistance used the quantitative methodology of surveys to collect information on individual perceptions of entrepreneurs and managers of venture capital-backed firms. In the value-added scholarship, the majority of research methodologies has been descriptive, often producing inconsistent results about explanatory power of relationships among variables.

From the perspective of a research design, measuring the assistance provided by venture capitalists to investee firms is an empirical challenge. The information about value-added activities of investors is not collected by standard sources at the level of venture capital industry (Bottazzi et al., 2008). Often, a causal relationship between variables is not obvious, based on the data obtained from the surveys. For instance, economic performance is both a dependent and independent variable in the analysis of value-added activities of venture capital investors. In such events, interviews were conducted to determine the cause and effect relationship between variables.

As previously noted, this study used a blended quantitative and qualitative methodology. The quantitative methodology was the initially primary methodology of this study and it was used in the process of analysing data collected from Hungary-based investee firms, while the objective of follow-on qualitative methodology was to, subsequently, analyse the data collected from venture capitalists, with an objective of providing additional contextualization to the findings of the quantitative research and hopefully providing new insights. The follow-on qualitative research, therefore, added robustness to the study and complemented the findings of the quantitative research.

6.3.2 Quantitative Methodology

This study used the quantitative methodology of descriptive surveys to collect responses from venture capital-backed portfolio firms. A descriptive survey is a method for collecting specific data about dependent and independent variables of interest that can be analysed for frequencies, relationships and correlations. This quantitative research is not correlational in nature, as its objective was not to indicate relationships between variables, but to collect information and examine assistance provided by venture capitalists to Hungary-based investee firms, offering some conclusions about the implications of activities of venture capitalists for Hungary-based investee firms and entrepreneurial sector as a whole.

The survey collected data from respondents from December of 2019 to March of 2020, using a web-based questionnaire administered to the sample of Hungary-based venture capital-backed investee firms. The survey was administered using a web-based questionnaire tool Survey Monkey, collecting 26 complete observations during the mentioned period.

The questionnaire was created and administered only in English, consistent with the language of publication of results and findings of this study. In December of 2019, the questionnaire was pre-tested on the sample of three respondents and its observations were analysed for possible inconsistencies and biases. During pre-testing, the respondents were interviewed too. Upon interviews, the final version of the survey was drafted and administered to the sample of respondents.

The survey asked 46 questions about the perceived value of assistance of venture capitalists. The survey has also collected information about respondents and investee firms, in order to control if collected observations were representative of the sample and could have been included in the analysis. A complete list of questions is enclosed in the '*Appendix 1: Survey questions*'.

Similarly to prior studies, the quantitative research limited its questions to the value-added activities of lead investors in venture capital-backed firms, as lead investors were likely to maintain direct contact with investee firms. Moreover, by focusing on the assistance provided by lead investors, the research strived to eliminate the noise in data, arising from circumstances, where there were several venture capitalists in syndication.

6.3.3 Qualitative Methodology

This follow-on qualitative research used the methodology of semi-structured interviews to collect responses from venture capitalists about processes and implications of assistance provided to Hungary-based investee firms.

A semi-structured interview is a type of interview where several closed- and open-ended questions are asked from respondents, often accompanied by follow-up questions, allowing for participants to communicate their ideas and insights, as a result of their own intentions. A semi-structured interview has further advantages of providing detailed and rich data for understanding the processes of assistance of venture capitalists, as well as their consequences on investee firms. It is, therefore, a more suitable exploratory method for collection of new data and individual perspectives, providing new ideas and insights needed for contextualization of the findings of the quantitative research.

The data was collected from respondents between August of 2020 and March of 2021 using video conferencing tool Zoom (the execution of face-to-face interviews was compromised by COVID-19 pandemic and available video conferencing tools appeared as the closest substitute for face-to-face interviews during COVID-19 pandemic). During this period, eight complete observations were collected.

During interviews, which lasted for up to 45 minutes, respondents were asked five interview questions. Four interview questions were open-ended questions and had the objective

of encouraging respondents to elaborate on their perspectives, experiences and provide case-studies.

To ensure the alignment between questions and increase the quality of collected information, significant attention was dedicated to enhancing the reliability of the interview protocol. The reliability of the interview determines the quality and adequacy of collected data. The interview protocol is regarded reliable when it collects consistent information over time.

The interview protocol refinement ("IPR") framework was used to develop and refine the interview protocol. The interview protocol was produced in four phases: i) drafting interview questions based on the alignment between the themes that needed to be explored and interview questions, ii) construction of conversion, iii) feedback collection on the interview protocol and iv) piloting the interview protocol.

The alignment between themes that needed to be explored and interview questions had an objective of increasing the utility of the interview questions, providing valuable data within the limited time available for data collection. As experiences of venture capitalists are often complex and dense, accumulating over a period of many years, the objective of open-ended questions was to generate relevant information on each theme during a conversation, while encouraging respondents to reflect and elaborate on various individual experiences. The utility of interview questions was further strengthened by the use of professional language of venture capitalists, taking into consideration the professional and sociological context of their perspectives and experiences, as well as the social nature of conversation.

The alignment matrix between themes and interview questions is enclosed in the '*Appendix 2: Interview protocol matrix for qualitative research'* were interview questions are listed in rows and themes that needed to be explored are listed in columns.

Interview questions were differently formulated from the themes that needed to be explored. Interview questions often asked about specific events from professional life of venture capital managers. The interview consisted of two different types of questions: i) one introductory question and b) four key questions. The key interview questions were open-ended questions and they were the most relevant source of information for the qualitative element of this study. The objective of the introductory question was to follow conversation rules and elicit information about venture capitalists. Some interview questions asked respondents to provide examples and case-studies, eliciting additional information. In order for interviews to resemble a conversation, interviews were guided by a written script, where the ongoing conversation was staged in written.

The interview questions were drafted in English, consistent with the language of the publication of results and findings of this study. To enhance its reliability, the interview protocol was tested, collecting feedback from likely participants, highlighting the understanding and clarity of interview questions, possible inconsistencies and biases. The interview was pre-tested on a sample of one respondent and its observations were analysed, during which the respondent was interviewed. Upon this, the final interview was piloted and launched to the sample of respondents. The interview protocol matrix is enclosed in '*Appendix 3: Interview protocol for qualitative research*'.

6.4 Variables

6.4.1 Quantitative Research

Descriptive surveys were used to collect quantitative responses from Hungary-based investee firms within three categories of value-added activities of venture capitalists; i) provision of strategic assistance, ii) provision of assistance in professionalization and iii) provision of relational capital. The survey collected information within the mentioned three categories of value-added activities of venture capitalists on two following variables: i)

frequency and ii) value of assistance. The survey collected information on 42 variables of relevance for analysis of value-added activities of venture capitalists.

The quantitative research had a deductive approach to variables and formulation of questions used in the survey. A number of variables used in this study came from previous studies in assistance of venture capitalists, which are abundant source of validated constructs and data about assistance of venture capitalists, provided to a variety of sampled firms. The key sources of constructs used by the quantitative research in developing the survey questions were the study of Gorman and Sahlman (1989) originally published in 1986 in the 'Frontiers of Entrepreneurship Research', the study of MacMillan et al. (1989) and the study of Luukkonen et al. (2013). The results of the quantitative research are compared with the results of Luukkonen et al. (2013) and Gompers et al. (2020) in Section 8.2.

Earlier studies provided a rich source of insights and information about various forms of assistance of venture capitalists that this study grouped into three categories of value-added activities, based on the extensive review of management and value-added scholarship. The possible forms of assistance of venture capitalists extend beyond the variables analysed in this study.

6.4.1.1 Variables for Measuring the Provision of Strategic Assistance

Venture capitalists are important external sources of strategic information for investee firms. Provision of strategic assistance to investee firms is a knowledge-sharing process, where venture capitalists have the role of 'knowledge brokers'. The strategic assistance of vesture-capitalists is provided in form of a feedback, advising and consulting on strategic ideas, initiatives and topics, such as customers, markets and competitors.

In the analysis of strategic assistance of venture capitalists, the quantitative research was focused on the assistance of venture capitalists in development of products and services

(product innovation) and positioning of investee firms. The quantitative methodology has collected information that measures the strategic assistance of venture capitalists in product innovation and positioning by asking entrepreneurs about their perceptions of the value and frequency of the advice or opinion of venture capitalists on the following:

i) the investee firm's customers,

ii) customer needs,

iii) features of products and services of the investee firm,

iv) the investee firm's strengths and weaknesses and

v) the investee firm's competitors.

The quantitative methodology collected information on two variables i) value of assistance and ii) frequency of assistance. The value variable is the respondent perception of the value of information received from venture capital investors. For each area of strategic assistance, respondents were asked to indicate their perception of the value of assistance on 5-point Likert scale:

i) extremely valuable,

ii) very valuable,

iii) somewhat valuable,

iv) not so valuable and

v) not valuable et all.

In the analysis of data collected with quantitative methodology, the value of strategic assistance is estimated as the mean score of individually collected observations about the value

of assistance provided by venture capitalists in course of a period of one year. The results also indicated the percentage of firms to which the specific assistance was provided.

Given that the quantitative research provides comparative analysis of private and government venture capitalists, it also examines if there is a statistically significant difference between the value of strategic assistance provided by private and government venture capitalists by comparing the t-test results (two independent sample t-test for testing for differences between means, assuming equal variance) of the data collected using descriptive surveys. The significance level used by the quantitative research is 0.1 and a p-value of less than 0.1 is interpreted as indicating the evidence of a statistically significant difference between private and government venture capitalists in the value of strategic assistance provided to Hungary-based investee firms.

The frequency is the respondent statement of the frequency of assistance of venture capitalists. For each area of strategic assistance, the respondents were asked to indicate the frequency of provided assistance over a period of one year on 8-point scale:

i) never,

ii) 1 occasion,

iii) 2 occasions,

iv) 3 occasions,

v) 4 occasions,

vi) 5 occasions,

vii) between 6 and 10 occasions and

viii) more than 10 occasions.

The frequency of strategic assistance is the mean score of individually collected observations about the frequency of assistance provided by venture capitalists in course of a period of one year. The results also indicated the percentage of firms to which the specific assistance was provided.

Since the quantitative research provided comparative analysis of private and government venture capitalists, it also examined if there was a statistically significant difference in the frequency of strategic assistance provided by private and government venture capitalists by comparing the t-test results (two independent sample t-test for testing for differences between means, assuming equal variance). The significance level used by the quantitative research is 0.1 and a p-value of less than 0.1 is interpreted as indicating the evidence of a statistically significant difference between private and government venture capitalists in the frequency of provision of strategic assistance to Hungary-based investee firms.

By asking respondents about their perceptions of value and frequency of the assistance of venture capital investors in each mentioned area, this study has strived to collect detailed information to offer comprehensive analysis of strategic assistance provided by venture capitalists to Hungary-based investee firms.

6.4.1.2 Variables for Measuring the Provision of Assistance in Professionalization

The scholarship has often referred to the assistance of venture capitalists in development of organizational capabilities of portfolio firms as professionalization. The assistance of vesture-capitalists in professionalization is provided in form of a feedback, advising and consulting on processes, routines, joint activities and organizational capabilities. The quantitative methodology collected information that measures the assistance in professionalization in two areas of relevance for professionalization of firms: i) advising on development of organizational capabilities (process innovation) and ii) advising on joint activities with the third-parties.

The quantitative research has collected data on the frequency and value of activities of venture capitalists of advising Hungary-based investee firms on development of organizational capabilities in the area of:

i) financial management,

ii) technology management,

iii) supply chain management and

iv) quality management.

Venture capitalists provide assistance to investee firms by advising them on joint activities with the third-parties, as activities with the third-parties contribute to professionalization of investee firms. The quantitative research collected data on the frequency and value of advising Hungary-based investee firms on activities with

i) sales & marketing partners,

ii) suppliers and

iii) R&D partners.

The research has collected information on two variables i) value of assistance and ii) frequency of assistance.

The value variable is the respondent perception of the value of information received from venture capital investors. For each area of assistance in professionalization, respondents were asked to indicate their perception of the value of assistance on 5-point Likert scale:

i) extremely valuable,

ii) very valuable,

iii) somewhat valuable,

iv) not so valuable and

v) not valuable et all.

The value of assistance in professionalization is the mean score of individually collected observations about the value of assistance provided by venture-capitalists in course of a period of one year. The results also indicated the percentage of firms to which the specific assistance was provided.

Given that the quantitative research provided comparative analysis of private and government venture capitalists, it also examined if there is a statistically significant difference in the value of assistance in professionalization provided by private and government venture capitalists by comparing the t-test results (two independent sample t-test for testing for differences between means, assuming equal variance) of the data collected using descriptive surveys. The significance level used by the quantitative research is 0.1 and a p-value of less than 0.1 is interpreted as indicating the evidence of a statistically significant difference between private and government venture capitalists in the value of assistance in professionalization provided to Hungary-based investee firms.

The frequency is the respondent statement of the frequency of assistance of venture capitalists. For each area of assistance in professionalization, the respondents were asked to indicate the frequency of provided assistance over a period of one year on 8-point scale:

i) never,

ii) 1 occasion,

iii) 2 occasions,

iv) 3 occasions,

v) 4 occasions,

vi) 5 occasions,

vii) between 6 and 10 occasions and

viii) more than 10 occasions.

The frequency of assistance in professionalization is the mean score of individually collected observations about the frequency of assistance provided by venture capitalists in course of a period of one year. The results also indicate the percentage of firms to which the specific assistance was provided, as the research strived to collect detailed information for comprehensive analysis of assistance of venture capitalists in professionalization of Hungary-based investee firms.

Since the quantitative research provides comparative analysis of private and government venture capitalists, it also examined if there was a statistically significant difference in the frequency of assistance in professionalization provided by private and government venture capitalists by comparing the t-test results (two independent sample t-test for testing for differences between means, assuming equal variance). The significance level used by the quantitative research is 0.1 and a p-value of less than 0.1 is interpreted as indicating the evidence of a statistically significant difference between private and government venture capitalists in the frequency of provision of assistance in professionalization to Hungary-based investee firms.

6.4.1.3 Variables for Measuring the Provision of Relational Capital

The provision of relational capital by venture capitalists is a value-added activity of identifying and connecting investee firms with the specific third-parties for entering into contracts, partnerships and capital, loan and credit transactions. The quantitative methodology

collected information that measures the assistance in transactions of investee firms in three unique areas: i) commercial and labour contracts of investee firms, ii) commercial and strategic partnerships of investee firms and iii) their transactions with providers of capital, loan and credit.

The quantitative research collected the data on the frequency and value of activities of venture capitalists of introducing Hungary-based investee firms to the following third-parties:

i) customers,

ii) suppliers,

iii) senior executives,

iv) sales and marketing partners,

v) product licencing partners,

vi) R&D partners,

vii) venture capital investors,

viii) corporate investors and

ix) bank executives.

The research has collected information on two variables i) value of assistance (network) and ii) frequency of assistance.

The value is the respondent perception of the value of assistance of venture capital investors in prospective transactions of investee firms. The respondents were asked to indicate their perception of the value of networks on 5-point Likert scale:

i) extremely valuable,

ii) very valuable,

iii) somewhat valuable,

iv) not so valuable and

v) not valuable et all.

The value of relational capital is the mean score of individually collected observations about the value of assistance provided in course of a period of one year. The results also indicate the percentage of firms to which the specific relational capital was provided.

Given that the quantitative research provided comparative analysis of private and government venture capitalists, it also examines if there was a statistically significant difference in the value of relational capital provided by private and government venture capitalists by comparing the t-test results (two independent sample t-test for testing for differences between means, assuming equal variance) of the data collected using descriptive surveys. The significance level used by the quantitative research is 0.1 and a p-value of less than 0.1 is interpreted as indicating the evidence of a statistically significant difference between private and government venture capitalists in the value of relational capital provided to Hungary-based investee firms.

The frequency is the respondent statement of the frequency of assistance of venture capitalists. The respondents were asked to indicate the frequency of provided assistance over a period of one year on 8-point scale:

i) never,

ii) 1 occasion,

iii) 2 occasions,

iv) 3 occasions,

v) 4 occasions,

vi) 5 occasions,

vii) between 6 and 10 occasions and

viii) more than 10 occasions.

The frequency of provision of relational capital is the mean score of individually collected observations about the frequency of assistance provided by venture capitalists in course of the period of one year. The results also indicate the percentage of firms to which the specific relational capital was provided, as the research strived to collect detailed information for comprehensive analysis of assistance of venture capitalists.

Since the quantitative research provided comparative analysis of private and government venture capitalists, it also examined if there was a statistically significant difference in the frequency of provision of relational capital by private and government venture capitalists by comparing the t-test results (two independent sample t-test for testing for differences between means, assuming equal variance). The significance level used by the Since the quantitative research is 0.1 and a p-value of less than 0.1 is interpreted as indicating the evidence of a statistically significant difference between private and government venture capitalists in the frequency of provision of relational capital to Hungary-based investee firms.

6.4.2 Qualitative Research

Semi-structured interviews conducted with venture capitalists collected detailed and rich data, in order to provide additional contextualization of the findings of the quantitative research.

The data collected during interviews was manually coded. Thematic codes were assigned to responses and phrases collected during interviews, in order for the research to efficiently analyse and summarize its findings. The objective of thematic coding was to enable analysis of data based on specific themes that emerged during interviews.

The follow-on qualitative research had a deductive approach to the coding process, due to being conducted in the aftermath of the quantitative research. Upon collection of interview responses, coding was complemented with new elements that arose during interviews. The coding of the results of the qualitative research was done in relation to some of the variables used in the quantitative research, given that subsequently conducted qualitative research was conducted with pre-established categories, yet with an objective of producing new information and insights that may emerge during interviews with venture capitalists.

The objective of the interviews was to collect insights and ideas of respondents in two areas of inquiry:

i) Implications of assistance provided by venture capitalists to Hungary-based investee firms;

ii) Differences between Hungary-based private and government venture capital-backed investee firms.

6.4.2.1 Thematic Coding of Implications of Assistance

The assistance of venture capitalists is one of critical knowledge-sharing processes in an economy with a number of anticipated and unanticipated microeconomic and macroeconomic consequences. The follow-on qualitative research had a deductive approach to coding, creating thematic areas of assistance in relation to some of the variables used in the quantitative research, given that subsequently conducted qualitative research was conducted with pre-established categories, yet with an objective of producing new information and

insights. The qualitative research examined a number of specific implications of assistance for investee firms and entrepreneurial sector, in terms of:

i) strategy,

ii) organizational capabilities,

iii) relational capital

Within each thematic area, a number of different thematic codes was assigned to responses and phrases collected during interviews. Furthermore, the coding also distinguished between microeconomic and macroeconomic implications.

6.4.2.2 Thematic Coding of Differences between Private and Government Sectors

The follow-on qualitative research outlined thematic areas of differences between private and government venture capital-backed sectors in relation to the variables used in the quantitative research. The implications of policy-driven expansion of government venture capital finance were grouped ex-post, during the coding of qualitative research, into three broad categories:

i) differences in strategy, organizational capabilities and relational capital of Hungary-based private and government venture capital-backed firms,

ii) structural outcomes,

iii) differences between private and government venture capitalists active in Hungary.

CHAPTER 7: RESEARCH LIMITATIONS

This chapter discusses some limitations of this study. The main limitations of this study are its limited samples and methodological limitations, biases of respondents and limited data collected by quantitative and qualitative research. The quantitative methodology was initially the primary methodology of this study, while follow-on qualitative methodology was introduced subsequently to provide additional contextualization to the findings of the quantitative research.

7.1 Samples

The quantitative research collected data on frequency and value of assistance provided by venture capitalists on the sample of Hungary-based investee firms. The follow-on qualitative research was an exploratory attempt to collect information on processes and implications of assistance provided by venture capitalists to Hungary-based investee firms on the sample of venture capitalists.

The number of venture capital-backed investee firms and venture capitalists in both samples was limited. The collection of data for this study did not receive a broader support from venture capitalists and the response rate of individual respondents in both quantitative and qualitative research was below 20%. Yet, the consequences of a limited sample in quantitative research for the findings of this study were mitigated by the qualitative research, which provided exploratory data, contextual knowledge and actual examples, thus adding robustness to the findings.

The collection of quantitative data from Hungary-based investee firms was interrupted by the outbreak of COVID-19 pandemic in late March of 2020. The objective of quantitative research was to collect the empirical data in ordinary economic circumstances and the collections of data from Hungary-based investee firms was suspended after the outbreak of COVID-19 pandemic.

26 complete observations from Hungary-based investee firms and eight complete observations from venture capitalists were collected for this study. A larger sample of respondents would have allowed to check the robustness of its results.

7.2 Biases

Both participant and interviewer biases played had a relevant role and limitations to this research.

7.2.1 Participant Biases

The variables measured and analysed within the scope of this study were based on the perceptions of respondents, for which there was no publicly available data. This study had no opportunity to analyse the accuracy of collected empirical data.

Individual qualities of respondents have relevance for the data collected in any research. Such, independent, variables are: age, political views, personality and behaviour, which have relevance for the outcomes of both quantitative and qualitative research. Moreover, as views of government intervention in venture capital market were often shaped by political attitudes, information collected from respondents was determined by what respondents considered as socially and politically acceptable. Social desirability bias of respondents was also acknowledged as a significant limitation of this study, given the controversial question about the effectiveness of policy-driven expansion of government venture capital funding.

Furthermore, investee firms may have a different absorptive capacity to value the assistance of venture capitalists. Determinants of absorptive capacity may be a firm-specific and respondent-specific. For instance, the respondents must have had different individual experiences about venture capitalist assistance, different entrepreneurial and professional experiences and individual managerial competences, thus providing biased data. Their individual differences must have influenced their understanding of required information and

the accuracy of provided data. Respondents may have also provided inaccurate information, by providing, what they perceived as, favourable answers.

During the interview, venture capitalists were asked to recollect and give examples of historic events according to their memory. Significant time-lapse between events in the life of respondents or recollection of distant events in professional careers, as in the case of qualitative research, is its possible limitation, contributing to possible inaccuracy of collected data. Moreover, respondents may have provided inaccurate and incomplete information about historic events they themselves did not regard as relevant.

7.2.2 Interviewer Biases

Interviewer biases were a limitation of this study too. The interviewer was acknowledged to have had significant informal insights into Hungarian venture capital scene, shaped by personal experiences and opinions.

7.3 Research Methodologies

7.3.1 Quantitative Research

The collection of data for quantitative research was based on the methodology of descriptive surveys. This research element did not produce in-depth data and lacked open-ended questions. This limitation was allowed, due to the fact that the data on value-added activities of venture capitalists had been extensively collected in academic scholarship by structured and closed-ended questions. These limitations were balanced with the benefits of comparative analysis of the data with the results of studies examining the same processes in other countries.

Another important limitation of the quantitative research was that the data was collected at one point in time. A longitudinal method for collection of data, such as panel study would have offered information about changes in perceptions of the same sample of respondents, eliminating some of the biases in the data.

7.3.2 Survey Questions

The quantitative element of this study collected empirical data using an online questionnaire tool and Likert scale, which had been used to collect comparable data in similar studies conducted on other samples of investee firms. The use of Likert scale is based on the assumption of even metric between the points of the answer. Furthermore, Likert scale has likely produced a confusion when collecting responses for specific processes of assistance that respondents had no experience with. Yet, as previous studies examining the provision of assistance had based their data collection on the use of Likert scale, given that the objective of the survey was to collect information on the value and frequency of various forms of assistance, the limitations of the Likert scale may not have been as significant.

Further limitation of the survey was due the absence of open-ended questions in the questionnaire. The purpose of open-ended questions is to test the understanding and biases of respondents. The use of open-ended questions would have contributed to the quality of collected data by collecting new and unstructured information, specific to the qualities of investee firms and circumstances of assistance.

7.3.3 Qualitative Research

To compensate for the limitations of quantitative element of this study, it eventually also used the qualitative methodology of interviews to collect exploratory information from venture capitalists. The follow-on qualitative data was not collected from venture capitalists simultaneously with the collection of quantitative data from Hungary-based investee firms. Moreover, the results of these two research endeavours were not paired among venture capitalists and investee firms. Pairing of the results might have compromised the collection process and led to a wider lack of support for this study.

Further limitation of interviews was due to the fact that they were not face-to-face conversations, as the collection of data occurred via video conferencing tool Zoom due to ongoing pandemic.

7.3.4 Interview Questions

The interview protocol consisted mostly of open-ended questions that contributed to outcomes and findings of this study by collecting new and unstructured information. However, a limited number and specific wording of interview questions presented a possible limitation of qualitative research.

7.4 Collected Information

This survey collected a limited amount of information about Hungary-based investee firms. Some firm-specific information, such as firms' industry, was collected by the survey, in order to be used as control variables. Furthermore, the research collected information on the amount of venture capital financing provided to investee firms using a Likert scale, rather than numerical responses.

The collection of numerical responses for some data would have contributed to the robustness of the results of this study. One of such information is the amount of venture capital financing provided by venture capitalists to investee firms. As venture capital has significant positive treatment on the growth of young entrepreneurial ventures, the robustness of findings of this study would have been increased by collection of precise data on the amount of financing provided to investee firms, thus helping identify the origin of the positive treatment effect of venture capital finance and the extent to which it was associated with venture capital financing, or alternatively to the quality and frequency of assistance provided by venture capitalists.

7.5 Heterogeneity of Investors

The studies of Sorensen (2007) and Bottazzi et al. (2008) highlighted that venture capital investors were highly heterogeneous in a number of characteristics. Some of the critical

differences among venture capitalists with relevance for their activities are their reputation, experience, human capital and investment objectives.

The heterogeneity of venture capitalists and diversity of their capabilities may not have been as significant limitation for the outcome and findings for this research, given the fact that this research controlled for differences between private and government venture capitalists and provided comparative analysis of the assistance provided by two distinct categories of venture capital investors. Reviewed literature in Chapter 4 highlighted that the critical source of differences among venture capitalists was their ownership and governance structure, which had implications for their resources and capabilities, as well as the process of assistance.

Within two distinct categories of venture capital investors, the research did not try to limit the effects of the heterogeneity of investors, as the objective of this study was to describe differences between private and government venture capital sectors.

The research excluded from the analysis the activities of individual investors, commonly referred to as ‘angel investors’, as its objective was to examine the sample of institutional investors and firms backed by institutional investors. The fact that this study did not collect information on the assistance provided by individual investors to Hungary-based firms may be interpreted as its limitation.

In the next two chapters, the research will offer its results and conclusions.

CHAPTER 8: RESULTS AND DISCUSSION

This study presented evidence on the role of venture capital finance in entrepreneurial processes and development of resources and capabilities of Hungary-based investee firms from management and public policy perspectives. This study examined processes of post-investment assistance of venture capitalists provided to Hungary-based investee firms and their implications, based on the data collected from Hungary-based investee firms between December of 2019 and March of 2020 and subsequently collected data from venture capitalists between August of 2020 and March of 2021.

The studies of Karsai (2013), (2018) and Milicsevics et al. (2020) indicated that substantial transformation of Hungarian venture capital market took place in the aftermath of the global financial recession of 2008. Since the global financial recession of 2008, a growing number of early-stage firms were incubated in Hungary, emerging from a unique cultural, institutional and economic setting, as policies triggered the expansion of venture capital market and emergence of domestic venture capital market, with stakeholders with resources and capabilities needed for overcoming high agency, information asymmetry and transaction costs of Hungary-based early-stage firms.

The study of Milicsevics et al. (2020) indicated that since the global financial recession of 2008, Hungary-based investee firms made increasing contribution to employment and economic value-added in Hungary. Yet, other studies highlighted the persistence of market failures of Hungarian entrepreneurial sector, such as poor entrepreneurial capabilities and skills and high information asymmetry costs (Szerb et al., 2019). Limited information about exit performance of Hungary-based investee firms and evidence of persistent market failures of Hungarian entrepreneurial sector posed a research question about qualities of Hungary-based investee firms and assistance provided by venture capitalists to Hungary-based investee firms and their implications.

This study used two different research methodologies on two different samples to collect responses, measure and analyse the processes and implications of assistance provided by venture capitalists to Hungary-based investee firms. Section 8.1 provided results of the quantitative research about different forms of assistance provided by private and government venture capitalists to Hungary-based investee firms. Section 8.2 examined the results of the quantitative research against the findings of other comparable studies is this field. Section 8.3 offered insights and additional context for examining the implications of processes of assistance for entrepreneurial processes and quality of Hungary-based investee firms.

8.1 Quantitative Research

The objective of quantitative research was to examine different forms of assistance provided by venture capitalists to Hungary-based investee firms. A number of conclusions were inferred from its empirical results about qualities Hungary-based private and government venture capital-backed firms that were subsequently examined and validated by the findings of subsequently conducted follow-on qualitative research.

Initially, the quantitative element of this study offered an analysis of the selected forms of assistance provided by venture capitalists to Hungary-based investee firms, which identified specific roles of venture capitalists in entrepreneurial processes in Hungary. By focusing on the activities of venture capitalists that mitigate business and transactions risk of early-stage firms, the quantitative research provided an analysis of value-added activities of venture capitalists in three categories:

i) provision of strategic assistance,

ii) provision of assistance in professionalization and

iii) provision of relational capital.

This study was the first academic attempt to collect the data and examine the value of assistance provided by venture capitalists to Hungary-based investee firms. This study also had policy implications. The quantitative research initially offered a comparative analysis of assistance provided by private and government venture capitalists to Hungary-based investee firms. It suggested that private and government venture capital-backed sectors had specific qualities, which were further examined in the qualitative research. The combined results of quantitative and follow-on qualitative research indicated that there was a different treatment effect of private and government venture capital finance, with implications for the quality of venture capital-backed sector in Hungary.

The important contribution of this study was in collecting empirical data about assistance provided by private and government venture capitalists, offering findings about their comparative differences. The empirical data were collected by this study with an objective of identifying the outcomes of policy-driven expansion of government venture capital financing on entrepreneurial sector, innovation, knowledge-transfer, productivity, performance and competitiveness of Hungarian venture capital-backed sector.

The quantitative research had two main assumptions:

i) Venture capitalists provided i) strategic assistance, ii) assistance in professionalization and iii) relational capital to Hungary-based early-stage investee firms.

ii) The categories of private and government venture capitalists were different in i) strategic assistance, ii) assistance in professionalization and iii) relational capital provided to Hungary-based early-stage investee firms.

8.1.1 Provision of Strategic Assistance

Venture capitalists provide strategic assistance and governance to investee firms throughout their life-cycle. It is widely accepted that their strategic assistance has a critical role in the emergence of firms of superior quality. The venture capital scholarship indicated that venture capitalists' assistance in business strategy of investee firms was one of their most important functions.

A number of previous studies explored the role of venture capitalists as investee firms' strategic advisors (e.g.: Gorman & Sahlman, 1989; MacMillan et al., 1989, Busenitz et al., 2004; De Clercq & Manigart, 2007). Venture capital investors often serve as a sounding board for strategic ideas, initiatives and advisors on strategic planning. Due to their industry-specific experience, resources and capabilities, venture capitalists have valuable insights about potential acceptance of products and services, consumer preferences and consumer needs that early-stage investee firms can leverage in product development. Industry- and market-specific experience of venture capitalists allows them to make informed advices on potential market, competition and positioning.

The contribution of strategic assistance of venture capitalists to early-stage firms can be summarized as follows:

i) Strategic assistance of venture capitalists is important source for product innovation.

ii) Strategic assistance of venture capitalists helps investee firms position their products and services on domestic and international market.

The academic scholarship indicated that early-stage firms have significant absorptive capacity to value and assimilate information from external sources. Strategic assistance of venture capitalists helps early-stage firms achieve faster product innovation and time-to-market.

The quantitative research examined the assistance provided by venture capitalists to Hungary-based investee firms in development of products and services (product innovation) and positioning.

In terms of provision of strategic assistance, two main assumptions of the quantitative research were:

iii) Venture capitalists provided strategic assistance to Hungary-based investee firms in development of products and services (product innovation) and strategic positioning.

iv) Categories of private and government venture capitalists were different in strategic assistance provided to investee firms in development of products and services (product innovation) and strategic positioning.

8.1.1.1 Assistance in Development of Products and Services (Product Innovation) and Positioning

8.1.1.1.1 Results

The quantitative research collected data on the frequency and value of strategic assistance of venture capitalists in product innovation by advising on i) customers ii) customer needs and iii) features of products and services. Furthermore, the quantitative research collected data on the frequency and value of assistance of venture capitalists in positioning of investee firm's products and services by advising on i) the investee firms' strengths and weaknesses and ii) competitors.

Information about customers is a critical form of knowledge that can be leveraged in product innovation. The results of the quantitative research indicated that 65% of sampled Hungary-based investee firms were advised by venture capitalists on customers on an average of 2.4 occasions during the observed period of one year. The findings of the quantitative research indicated that the value of this strategic assistance of venture capitalists was moderate (3.3). The quantitative research identified a statistically significant difference between private and government venture capitalists in value of assistance in customers ($p=0.007$). The value of private venture capitalists' assistance in customers (3.8) was significantly higher relative to the value of assistance provided by government venture capitalists (2.3). Private venture capitalists furthermore advised 61% of sampled private venture capital-backed firms on customers on an average of 2.7 occasions during the observed period of one year, while government venture capitalists advised 75% of sampled government venture capital-backed firms on customers on an average of 1.8 occasions during the same period.

Information about customer needs is important form of strategic knowledge that early-stage firms leverage in defining product and value propositions. The results of the quantitative research indicated that 58% of sampled Hungary-based investee firms were advised by venture capitalists on customer needs on an average of 2.5 occasions during the observed period of one year. The findings of the quantitative research indicated that the value of this form of strategic assistance was moderate (3.2). The collected data did not identify a significant statistical difference between private and government venture capitalists in this form of strategic assistance.

Information about features of products and services is relevant for product design and innovation. The results of the quantitative research indicated that 46% of sampled Hungary-based investee firms were advised by venture capitalists on product features on an average of 2.5 occasions during the observed period of one year. According to the results, the value of this

strategic assistance of venture capitalists was moderate (3.0). The collected data did not identify a significant statistical difference between private and government venture capitalists in this form of strategic assistance. The assistance of private venture capitalists in product features was provided to 44% of sampled private venture capital-backed firms on an average of 3.1 occasions during the observed period of one year, while such assistance of government venture capitalists was provided to 50% of sampled government venture capital-backed firms on an average of 1.3 occasions during the same period.

Advising on investee firms' strengths, weaknesses and competitors represents relevant knowledge in positioning of investee firms' product and services. The results of the quantitative research indicated that 38% of sampled Hungary-based investee firms were advised by venture capitalists on strengths and weaknesses on an average of 2.5 occasions during the observed period of one year. The results of the quantitative research indicated that the value of this strategic assistance of venture capitalists was moderate (2.9). The quantitative research did not identify a statistically significant difference between private and government venture capitalists in this strategic assistance. The quantitative assistance of private venture capitalists in identifying strengths and weaknesses was provided to 39% of sampled firms on an average of 3.1 occasions during the observed period of one year, while such assistance of government venture capitalists was provided to 38% of sampled firms on an average of 1 occasion during the same period.

The results of the quantitative research furthermore indicated that 38% of sampled Hungary-based investee firms were advised by venture capitalists on competitors on an average of 2.7 occasions during the observed period. The results indicated that the value of this assistance of venture capitalists was moderate (3.7). The quantitative research identified a statistically significant difference between private and government venture capitalists in the value of this strategic assistance ($p=0.068$), but not in the frequency of its assistance.

Table 7 summarizes the results of the quantitative research.

Table 7: Quantitative research: Frequency and value of strategic assistance of venture capitalists in development of products and services (product innovation) and positioning of Hungary-based investee firms

Forms of assistance	All venture capitalists				Private venture capitalists				Government venture capitalists				Difference	
	Frequency		Value		Frequency		Value		Frequency		Value		Two sample t-test	
	% of ob.	Mean	Mean	S. d.	% of ob.	Mean	Mean	S. d.	% of ob.	Mean	Mean	S. d.	Frequency	Value
Provision of strategic assistance														
i) Assistance in development of products and services (product innovation) and positioning														
Customers	65%	2.4	3.3	1.1	61%	2.7	3.8	0.9	75%	1.8	2.3	0.7		0.007
Customer needs	58%	2.5	3.2	1.0	56%	2.5	3.5	1.1	63%	2.4	2.6	0.5		
Features of products and services	46%	2.5	3.0	1.3	44%	3.1	3.1	1.4	50%	1.3	2.8	1.1		
Firm's strengths and weaknesses	38%	2.5	2.9	0.9	39%	3.1	3.0	1.1	38%	1.0	2.7	0.5		
Firm's competitors	38%	2.7	3.7	1.0	44%	3.0	4.0	0.9	25%	1.5	2.5	0.5		0.068

The significance level used by this research is 0.1 and a p-value of less than 0.1 is interpreted as indicating the evidence of a statistically significant difference between private and government venture capitalists in the frequency and value of provided strategic assistance to Hungary-based investee firms.

The comparison of the t-test results identified a statistically significant difference between private and government venture capitalists in advising Hungary-based investee forms on customers and competitors. The results identified that the difference between private and government venture capitalists was in the value of their assistance provided to Hungary-based investee forms, rather than in the frequency of provided assistance.

8.1.1.1.2 Discussion

In terms of provision of strategic assistance, the first main assumption of the quantitative research was that venture capitalists provided strategic assistance to Hungary-based investee firms in product innovation and strategic positioning. The second main assumption of the quantitative research was that categories of private and government venture capitalists were different in strategic assistance provided to Hungary-based investee firms.

i) The results of the quantitative research support the first assumption that venture capitalists provided strategic assistance to Hungary-based investee firms in development of products and services (product innovation) and positioning.

ii) The results of the quantitative research support the second assumption that categories of private and government venture capitalists were different in the assistance they provide to Hungary-based investee firms in development of products and services (product innovation) and positioning.

Strategic assistance of venture capitalists in development of investee firms' products and services (product innovation) and strategic positioning mitigates business risks of early-stage firms and improves their economic performance.

One of the distinct characteristics of early-stage firms are multiple strategic and operational uncertainties. A significant source of uncertainty of early-stage firms is due to the

absence of information about market potential of investee firms' products and services in terms of market size and market acceptance of products and services, their application as well as customer preferences, needs and budget. The strategy of early-stage firms is often the result of entrepreneurs' understanding of products' and services' market potential. Often lacking in-depth information about markets, customers, customer needs and customer preferences, early-stage firms are more likely to assimilate knowledge from external sources than mature firms with sophisticated information governance and learning processes.

The results of the quantitative research indicated that strategic assistance of venture capitalists was provided to a moderate number of Hungary-based investee firms. The results of the quantitative research also suggested that the absorptive capacity of early-stage firms to "value of new, external information, assimilate it, and apply it to commercial ends" (Cohen & Levinthal, 1990) was potentially high.

The study of Hallmann and Puri (2000) indicated that innovative early-stage investee firms racing to become 'first-movers' attributed higher importance to the active provision of assistance of venture capitalists. Venture capitalists provide strategic assistance in product innovation by acting as important external sources of knowledge for investee firms. Venture capitalists also provide strategic assistance in positioning by advising on investee firms' strengths, weaknesses and competitors. Diverse forms of strategic assistance provided by venture capitalists to Hungary-based investee firms indicated that venture capitalists had comprehensive approach to strategy.

For innovative early-stage investee firms, one of key contributions of venture capitalists is in product - market dimension and reduction in time to bring products and services to the market. Validation of products and services of early-stage firms reduces some of their uncertainty and business risk and paves the way for development of their capabilities, in order for investee firms to meet increasing demand for their products and services. Firms with

validated products conduct product and process innovation at the high rate and have significant absorptive capacity to value the assistance of venture capitalists in development of products and services (product innovation) and organizational capabilities (process innovation). The latter value-added assistance of venture capitalists will be discussed in the next section.

The results of the quantitative research pointed to the significant difference between private and government venture capitalists in the value of their strategic assistance, suggesting that government venture capitalists may not be an effective policy response for supporting Hungary-based innovative firms. The empirical data collected by the quantitative research supports the findings of reviewed academic literature suggesting that the assistance of private venture capitalists in product innovation is superior (Leleux & Surlemont, 2003) and that government venture capital-backed firms are less innovative (Bertoni & Tykvová, 2015).

The objective of subsequently conducted follow-on qualitative research was to provide additional insights about differences between Hungary-based private and government venture capital-backed investee firms.

8.1.2 Provision of Assistance in Professionalization

Venture capitalists provide assistance to investee firms in development of their organizational capabilities (process innovation). Commonly referred as the assistance in professionalization, this form of assistance of venture capitalists has a critical role in development organizational capabilities of investee firms and competences of entrepreneurs.

The scholarship pointed to significant heterogeneity among venture capitalists in their resources and capabilities to provide assistance in professionalization, which could range from assisting in development of industry-specific business processes and implementation of best-practices to assisting in development of managerial competences and social relationships. Venture capitalists often serve as a sounding board for ideas and initiatives on operating

activities of investee firms. They furthermore have the role of mentors when they provide assistance and governance to entrepreneurs to professionalize by acquiring specific managerial competences and skills. One of distinct characteristics of early-stage firms are rudimentary, temporary and unstable processes and absence of managerial competences to execute specific operational tasks.

The contribution of assistance in professionalization of early-stage firms can be summarized as follows:

i) Professionalization of early-stage investee firms mitigates business and transaction risks of early-stage firms and improves their productivity and economic performance, as firms develop capabilities to enter into transactions with the third-parties.

ii) By developing knowledge-sharing process and combinative capabilities for creation of tacit and codified knowledge, professionalization of early-stage firms improves their absorptive capacity.

iii) Professionalization improves the exit performance of early-stage firms as they develop processes for production of internal records of operating and financial performance and information governance.

iv) The professionalization of early-stage firms results in acquisition of managerial competences by entrepreneurs that can be leveraged in new ventures.

The scholarship has extensively analysed the effect of professionalization on productivity and economic performance of investee firms. The academic scholarship indicated that the absorptive capacity of early-stage firms to appropriate and develop new organizational capabilities was significant. While some organizational capabilities allow investee firms to

achieve fast time-to-market and first-mover advantage, other capabilities are critical for learning and transfer of knowledge. Investee firms leverage the networks of venture capitalists to enter into transactions (e.g. partnerships). In order for investee firms to benefit from collaboration and partnerships with the third-parties, the investee firms must have some organizational capabilities.

In this section, the quantitative research presents the results of the analysis of the activities of venture capitalists that professionalize investee firms. The quantitative research took into consideration two unique forms of assistance of relevance for professionalization of firms: i) advising on development of organizational capabilities (process innovation) and ii) advising on joint activities with the third-parties.

In terms of provision of assistance in professionalization, the quantitative research had two main assumptions:

i) Venture capitalists professionalized Hungary-based investee firms by advising on i) development of organizational capabilities (process innovation) and ii) joint activities with third-parties.

ii) Categories of private and government venture capitalists were different in the assistance provided to Hungary-based investee firms in i) development of organizational capabilities (process innovation) and ii) joint activities with third-parties.

8.1.2.1 Assistance in Development of Organizational Capabilities (Process Innovation)

8.1.2.1.1 Results

The quantitative research collected data on the frequency and value of activities of venture capitalists of advising Hungary-based investee firms on development of organizational

capabilities in i) financial management, ii) technology management, iii) supply chain management and iv) quality management.

Financial management consists of a number organizational capabilities and individual competences of planning, organizing and controlling financial activities of a firm. The results of the quantitative research indicated that 73% of sampled Hungary-based investee firms were advised by venture capitalists on development of capabilities in financial management on an average of 4.3 occasions during the observed period of one year. The findings of the quantitative research indicated that the value of assistance of venture capitalists in financial management was moderate (3.4). The quantitative research identified a statistically significant difference between private and government venture capitalists in both the frequency ($p=0.06$) and value ($p=0.001$) of their assistance in financial management. The value of assistance provided by private venture capitalists in financial management (3.9) was significantly higher than the value of assistance of government venture capitalists (1.8). The assistance of private venture capitalists in financial management was provided to 78% of sampled private venture capital-backed firms on an average of 5.1 occasions during the observed period of one year, while the assistance of government venture capitalists was provided to 63% of sampled firms on an average of 2.2 occasions during the same period.

Technology management requires organizational capabilities and individual competences of learning, knowledge-sharing and leveraging knowledge in development of products and processes of a firm. The results of the quantitative research indicated that 50% of sampled Hungary-based investee firms were advised by venture capitalists on development of capabilities in technology management on an average of 3.5 occasions during the observed period of one year. The findings of the quantitative research indicated that the value of assistance of venture capitalists in technology management was moderate (3.5). The quantitative research identified a statistically significant difference between private and

government venture capitalists in both the frequency (p=0.075) and value (p=0.021) of their assistance in technology management. The value of assistance of private venture capitalists in technology management (4.0) was significantly higher relative to the value of assistance of government venture capitalists (2.0). The assistance of private venture capitalists in technology management was provided to 56% of sampled firms on an average of 4.3 occasions during the observed period of one year, while the assistance of government venture capitalists was provided to 38% of sampled firms on an average of 1 occasion during the same period.

The results of the quantitative research indicated that venture capitalists provided a limited assistance in supply chain management. The results of the quantitative research indicated that 23% of sampled Hungary-based investee firms were advised by venture capitalists on development of capabilities in supply chain management on an average of 1.8 occasions during the observed period of one year. The results of the quantitative research indicated that the value of assistance of venture capitalists in supply chain management was moderate (3.2). The collected data did not identify a significant statistical difference between private and government venture capitalists in this form of assistance.

The results of the quantitative research also indicated that venture capitalists provided a limited assistance in quality management. The results indicated that 19% of sampled Hungary-based investee firms were advised by venture capitalists on development of capabilities in quality management on an average of 1.4 occasions during the observed period of one year. The results indicated that the value of assistance of venture capitalists in quality management was moderate (2.8). The collected data did not identify a significant statistical difference between private and government venture capitalists in this form of assistance.

Table 8 summarizes the results of the quantitative research.

Table 8: Quantitative research: Frequency and value of assistance of venture capitalists in development of organizational capabilities (process innovation) of Hungary-based investee firms

Forms of assistance	All venture capitalists				Private venture capitalists				Government venture capitalists				Difference	
	Frequency		Value		Frequency		Value		Frequency		Value		Two sample t-test	
	% of ob.	Mean	Mean	S. d.	% of ob.	Mean	Mean	S. d.	% of ob.	Mean	Mean	S. d.	Frequency	Value
Provision of assistance in professionalization														
i) Assistance in development of organizational capabilities (process innovation)														
Financial management	73%	4.3	3.4	1.3	78%	5.1	3.9	1.0	63%	2.2	1.8	0.7	0.060	0.001
Technology management	50%	3.5	3.5	1.3	56%	4.3	4.0	1.1	38%	1.0	2.0	0.8	0.075	0.021
Supply chain management	23%	1.8	3.2	0.9	28%	1.8	3.2	1.0	13%	2.0	3.0	0.0		
Quality management	19%	1.4	2.8	0.7	22%	1.0	2.8	0.8	13%	3.0	3.0	0.0		

The significance level used by this research is 0.1 and a p-value of less than 0.1 is interpreted as indicating the evidence of a statistically significant difference between private and government venture capitalists in the frequency and value of provided assistance in professionalization to Hungary-based investee firms.

The comparison of the t-test results revealed a statistically significant difference between private and government venture capitalists in the frequency and value of assistance in development of capabilities of Hungary-based investee firms in financial and technology management. The results indicated that the difference between private and government venture capitalists was in the activities of providing assistance to Hungary-based investee firms as well as in the value of their assistance, but that difference is limited to certain areas of professionalization.

8.1.2.1.2 Discussion

The first main assumption of the quantitative research was that venture capitalists professionalized Hungary-based investee firms by advising them on development of organizational capabilities (process innovation). The second main assumption of the quantitative research was that categories of private and government venture capitalists were different in the assistance they provide to Hungary-based investee firms in development of organizational capabilities (process innovation).

i) The results of the quantitative research support the first assumption that venture capitalists provided assistance to Hungary-based investee firms in development of organizational capabilities (process innovation). The assistance in supply chain management and quality management was provided to a limited number of Hungary-based investee firms.

ii) The results of the quantitative research support the second assumption that categories of private and government venture capitalists were different in the assistance they provide to Hungary-based investee firms in development of organizational capabilities (process innovation).

Investee firms with validated products pursue product and process innovation at the high rate and strive to reduce as many of their strategic and operational uncertainties. Development of capabilities mitigates business and transaction risks of early-stage investee firms. It furthermore improves productivity of early-stage firms and likelihood of their superior economic and exit performance.

At early-stage, organizational capabilities of investee firms are unstable and temporary. But as demand for their products and services of firms grows, the capabilities of firms become increasingly specialized, mechanistic and integrated. In order for investee firms to meet growing demand for their products and services, they develop processes for efficiency, standardization, improved product quality and reliability. At this stage, investee firms develop complex processes for performance monitoring and control, which provide data for strategic and operational decisions. As decisions become increasingly based on internally generated information, investee firms' absorptive capacity to value external information gradually declines.

Although the objective of this study was to contribute to the scholarship by offering country-specific analysis of value-added activities of venture capitalists, the quantitative research offered some insights about the evolutionary pattern of assistance of venture capitalists, contributing to the international scholarship beyond its original scope. The results of the quantitative research indicated that the pattern of assistance provided by venture capitalists to Hungary-based firms was not equally spread across the examined areas of product and process innovation. While strategic assistance of venture capitalists was provided to Hungary-based investee firms in all examined areas of product innovation, the assistance in professionalization was concentrated on development of capabilities in financial management and technology management. Investee firms are likely to develop integrated capabilities in quality management and supply chain management at later stages, as these are relevant

capabilities for standardization and efficiency. The results of the quantitative research therefore indicated that provision of assistance had a life-cycle.

Limited assistance of venture capitalists in development of integrated processes for efficiency, standardization and quality indicates that Hungary-based investee firms have significant flexibility in reconfiguring their resources and product innovation. This conclusion is furthermore supported by the fact that many processes in financial management and technology management are dynamic capabilities – common, transferable and temporary strategic and operational processes used to reconfigure resources of firms into new sources of information and competitive advantage. The monitoring and reporting processes are one of the most widespread dynamic capacities in investee firms. In providing assistance in professionalization, venture capitalists act as 'knowledge brokers' when they advise investee firms on development of processes.

The results of the quantitative research indicated that assistance provided by private venture capitalists in development of capabilities of Hungary-based investee firms in financial management and technology management was superior relative to the assistance provided by government venture capitalists. It is assumed that in absence of pressures to deliver financial returns within a limited investment horizon, the assistance of government venture capitalists had inferior qualities relative to the assistance provided by private investors.

Private venture capitalists are more likely to assist Hungary-based investee firms in development of processes that improve productivity of investee firms such as: data collection and data analysis processes, performance monitoring and reporting processes and information governance. These capabilities increase the transparency of operations and contribute to the production of internal records of operating and financial performance of investee firms. These capabilities are highly valuable in transactions of investee firms as they lower information

asymmetry and transaction costs of entering into transactions with the third-parties. Such capabilities generally improve economic and exit performance of investee firms.

The quantitative research did not analyse the quality of Hungary-based investee firms. Yet, the conclusion may be inferred from its empirical results that economic and exit performance of Hungary-based private venture capital-backed firms was likely to be superior relative to the economic and exit performance of government venture capital-backed firms. The objective of subsequently conducted follow-on qualitative research was provide additional insights about differences between Hungary-based private and government venture capital-backed investee firms.

8.1.2.2 Assistance in Strategy and Activities with the Third-Parties

8.1.2.2.1 Results

Besides advising on development of organizational capabilities (process innovation), venture capitalists provide assistance to investee firms in their strategy and joint activities with the third-parties. Activities of investee firms with the third-parties contribute to professionalization of investee firms.

The quantitative research collected data on the frequency and value of assistance of venture capitalists in strategy and activities of Hungary-based investee firms with i) sales & marketing partners, ii) suppliers and iii) R&D partners. The quantitative research collected empirical data on the assistance of venture capitalists in joint activities of Hungary-based investee firms, as well on the assistance of venture capitalists in introducing investee firms to prospective transaction partners, discussed in the next section.

The results of the quantitative research indicated that 50% of sampled Hungary-based investee firms were advised by venture capitalists on strategy and activities with sales and marketing partners on an average of 2.4 occasions during the observed period of one year. The

results of the quantitative research indicated that the value of assistance of venture capitalists in joint activities of Hungary-based investee firms with sales and marketing partners was moderate (3.3). The collected data did not identify a significant statistical difference between private and government venture capitalists in this form of assistance.

The results of the quantitative research indicated that 38% of sampled Hungary-based investee firms were advised by venture capitalists on strategy and joint activities with suppliers on an average of two occasions during the observed period of one year. The results of the quantitative research indicated that the value of assistance of venture capitalists in joint activities of Hungary-based investee firms with suppliers was moderate (3.5). The quantitative research identified a statistically significant difference ($p=0.003$) in the value of assistance provided by private venture capitalists (4.0) and government venture capitalists (2.3) in joint activities of Hungary-based investee firms with suppliers. The collected data, however, did not identify a significant statistical difference between private and government venture capitalists in the frequency of providing this form of assistance to Hungary-based investee firms.

The results of the quantitative research indicated that venture capitalists provided a limited assistance to Hungary-based investee firms in strategy and joint activities with R&D partners. The results of the quantitative research indicated that 27% of sampled Hungary-based investee firms were advised by venture capitalists on their strategy and joint activities with R&D partners on an average of 1.3 occasions during the observed period of one year. The results of the quantitative research indicated that the value of this forms of assistance provided by venture capitalists to Hungary-based investee firms was moderate (2.9). The collected data did not identify a significant statistical difference between private and government venture capitalists.

Table 9 summarizes the results of the quantitative research.

Table 9: Quantitative research: Frequency and value of assistance of venture capitalists in joint activities of Hungary-based investee firms with the third-parties

Forms of assistance	All venture capitalists				Private venture capitalists				Government venture capitalists				Difference	
	Frequency		Value		Frequency		Value		Frequency		Value		Two sample t-test	
	% of ob.	Mean	Mean	S. d.	% of ob.	Mean	Mean	S. d.	% of ob.	Mean	Mean	S. d.	Frequency	Value
Provision of assistance in professionalization														
ii) Assistance in strategy and activities with the third-parties														
Strategy and activities with sales partners	50%	2.4	3.3	1.0	56%	2.6	3.5	1.0	38%	1.7	2.7	0.5		
Strategy and activities with suppliers	38%	2.0	3.5	0.9	39%	2.1	4.0	0.5	38%	1.7	2.3	0.5		0.003
Strategy and activities with R&D partners	27%	1.3	2.9	1.0	28%	1.0	3.0	1.1	25%	2.0	2.5	0.5		

The significance level used by this research is 0.1 and a p-value of less than 0.1 is interpreted as indicating the evidence of a statistically significant difference between private and government venture capitalists in the frequency and value of provided assistance in professionalization to Hungary-based investee firms.

The comparison of the t-test results revealed a statistically significant difference between private and government venture capitalists in the value of assisting joint activities with suppliers. The results identified that the difference between private and government venture capitalists was in the value of their assistance provided to Hungary-based investee forms, rather than in the frequency of provided assistance.

8.1.2.2.2 Discussion

The first main assumption of quantitative research was that venture capitalists professionalized Hungary-based investee firms by advising them on joint activities with third-parties. The second main assumption of quantitative research was that categories of private and government venture capitalists were different in assistance they provide to Hungary-based investee firms in strategy and joint activities with third-parties.

i) The results of the quantitative research offered some support to the first assumption that venture capitalists advised Hungary-based investee firms on strategy and joint activities with third-parties. This form of assistance was provided to a limited number of Hungary-based investee firms.

ii) The results of the quantitative research support the second assumption that categories of private and government venture capitalists were different in the assistance provided to Hungary-based investee firms in strategy and joint activities with third-parties.

As other results of quantitative research indicate, venture capitalists provide assistance to Hungary-based investee firms in entering into transactions and partnerships with the third-parties. Specifically, development of some capabilities occurs through joint activities with the third-parties. One of the critical benefits of joint activities with the third-parties is transfer of

tacit knowledge. Joint activities of entrepreneurs also create positive externalities, social and economic benefits.

It was already highlighted that early-stage firms are likely to value and assimilate knowledge from external sources who are familiar with the specific market and technology. Joint activities are interfirm activities that occur across boundaries of firms. A number of studies highlighted that innovative entrepreneurial ventures efficiently internalized knowledge of third-parties. Besides acquiring codified information such as insights, analyses and research evidence from external sources, early-stage firms acquire tacit knowledge from external sources such as know-how, routines and strategic and operational dynamic capabilities used in organization and reconfiguration of resources into new sources of information and competitive advantage.

Joint activities with third-parties are critical forms of transfer of tacit knowledge and have important role in development of organizational capabilities of investee firms. They thus contribute to professionalization of investee firms. The implicit type of knowledge is important for development of young entrepreneurial firms and joint activities are important channels for transfer of such knowledge. Joint activities therefore improve productivity, economic and exit performance of investee firms.

Despite a number of benefits of joint activities, the results of the quantitative research indicated that venture capitalists assisted only limited number of Hungary-based investee firms in joint activities with third-parties. The results of the quantitative research may confer the conclusion that Hungary-based investee firms had limited access to external sources of tacit knowledge and dynamic capabilities. The absence of this critical assistance of venture capitalists was likely to have implications for Hungary-based investee firms in technology adoption, achieving fast time-to-market and first-mover advantage, where tacit knowledge and dynamic capabilities are critical for fast organization of resources.

As joint activities facilitate interfirm tacit knowledge-sharing among firms and entrepreneurs in the ecosystem, such forms of spatial exchange have relevance for the emergence and aggregation of high-quality firms. In innovative sectors of the economy, innovation has substantial positive externalities, offering high social and economic rate of return. By encouraging the joint activities of firms and entrepreneurs, a policy intervention should aim at improving the quality of Hungarian entrepreneurial sector.

The results of the quantitative research support its main assumption that private and government venture capitalists were different in assisting Hungary-based investee firms in professionalization. While, the quantitative research did not analyse the quality of Hungary-based investee firms, the conclusion could be inferred from its empirical results about the quality of Hungary-based private and government venture capital-backed investee firms. The objective of subsequently conducted follow-on qualitative research was provide additional insights about differences between Hungary-based private and government venture capital-backed investee firms.

8.1.3 Provision of Relational Capital

Venture capitalists provide relational capital to investee firms by connecting investee firms with specific third-parties for entering into commercial and labour contracts, commercial and strategic partnerships and capital transactions. Networks of venture capitalists are infrastructure for the exchange of timely, reliable and high-quality private information about prospective transactions of investee firms.

A number of studies identified that networks of venture capitalists had a critical role in development of investee firms. The customer, supplier and labour contracts, strategic and commercial partnerships and transactions with the providers of capital contribute to investee firms' market validation and improve their productivity, development of organizational

capabilities, complementary and relation-specific assets. Therefore, networks of venture capitalists are a critical source of resources and capabilities for investee firms.

The contribution of relational capital to investee firms can be summarized as follows:

i) Networks of venture capitalists are the source of prospective transaction partners of investee firms.

ii) Networks of venture capitalists are the source of potential commercial partnerships for commercialization of products and services of investee firms.

iii) Networks venture capitalists are the source of potential strategic partnerships for building complementary and relation-specific assets that confer long-term competitive advantage to investee firms.

iv) Networks of venture capitalists are important sources of capital, loan and credit transactions of investee firms.

The academic scholarship indicated that venture capital-backed firms cooperate and engage in collaborative activities and alliances in the area of R&D, sales, marketing and technology due to significant absorptive capacity. The academic scholarship also indicated that quality of networks of venture capitalists was highly correlated with their investment performance, as well as with the economic performance of their investee firms. Investee firms backed by investors with high-quality and diverse networks enjoy the advantages of entering into exchange with the third-parties that are most likely to contribute to positive outcomes.

In this section, the quantitative research examined the assistance of venture capitalists in: i) commercial and labour contracts, ii) commercial and strategic partnerships and iii) transactions with providers of capital, loan and credit.

In provision of relational capital, the quantitative research had two main assumptions:

i) Venture capitalists were important sources of i) customer, supplier and labour contracts ii) commercial and strategic partnerships and iii) capital, loan and credit transactions for Hungary-based investee firms.

ii) Categories of private and government venture capitalists were different in assisting i) customer, supplier and labour contracts ii) commercial and strategic partnerships and iii) capital and credit transactions of Hungary-based investees.

8.1.3.1 Assistance in Commercial and Labour Contracts

8.1.3.1.1 Results

The quantitative research collected data on the frequency and value of assistance of venture capitalists in introducing Hungary-based investee firms to prospective i) customers, ii) suppliers and iii) senior executives. The objective of quantitative research was to collect country-specific data, offering conclusions about the role of venture capitalists in customer, supplier and labour contracts of Hungary-based investee firms.

The results of the quantitative research indicated that venture capitalists introduced an average of 2.8 prospective customers to 58% of sampled Hungary-based investee firms during the observed period of one year. The results of the quantitative research indicated that the value of assistance of venture capitalists in locating potential customers of Hungary-based investee firms was moderate (3.6). The collected data did not identify a significant statistical difference between private and government venture capitalists in this form of assistance. Yet, this form of assistance was provided by private venture capitalists to 67% of private venture capital-backed firms, while government venture capitalists introduced only 38% of government venture capital-backed firms to prospective customers from their networks.

The results of the quantitative research indicated that venture capitalists provided a limited assistance in transactions with suppliers of Hungary-based investee firms. Venture capitalists introduced an average of 2.5 prospective suppliers to 31% of sampled Hungary-based investee firms during the observed period of one year. The results of the quantitative research suggested that the value of assistance of venture capitalists in locating potential suppliers of Hungary-based investee firms was moderate (3.4). The collected data did not identify a significant statistical difference between private and government venture capitalists in this form of assistance.

The results of the quantitative research indicated that venture capitalists introduced an average of 2.2 prospective senior executives to 42% of sampled Hungary-based investee firms during the observed period of one year. The results of the quantitative research indicated that the value of assistance of venture capitalists in recruiting potential senior executives of Hungary-based investee firms was moderate (3.7). The quantitative research identified a statistically significant difference between private and government venture capitalists in the value of assistance in recruiting senior executives of Hungary-based investee firms ($p=0.007$). The value of assistance of private venture capitalists in recruiting senior executives (4.1) was significantly higher relative to the value of assistance of government venture capitalists (2.7).

The comparison of the t-test results revealed a statistically significant difference between private and government venture capitalists in assisting the recruitment of senior executives. The results identified that the difference between private and government venture capitalists was in the value of their assistance and networks, rather than in the frequency of assistance in recruiting senior executives of Hungary-based investee firms.

Table 10 summarizes the results of the qualitative research.

Table 10: Quantitative research: Frequency and value of assistance of venture capitalists in customer, supplier and labour contracts of Hungary-based investee firms

Forms of assistance	All venture capitalists				Private venture capitalists				Government venture capitalists				Difference	
	Frequency		Value		Frequency		Value		Frequency		Value		Two sample t-test	
	% of ob.	Mean	Mean	S. d.	% of ob.	Mean	Mean	S. d.	% of ob.	Mean	Mean	S. d.	Frequency	Value
Provision of relational capital														
i) Commercial and labour contracts														
Assistance in customer contracts	58%	2.8	3.6	1.0	67%	3.0	3.7	1.0	38%	2.0	3.3	0.5		
Assistance in supplier contracts	31%	2.5	3.4	0.9	33%	2.7	3.3	0.9	25%	2.0	3.5	0.5		
Assistance in staff contracts	42%	2.2	3.7	0.9	44%	2.3	4.1	0.6	38%	2.0	2.7	0.5		0.007

The significance level used by this research is 0.1 and a p-value of less than 0.1 is interpreted as indicating the evidence of a statistically significant difference between private and government venture capitalists in the frequency and value of provided relational capital to Hungary-based investee firms.

8.1.3.1.2 Discussion

The first main assumption of the quantitative research was that venture capitalists were important sources of customer, supplier and labour contracts of Hungary-based investee firms. The second main assumption of the quantitative research was that categories of private and government venture capitalists were different in assisting customer, supplier and labour contracts of Hungary-based investee firms.

i) The results of the quantitative research support the first assumption that venture capitalists were important sources of customer, supplier and labour contracts of Hungary-based investee firms.

ii) The results of the quantitative research support the second assumption that categories of private and government venture capitalists were different in assisting contracts of Hungary-based investee firms.

According to the findings of the quantitative research, the networks of venture capitalists were high-quality source of potential customers, suppliers and senior executives of Hungary-based investee firms, which were able to recognize their benefits to productivity. Yet, the assistance in prospective customer, supplier and labour contracts was provided to a limited number of Hungary-based investee firms, despite the benefits.

The activity of introducing investee firms to prospective customers, suppliers and senior staff is a tangible and result-orientated activity. The effect of commercial and labour contracts on productivity of firms is often immediate, relative to lagging effect of commercial and strategic partnerships. The empirical data collected by the quantitative research highlighted that commercial and labour contracts were one of the most efficient contributions of venture capitalists to productivity of Hungary-based investee firms. The results of the quantitative

research provided empirical support to the conclusions of Alperovych et al., (2015) that venture capitalists had effect on productivity of investee firms after the first round of financing.

While a number of studies indicated that venture capitalists assisted investee firms in supplier contracts, the empirical data collected from Hungary-based investee firms offered only a limited support to that conclusion. One of the potential explanations for an absence of broader assistance in supplier contracts of Hungary-based investee firms are limited synergies within portfolios of venture capitalists and absence of relational strategies, exploring the benefits of intraportfolio activities and collaboration among Hungary-based investee firms.

The results of the qualitative research indicated that the difference between private and government venture capitalists was in the value of their assistance and networks. The difference in the value of networks of private and government venture capitalists did not seem to be as significant as indicated in other research, conducted on the samples of venture capital-backed firms from other countries (e.g. Gomez-Mejia et al.,1990; Fried & Hisrich, 1995; Luukkonen et al., 2013).

Other studies indicated that government venture capitalists and government venture capital-backed firms were unattractive to experienced managers (Manigart et al., 2002, Cumming et al., 2017). Significant difference between private and government venture capitalists was identified in the value of their networks of senior executive from business sectors, indicating that Hungary-based government venture capital-backed firms had a limited access to the labour market, where competitors offered incentives based on the financial performance and returns.

8.1.3.2 Assistance in Commercial and Strategic Partnerships

8.1.3.2.1 Results

The quantitative research collected data on the frequency and value of assistance of venture capitalists in introducing Hungary-based investee firms to prospective i) sales and marketing partners, ii) product licencing partners and iii) R&D partners. This objective of the quantitative research was to collect country-specific data, offering conclusions limited to the role of venture capitalists in partnerships of Hungary-based investee firms.

The results of the quantitative research indicated that venture capitalists introduced an average of 2.4 prospective sales and marketing partners to 42% of sampled Hungary-based investee firms during the observed period of one year. The results of the quantitative research indicated that the value of assistance of venture capitalists in sales and marketing partnerships of Hungary-based investee firms was moderate (3.4). The collected data did not identify a significant statistical difference between private and government venture capitalists in this form of assistance.

The results of the quantitative research indicated that venture capitalists provide limited assistance in prospective product licencing partnerships of Hungary-based investee firms. Venture capitalists introduced an average of 1.3 prospective product licencing partners to 23% of sampled Hungary-based investee firms during the observed period of one year. The results of the quantitative research indicated that the value of assistance of venture capitalists in product licensing partnerships of Hungary-based investee firms was moderate (3.2). The collected data did not identify a significant statistical difference between private and government venture capitalists in this form of assistance.

Table 11 summarizes the results of the quantitative research.

Table 11: Quantitative research: Frequency and value of assistance of venture capitalists in commercial and strategic partnerships of Hungary-based investee firms

Forms of assistance	All venture capitalists				Private venture capitalists				Government venture capitalists				Difference	
	Frequency		Value		Frequency		Value		Frequency		Value		Two sample t-test	
	% of ob.	Mean	Mean	S. d.	% of ob.	Mean	Mean	S. d.	% of ob.	Mean	Mean	S. d.	Frequency	Value
Provision of relational capital														
ii) Commercial and strategic partnerships														
Assistance in sales & marketing partnerships	42%	2.4	3.4	0.9	44%	2.6	3.3	1.0	38%	1.7	3.7	0.5		
Assistance in product licensing partnerships	23%	1.3	3.2	1.1	28%	1.4	3.2	1.2	13%	1.0	3.0	0.0		
Assistance in R&D partnerships	15%	1.5	2.8	0.4	17%	1.0	2.7	0.5	13%	3.0	3.0	0.0		

The significance level used by this research is 0.1 and a p-value of less than 0.1 is interpreted as indicating the evidence of a statistically significant difference between private and government venture capitalists in the frequency and value of provided relational capital to Hungary-based investee firms.

The results of the quantitative research indicated that venture capitalists provided limited assistance in prospective R&D partnerships of Hungary-based investee firms. Venture capitalists introduced an average of 1.5 prospective R&D partners to 15% of sampled Hungary-based investee firms during the observed period of one year. The results of the quantitative research indicated that the value of assistance of venture capitalists in R&D partnerships of Hungary-based investee firms was moderate (2.8). The collected data did not identify a significant statistical difference between private and government venture capitalists in this form of assistance.

The comparison of the t-test results did not reveal a statistically significant difference between private and government venture capitalists in assisting prospective partnerships of Hungary-based investee firms.

8.1.3.2.2 Discussion

The first main assumption of the quantitative research was that venture capitalists were important sources of commercial and strategic partnerships for Hungary-based investee firms. The second main assumption of the quantitative research was that categories of private and government venture capitalists were different in assisting commercial and strategic partnerships of Hungary-based investee firms.

i) The results of the quantitative research offer some support to the first assumption that venture capitalists were important sources of commercial and strategic partnerships for Hungary-based investee firms. The assistance in product licencing and R&D partnerships of investee firms was provided to a limited number of Hungary-based investee firms.

ii) The results of the quantitative research do not support the second assumption that categories of private and government venture capitalists were different in

assisting commercial and strategic partnerships of Hungary-based investee firms.

The results of the analysis indicated that a modest amount of Hungary-based investee firms leveraged the relational capital of venture capitalists for entering into commercial and strategic partnerships. The broader assistance of venture capitalists in commercial and strategic partnerships of Hungary-based investee firms was missing and it could have had consequences on economic and exit performance of Hungary-based investee firms.

The commercial and strategic partnerships are repeated and enduring forms of interfirm collaboration that necessitate investment in complementary and relation-specific assets. There is an abundant evidence in management scholarship that the repeated and enduring partnerships among firms confer competitive advantage and superior economic performance. Commercial partnerships improve productivity of firms from commercialization of their products and services. The academic scholarship indicated that venture capital-backed firms achieved superior economic performance, due to accessing external resources and capabilities through their commercial partnerships (e.g.: Colombo et al., 2006; Bertoni et al., 2011).

Some forms of partnerships necessitate development of organizational capabilities for learning and knowledge management such as: knowledge-sharing processes, monitoring capabilities, information governance and capabilities for combination of knowledge. The scholarship examined the innovativeness of firms as a measure of combinative capabilities – "capabilities to recombine resources and capabilities to produce unique new outcome from existing knowledge" (Kogut & Zander, 1992).

A number of activities of early-stage ventures are interfirm activities. These activities require capabilities for interfirm communication, learning and knowledge creation. By entering into partnerships with other firms, investee firms access external sources of knowledge. Besides

acquiring codified information about customers, market and technology, investee firms leverage partnerships for acquiring tacit knowledge such as know-how, routines and strategic and operational dynamic capabilities used in organization and reconfiguration of resources into new sources of information and competitive advantage. Partnerships therefore contribute to economic and exit performance of investee firms.

Relative to contracts that often realize immediate benefits to productivity, partnerships have a lagging effect on productivity. Yet, partnering decisions reflect investee firms' long-term strategic goals and contribute to their long-term validation. The results of the quantitative research indicated that despite valuable networks of relational capital for investee firms to enter into partnerships, venture capitalists provided limited assistance in partnerships of Hungary-based investee firms.

Profiling firms for prospective partnerships is an important part of this form of assistance and requires industry- and market-specific knowledge and business experience. The assistance of venture capitalists in partnerships is critical in high-growth and high-technology industries with significant innovative and patenting activity, where the risks of appropriation are high. Assisting prospective partnerships often consists of taking part in negotiations, advising on the methods of safe transfer of assets and governance of intellectual property and information.

The findings of the qualitative research indicated that the difference between private and government venture capitalists in assisting partnerships of Hungary-based investee firms was not as significant as documented in other research, conducted on the samples of venture capital-backed firms from other countries, predominately from Western Europe.

8.1.3.3 Assistance in Transactions with Providers of Capital, Loan and Credit

8.1.3.3.1 Results

The quantitative research collected data on the frequency and value of assistance of venture capitalists in introducing Hungary-based investee firms to prospective i) venture capital investors, ii) corporate investors and iii) bank executives.

The results of the quantitative research indicated that venture capitalists introduced an average of 1.9 prospective venture capital investors to 50% of sampled Hungary-based investee firms during the observed period of one year. The results of the quantitative research also indicated that the value of assistance of venture capitalists in venture capital transactions of Hungary-based investee firms was moderate (3.5). The also research did not identified a statistically significant difference between private and government venture capitalists in assisting venture capital transactions of Hungary-based investee firms. Private venture capitalists introduced an average of 1.6 prospective venture capital investors to 61% of sampled private venture capital-backed investee firms, while government venture capitalists introduced an average of 3.5 prospective venture capital investors to 25% of sampled government venture capital-backed investee firms.

The results of the quantitative research indicated that venture capitalists provided a limited assistance in corporate transactions of Hungary-based investee firms. Venture capitalists introduced an average of 2 prospective corporate investors to 19% of sampled Hungary-based investee firms during the observed period of one year. The results of the quantitative research indicated that the value of assistance of venture capitalists in corporate investments in Hungary-based investee firms was moderate (3.8). The collected data did not identify a significant statistical difference between private and government venture capitalists in this form of assistance.

Table 12 summarizes the results of the quantitative research.

Table 12: Quantitative research: Frequency and value of assistance of venture capitalists in capital, loan and credit transactions of Hungary-based investee firms

Forms of assistance	All venture capitalists				Private venture capitalists				Government venture capitalists				Difference	
	Frequency		Value		Frequency		Value		Frequency		Value		Two sample t-test	
	% of ob.	Mean	Mean	S. d.	% of ob.	Mean	Mean	S. d.	% of ob.	Mean	Mean	S. d.	Frequency	Value
Provision of relational capital														
iii) Transactions with providers of capital, loan and credit														
Assistance in venture-capital transactions	50%	1.9	3.5	1.2	61%	1.6	3.5	1.2	25%	3.5	3.5	0.5		
Assistance in corporate transactions	19%	2.0	3.8	0.4	22%	2.0	3.8	0.4	13%	2.0	4.0	0.0		
Assistance in credit transactions	35%	1.8	3.0	1.2	22%	1.5	3.5	1.7	63%	2.0	2.6	0.5	0.025	

The significance level used by this research is 0.1 and a p-value of less than 0.1 is interpreted as indicating the evidence of a statistically significant difference between private and government venture capitalists in the frequency and value of provided relational capital to Hungary-based investee firms.

Venture capitalists introduced an average of 1.8 bank executives to 35% of sampled Hungary-based investee firms during the observed period of one year. The results of the quantitative research indicated that the value of assistance of venture capitalists in credit transactions of Hungary-based investee firms was moderate (3.0). The quantitative research identified a statistically significant difference between private and government venture capitalists in the frequency of assisting credit transactions of Hungary-based investee firms, but not in the value of their assistance. Private venture capitalists introduced an average of 1.5 bank executives to 22% of sampled private venture capital-backed investee firms, while government venture capitalists introduced an average of 2 bank executives to 63% of sampled government venture capital-backed investee firms.

The comparison of the t-test results did not identify a statistically significant difference between private and government venture capitalists in the value of their assistance. The statistically significant difference between private and government venture capitalists was identified in the frequency of assisting credit transactions of Hungary-based investee firms.

8.1.3.3.2 Discussion

The first main assumption of quantitative research was that venture capitalists were important sources of capital, loan and credit transactions of Hungary-based investee firms. The second main assumption of quantitative research were that categories of private and government venture capitalists were different in assisting capital, loan and credit transactions of Hungary-based investee firms.

i) The results of the quantitative research support the first assumption that venture capitalists were important sources of capital, loan and credit transactions of Hungary-based investee firms. The assistance in corporate investments in

Hungary-based investee firms was provided to a limited number of Hungary-based investee firms.

ii) The results of the quantitative research support the second assumption that categories of private and government venture capitalists were different in assistance they provide in capital, loan and credit transactions of Hungary-based investee firms.

The results of the quantitative research complement the findings of other studies (e.g.: Gorman & Sahlman, 1989; Bygrave & Timmons, 1992; Maula et al., 2005) that venture capitalists provide assistance to investee firms in capital and credit transactions by leveraging their networks of contacts. Yet, the assistance in prospective capital, loan and credit transactions of investee firms was provided to a moderate number of Hungary-based investee firms.

The comparative studies highlighted that private venture capital-backed firms had superior exit performance relative to the firms backed by government venture capital. In absence of pressures to deliver financial returns within a limited investment horizon, the exit strategies of private and government venture capitalists are different. Government venture capitalists are likely to choose exits that do not require significant investments and assistance in mitigating information asymmetry and agency costs of investee firms.

The results of the quantitative research suggested that government venture capitalists were likely to assist credit transactions of government venture capital-backed firms, indicating that investee firms backed by private and government venture capital had a different exit performance and that the exit strategy of two categories of venture capitalists was different. The scholarship identified only few instances where policy was successful in improving the exit performance of government venture capital-backed firms (e.g.: Cumming, 2007).

The quantitative research indicated that private venture capitalists provide assistance in development of capabilities (process innovation) of investee firms that improved their attractiveness on the capital market. Development of organizational capabilities increases the transparency of investee firms and has implications for their transactions as it mitigates the information asymmetry and agency costs.

The quantitative research identified some differences between private and government venture capitalists in the frequency of assisting investee firms in accessing capital and credit market that indicated that categories of private and government venture capitalists were different in exit strategy. The results of the quantitative research indicated that private venture capitalists introduced fewer prospective venture capital investors to higher number of investee firms relative to government venture capitalists.

The assistance of government venture capitalists in venture capital transactions of investee firms was provided with higher frequency to fewer investee firms. The processes of matching between investee firms and venture capitalists of certain qualities is a critical property of a venture capital market. The matching has a positive selection effect on investee firms in terms of signalling, legitimation, and certification. A random process of matching between venture capitalists and investee firms indicates that government venture capital may offer limited legitimation to investee firms.

The quantitative research did not find a statistically significant difference between private and government venture capitalists in the value of their assistance in capital and credit transactions of Hungary-based investee firms. A significant difference between private and government venture capitalists was found in the frequency of providing specific forms of assistance in capital and credit transactions of Hungary-based investee firms. These results suggested that government venture capital in Hungary had a unique life-cycle. Although quantitative research did not analyse the exit performance of Hungary-based investee firms, its

results indicated that Hungary-based government venture capital-backed firms were unattractive projects for private venture capitalists. The objective of subsequently conducted follow-on qualitative research was to offer additional insights and implications of the above-mentioned differences.

8.2 Comparison of Findings with the Results of Other Studies

The quantitative research offers a comparative analysis of assistance provided by private and government venture capitalists to investee firms in Hungary. It contributes to academic scholarship by providing information about a little-known Hungarian entrepreneurial sector and venture capital scene. While there is an abundance of information from mature venture capital markets on assistance provided by venture capitalists, little is known about processes of assistance of venture capitalists in Eastern Europe and activities of government venture capitalists.

The study of Gompers et al. (2020) is the most recent study examining the assistance provided by venture capitalists to investee firms, based on the data collected from the survey administered to 860 venture capitalists, in the period between November of 2015 and March of 2016, selected among the graduates of MBA programs from Chicago, Stanford and Harvard and the Kauffman Fellows. The results of the aforementioned study were limited by its geographical sample.

Even through conducted on a different sample of investee firms, this quantitative research offered findings that were comparable with the findings of Gompers et al. (2020), thus rendering further conclusions about assistance processes in Hungary. A comparison of the results of two studies indicated that assistance in professionalization was provided to a significantly higher portion of Hungary-based investee firms (81% of respondents), relative to the percentage of investee firms backed by USA-based venture capitalists (65% of respondents). Data collected in Hungary pointed out that venture capitalists responded to the

scarcity of entrepreneurial capabilities and skills in Hungarian entrepreneurial sector, highlighted in the study of Szerb et al. (2019), by providing operational assistance to a higher percentage of investee firms, relative to venture capitalists investing in mature entrepreneurial sectors. Venture capitalists in Hungary are, therefore, more likely to address market failures and improve outcomes of investee firms caused by the absence of organizational capabilities and individual competences in investee firms, than it is the case in mature entrepreneurial markets.

While a comparison of results of two studies indicated that assistance in strategy and relational capital was provided to almost identical portion of investee firms in Hungary and in the sample of Gompers et al. (2020), a significantly lower portion of Hungary-based investee firms (58% of respondents) was introduced to new investors, relative to the percentage of investee firms backed by USA-based venture capitalists (72% of respondents). This finding pointed to the overall lack of exit orientation of Hungary-based investors and poor exit performance of Hungary-based investee firms. The gap in the percentage of Hungary-based investee firms that was introduced to new investors by venture capitalists was significantly lower in government venture capital-backed sector, indicating that assistance processes in Hungary-based private venture capital-backed sector were somewhat comparable to those identified by Gompers et al. (2020).

A review of the academic literature identified that only one peer-reviewed study provided a comparative analysis of value-added activities of private and government venture capitalists in Europe. The study of Luukkonen et al. (2013) offers a comparative analysis of value-added activities of private and government venture capitalists across seven European countries: Belgium, Finland, France, Germany, Italy, Spain and the United Kingdom, based on the data collected from the survey administered to venture capital-backed firms.

The aforementioned study of Luukkonen et al. (2013) examined a number specific forms of assistance provided to early-stage investee firms by venture capitalists, highlighting that difference in value of some forms of assistance of private and government venture capitalists was statistically significant, yet without collecting a broad supporting evidence that private and government venture capitalists differed at a statistically significant level, across many activities of importance for strategy, professionalization and relational capital of investee firms. Similarly to the aforementioned study, but based on a different sample of investee firms, this study collected evidence that assistance provided by private and government venture capitalists to Hungary-based investee was different in specific and, yet, relevant forms of assistance, with potentially stark consequences on Hungary-based entrepreneurial sector. One of the advantages of this study is that, besides collecting information on the value of assistance of private and government venture capitalists, this study also collected information on the frequency of assistance, providing results about different patterns of interaction among investee firms and venture capitalists from a private and public sector in Hungary.

In Luukkonen et al. (2013), the statistically significant difference in assistance of private and government venture capitalists was identified in assistance in professionalization ($p<0.05$), including changing the management team ($p<0.05$) and finding new board members ($p<0.01$), as well as in assistance in exit ($p<0.05$), including finding new investors ($p<0.05$) and finding other forms of exit ($p<0.1$). Statistically significant difference in assistance of private and government venture capitalists was also identified in recruiting international board members ($p<0.1$). Even through conducted on a sample of Hungary-based investee firms, similarly to Luukkonen et al. (2013), the quantitative research identified statistically significant difference in the value of assistance of private and government venture capitalists in specific areas of professionalization and in executive recruitment.

A number of studies analysed the effectiveness of government venture capital by investigating performance of investee firms, in terms of productivity (Grilli & Murtinu, 2014; Alperovych et al., 2015), exit performance (Cumming & Johan, 2010; Cumming et al., 2017) patents, patent citations and innovation (Bertoni & Tykvová, 2015), often highlighting that value-created by government venture capitalists is lower, relative the value created by private venture capitalists. This quantitative research did not provide evidence that difference in assistance of private and government venture capitalists was across the board. The quantitative research outlined some stark differences in assistance provided by private and government venture capitalists to Hungary-based investee firms that could have significant consequences on investee firms' resources, capabilities and performance.

A number of studies found a complementarity between private and government venture capitalists (Maula et al., 2005; Grilli & Murtinu, 2011; Bertoni & Tykvová, 2015; Brander at al., 2015; Dahaj & Cozzarin, 2019). Other studies indicated that resources and capabilities of two types of investors were different to the extent that they were complementary (e.g.: Maula et al., 2005). The quantitative research did not aim to find evidence of a complementarity between private and government venture capitalists and its results should not be interpreted as an evidence of the complementary.

In the next Section, the research presents the results of the qualitative research, offering additional insights about differences between Hungary-based private and government sectors.

8.3 Qualitative Research

The qualitative research added an additional level of contextualization of the findings of the quantitative research, by providing additional insights about relevance of the processes of assistance of venture capitalists for Hungary-based investee firms and their anticipated and unanticipated consequences. A subsequently conducted follow-on qualitative element of this

study provided insights about implications of venture capitalist assistance for entrepreneurial processes and quality of Hungary-based investee firms and entrepreneurial sector.

The objective of semi-structured interviews with venture capitalists was to collect insights and ideas in two areas of inquiry:

i) Implications of assistance provided by venture capitalists to Hungary-based investee firms;

ii) Differences between Hungary-based private and government venture capital-backed investee firms.

8.3.1. Implications of Assistance

The assistance of venture capitalists is one of critical knowledge-sharing processes in an economy with a number of anticipated and unanticipated microeconomic and macroeconomic consequences. Within each of the following three general thematic areas, the qualitative research examined a number of specific implications of assistance for investee firms and entrepreneurial sector, in terms of:

i) strategy,

ii) organizational capabilities,

iii) relational capital

Interviewed respondents highlighted that processes of assistance and activities of venture capitalists were relevant for strategy, professionalization and relational capital of investee firms and their resources, capabilities and performance, but they also highlighted that relevance of assistance for qualities of firms was overestimated in academic literature. Three respondents indicated that post-investment value-added activities had lower importance for value creation, relative to project selection, confirming the results of the study of Gompers et

al. (2020). Yet, all interviewed venture capital managers indicated that they regularly provided assistance to their investee firms, as absence of assistance would have significantly increased business risk of their ventures.

All interviewed venture capital managers indicated that they provided strategic assistance to investee firms, 75% of interviewed venture capital managers indicated that their assistance had implications for organizational capabilities of investee firms, while all of interviewed venture capital managers indicated that they provided assistance in relational capital.

It was often highlighted during interviews that assistance of venture capitalists was more intensive in early-stage firms, relative to mature firms, given early-stage firms' dependence on external resources. Interviewed venture capital managers indicated that the involvement of venture capitalists in investee firms had a unique life-cycle, relative to private equity investors, as venture capitalists were likely to be more involved in investee firms in post-investment phase.

Three interviewed venture capital managers indicated that influencing decisions of investee firms required specific competences, which they acquired with experience. According to three interviewed venture capital managers, entrepreneurs often insisted on pursuing the course of action they considered relevant, ignoring the advises of venture capital managers. In such cases, assistance of venture capitalists resulted in high agency risks, despite its legitimate objectives.

Lastly, three interviewed venture capital managers indicated that the amount of investors that can be regarded as 'smart money' investors according to international standards was very limited in Hungary. During interviews, venture capital managers implied that the provision of assistance in Hungary had changed since the emergence of venture capital market

in Hungary, as general forms of assistance became more industry- and firm-specific. But widespread forms of assistance were still missing.

8.3.1.1. Implications of Strategic Assistance

8.3.1.1.1 Results

The subsequently conducted follow-on qualitative research collected country-specific data on a number of implications of strategic assistance provided by venture capitalists to Hungary-based investee firms. All interviewed venture capital managers indicated that they provided some form of strategic assistance to Hungary-based investee firms. The results of the qualitative research complemented the findings of the quantitative research, which indicated that strategic assistance of venture capitalists was one of the most frequent forms of assistance provided to Hungary-based investee firms.

Interviewed venture capital managers provided information by answering open-ended questions, indicating that the most frequent implication of strategic assistance provided to Hungary-based investee firms was a formulation of their new strategy (62.5% of respondents). Other prevalent implications were: international expansion (50% of respondents), product innovation (37.5% of respondents), new knowledge about customers (37.5% of respondents) and improved sales performance (37.5% of respondents). The collected results indicated that efforts of venture capitalists were focused on improving sales performance and on product innovation of Hungary-based investee firms.

Table 13: Qualitative research: Specific outcomes of strategic assistance identified by venture capitalists (percentage of respondents)

Total percentage of respondents that identified specific outcomes	100.0%
New strategy	62.5%
Strategic planning	12.5%
New knowledge about consumers (preferences, needs and budget)	37.5%
Larger market	25.0%
Capability to compete	25.0%
Product innovation	37.5%
Unique products and value propositions	12.5%
Faster market penetration	25.0%
International expansion	50.0%
Reduced strategic uncertainty and business risk	12.5%
Improved sales performance	37.5%
Acquisitions	12.5%

The results of the qualitative research highlighted that strategic assistance efforts of venture capitalists were focused on making tangible results in product - market dimension. The results of the qualitative research complemented the findings of the quantitative research that one of key contributions of venture capitalists to Hungary-based investee firms was in product - market dimension.

The respondents did not indicate that their assistance resulted in investee firms improving their competitiveness or gaining a competitive position on domestic or international market and the results were supportive of the findings of the quantitative research, indicating that a less frequent outcome of strategic assistance of venture capitalists occurred in capabilities of investee firms to compete.

Interviewed venture capital managers did not indicate that their strategic assistance had specific implications for the entrepreneurial sector. The data collected by qualitative research suggested that strategic assistance of venture capitalists had specific firm-level implications.

8.3.1.1.2 Discussion

The subsequently conducted follow-on qualitative research collected the data, which supported the assumption that venture capitalists contributed to business strategies of investee firms. All interviewed venture capital managers indicated that their strategic assistance had

specific positive outcomes, yet, two interviewed venture capital managers identified cases, where their strategic assistance did not produce positive outcomes.

Some venture capital managers were more optimistic about their capabilities to contribute to business strategies of investee firms than others. Interviewed venture capital managers offered different ideas about the efficient structure of strategic assistance. Two venture capital managers indicated that, in their experience, serving as a sounding board for strategic ideas, strategic initiatives and taking a role of mentors was more likely to produce positive outcomes, than directing entrepreneurs to pursue specific actions.

To support their statements about positive outcomes of their strategic assistance, interviewed venture capital managers shared several case-studies.

Several interviewed venture capital managers indicated that they assisted Hungary-based investee firms in entering international markets. Yet, they did not highlight that their assistance resulted in investee firms gaining competitiveness on the international market. Venture capital managers indicated that Hungary-based investee firms struggled to maintain their competitive position against competitors from neighbouring countries with smaller venture capital markets.

One respondent recollected that his insight into medical device market led an investee firm to design a new product for a niche market with high profitability margins, by leveraging its existing technology in a design of an innovative medical device, thus reducing its exposure to the risks of competing in a highly competitive narrow-margin market.

One interviewed venture capital manager recollected how his knowledge of the market and needs of customers shaped the business model of an e-invoicing solution provider, to become one of the market leaders in B2B e-invoicing, from its initial strategy to offer services to consumers, where investee firm competed in a highly competitive market. This venture

capital manager added value to the investee firm by his knowledge of the processes of large customers, in terms of their rigidity and design. Another respondent indicated that his understanding of customer demands in urban mobility market resulted in significant product innovation and design of an innovative product. These two venture capital mangers contributed to understanding how external information about customers could be a critical form of knowledge for product innovation at investee firms.

However, few respondents also indicated that some of their assistance did not produce positive outcomes. One respondent pointed out that his continuous efforts to position an investee firm's new product on the international market did not result in improved financial performance, until the firm started to focus on its core product and competences. Five interviewed venture capital managers highlighted that there was a fine line between providing valuable assistance to investee firms and providing too much assistance, where venture capital managers found themselves in taking the role of entrepreneurs.

According to one venture capital manager, a particularly challenging form of venture capitalist assistance is a strategic assistance, as entrepreneurs often insist on pursuing an envisioned strategy. Strategic assistance of venture capitalists can therefore lead to high agency risks and dispute. Yet, the findings of the qualitative research indicate that a new strategy was among the most frequent outcomes of strategic assistance provided by venture capitalists.

Two interviewed venture capital managers indicated that a more efficient area of assistance of venture capitalists was the assistance in professionalization of investee firms.

8.3.1.2. Implications for Professionalization of Firms

8.3.1.2.1 Results

The follow-on qualitative research presented the results collected from venture capital managers about implications of assistance in professionalization provided to Hungary-based

investee firms. This form of assistance of venture capitalists has an important role in development of organizational capabilities of investee firms and competences of entrepreneurs. 75% of interviewed venture capital managers indicated that they provided some form of assistance in professionalization to Hungary-based investee firms.

Interviewed venture capital managers identified a number of specific implications of assistance for development of organizational capabilities of investee firms by answering open-ended questions. Yet, many areas in professionalization were scarcely addressed by venture capitalists during interviews, confirming the results of the quantitative research that assistance provided to Hungary-based investee firms in development of organizational capabilities was limited to specific areas of professionalization.

Table 14: Qualitative research: Specific outcomes of assistance in professionalization identified by venture capitalists (percentage of respondents)

Total percentage of respondents that identified specific outcomes	75.0%
New organizational capabilities	37.5%
New competences and skills (of individuals)	37.5%
Process innovation	25.0%
Process planning	12.5%
Productivity and efficiency	37.5%
Knowledge-sharing process and combinative capabilities	12.5%
Joint-activities with the third-parties	25.0%
Information governance and production of operating records	25.0%
Performance monitoring and performance control	12.5%
Transparency of operations	25.0%
Compliance	12.5%
Scalability	12.5%

The results of the qualitative research indicate that the most frequent implications of assistance in professionalization were development of new organizational capabilities (37.5% of respondents), competences and skills in entrepreneurs (37.5% of respondents) and improved productivity and efficiency (37.5% of respondents). Other prevalent implications were: process

innovation (25% of respondents), joint-activities with the third parties (25% of respondents), improved information governance and production of operating records (25% of respondents) and improved transparency (25% of respondents).

The results of the qualitative research highlighted that assistance in professionalization was focused on certain areas of professionalization, providing an empirical support to the findings of the quantitative research.

Interviewed venture capital managers did not identify specific macroeconomic implications of their assistance for professionalization of firms.

8.3.1.2.2 Discussion

The results of the follow-on quantitative research indicated that venture capitalists provided limited assistance to Hungary-based investee firms in development of organizational capabilities (process innovation) and assisted a limited number of Hungary-based investee firms in joint activities. The quantitative results suggested that investee firms had a limited access to external sources of tacit knowledge and dynamic capabilities.

The results of subsequently conducted follow-on qualitative research complemented the findings of the quantitative research. Those venture capital managers that indicated that they provided some form of assistance in professionalization highlighted that Hungary-based early-stage firms had rudimentary processes and lacked managerial competences. To support their statements, they shared several case-studies.

Two interviewed venture capital managers highlighted that, by participating in joint activities with the third parties, investee firms developed organizational capabilities for exchange of knowledge and collaboration. One of interviewed venture capital managers recollected that roadshows he organized in the USA were the source of such exchange. One interviewed venture capital manager indicated that convincing several fashion brands to come

together for a pop-up store at an exclusive location gave them new organizational capabilities, improving their competitiveness through collaboration and learning. This respondent pointed to a difficulty in convincing investee firms that joint activities with competitors were potential source of benefits. Academic scholarship similarly indicated that absence of joint activities of investee firms impeded their fast time-to-market.

Scholarly literature indicated that professionalization of early-stage investee firms mitigated their risks and improved their productivity and economic performance. Joint activities with third-parties are opportunities for efficient and fast development of capabilities, allowing firms to acquire know-how, routines and dynamic capabilities. Despite a number of benefits of joint activities, the results of this study did not find evidence that this form of assistance of venture capitalists was widespread in Hungary.

One interviewed venture capital manager was pessimistic about the effectiveness of assistance in professionalization. In his experience, assistance in professionalization required that an investee firm hired an external executive to lead an initiative in process innovation. External executives, in his experience, enhanced an agency risk, as were often hired against the will of founders. The experience of this venture capital manager indicated that assistance in development of organizational capabilities (process innovation) had boundaries, and that it could not accelerate the evolutionary pattern of investee firms' development.

One of interviewed venture capital managers explained that for entrepreneurs it was often challenging to develop complex reporting and information governance processes. Moreover, in his experience, entrepreneurs often did not recognize the benefits of reporting processes for development of organizational capabilities. Two interviewed venture capital managers indicated that reporting processes improved transparency and operational reporting of investee firms, reducing their information asymmetry and transaction costs, when investee firms entered into commercial and capital transactions. The results of the quantitative research

indicated that entrepreneurs recognized the value of assistance provided by venture capitalists in financial management and technology management.

One of interviewed venture capital managers indicated that public policy never aimed at developing individual competences, as stakeholders had a view that competences could be contracted on the market. According to this venture capital manager, rapid expansion of venture capital market in the years after the global financial recession was not paralleled by a comparable development of competences on Hungarian market. This venture capital manager concluded that public policy displaced competences on Hungarian market since the global financial recession, reducing the competitiveness of country's entrepreneurial sector.

Absence of entrepreneurial capabilities and skills on Hungarian market was recognized by academic scholarship examining qualities of Hungarian entrepreneurial sector. This study contributed new evidence from venture capital market about processes of assistance in development of organizational capabilities of Hungary-based early-stage firms.

8.3.1.3. Implications for Relational Capital

8.3.1.3.1 Results

During a subsequent follow-on qualitative research, venture capital managers indicated what specific roles their networks had in development of Hungary-based investee firms. The scholarship highlighted that networks of venture capitalists were valuable sources of commercial and labour contracts, commercial and strategic partnerships and capital transactions for investee firms.

All interviewed venture capital managers indicated that their networks were the source of transactions of Hungary-based investee firms. Interviewed venture capital managers identified a number of implications of assistance in relational capital for development of investee firms. Yet, many possible implications of networks for investee firms were scarcely

addressed during interviews, supporting the results of the quantitative research that venture capitalists provided moderate assistance to Hungary-based investee firms in their transactions.

Table 15: Qualitative research: Specific outcomes of assistance in relational capital identified by venture capitalists (percentage of respondents)

Total percentage of respondents that identified specific outcomes	100.0%
New customer contracts	75.0%
Improved economic performance	37.5%
New supplier contracts	37.5%
New labor contracts, executive contracts	37.5%
New partnerships	12.5%
New collaboration	12.5%
New VC investment	62.5%
Corporate investment	12.5%
Improved exit performance	12.5%
Access to credit market	25.0%
Access to new organizational capabilities	12.5%

The results of the qualitative research indicated that the most frequent role of networks of venture capitalists was in assisting transactions with customer contracts (75% of respondents) and venture capitalists (62.5% of respondents). Other prevalent implications were improved performance (37.5% of respondents), new supplier contracts (37.5% of respondents) and new labour and executive contracts (37.5% of respondents).

8.3.1.3.2 Discussion

The academic scholarship has indicated that quality of networks of venture capitalists was highly correlated with their investment performance, as well as with the economic performance of their investee firms.

The results of the quantitative research indicated that venture capitalists provided assistance to Hungary-based investee firms in customer, supplier and labour contracts and transactions with the providers of capital and credit. According to the findings of the quantitative research, the networks of venture capitalists were high-quality source of potential

customers, suppliers and senior executives of Hungary-based investee firms. The quantitative research also indicated that the mentioned assistance was provided to a moderate number of Hungary-based investee firms.

The results of subsequently conducted follow-on qualitative research complemented the mentioned findings of the quantitative research and findings of other studies in this scholarship (e.g.: Gorman & Sahlman, 1989; Bygrave & Timmons, 1992; Maula et al., 2005). During interviews, venture capital managers identified their networks as an infrastructure for investee firms to enter into timely, reliable and valuable transactions. The results of subsequently conducted qualitative research pointed to a limited assistance provided to Hungary-based investee firms in strategic and commercial partnerships, confirming the results of the quantitative research.

One of interviewed venture capital managers recollected that connecting an investee firm with a commercial bank and a utility provider resulted in new KYC verification product designed by the investee firm for their consumers. The interviewed venture capital manager pointed out that his reputation in business relationships improved the investee firm's time-to-market and give it unparalleled competitive advantage.

One interviewed venture capital manager recollected that his USA-based contacts were valuable customers of his investee firm from big data industry, validating the investee firm on a large market for big data services. Other interviewed venture capital manager explained that he actively worked on expanding his network of contacts on the German market, where his Hungary-based investee firms from fashion industry needed supplier and buyer contracts.

Interviewed venture capital managers indicated that their relational capital was limited to specific sectors and geographical regions, where they were particularly active. Being able to provide a relational capital meant that venture capitalists knew how lobby and reach to industry

players, associations and legislators. Outside of targeted sectors and geographical regions, venture capitalists can only provide a limited assistance to investee firms.

The activity of introducing investee firms to prospective customers and suppliers is a tangible and result-orientated activity. The empirical data collected by this study indicated that commercial and labour contracts were one of the most efficient forms of contributions of venture capitalists to Hungary-based investee firms. Mentioned experiences of venture capitalists highlighted the role of international networks in the growth of firms with validated products and services. Investee firms backed by investors with international networks enjoyed the advantages of access to potential customers and suppliers from international markets, which can accelerate internationalization and cross-border expansion.

Among interviewed respondents, one venture capital manager indicated that he assisted a Hungary-based investee firm in a commercial partnership, which offered an entry into specific market.

Several venture capital managers indicated that trust, credibility and reputation in business relationships of venture capitalists increased the likelihood of positive outcomes for investee firms. Venture capital managers, furthermore, indicated that reputation of venture capitalists had important role in transactions with providers of capital and credit. It was indicated during interviews that networks of venture capitalists were the source of exits. Venture capital managers also indicated that that their networks had evolved according to their exit strategy, providing their investee firms with access to reliable contacts on the capital and credit market.

Three interviewed venture capitalists agreed that Hungary-based labs and incubators were not effective in creating high-quality early-stage ventures. However, they agreed that labs and incubators provided investee firms with valuable customer and supplier contacts.

8.3.2. Differences between Private and Government Sectors

8.3.2.1 Results

During subsequently conducted interviews, venture capital managers identified a wide range of implications of policy-driven expansion of government venture capital finance of relevance for Hungary-based private and government venture capital-backed firms and entrepreneurial sector. The implications of policy-driven expansion of government venture capital finance were grouped ex-post, during the coding of qualitative research, into three broad categories:

i) differences in strategy, organizational capabilities and relational capital of Hungary-based private and government venture capital-backed firms,

ii) structural outcomes,

iii) differences between private and government venture capitalists active in Hungary.

During the subsequent follow-on qualitative research, venture capital managers identified differences between private and government venture capital-backed firms. The quantitative research did not analyse the quality of Hungary-based venture capital-backed sector. Yet, the conclusion could be inferred from its empirical results that Hungary-based private venture capital-backed firms were superior in innovation, competitiveness, organizational capabilities, complementary assets and human resource, suggesting that economic and exit performance of Hungary-based private venture capital-backed firms was superior, relative to the economic and exit performance of government venture capital-backed firms. The objective of subsequently conducted follow-on qualitative research was to provide an additional level of contextualization of the results of the quantitative research, offering additional insights about differences between Hungary-based private and government venture

capital-backed sectors, as well as new context for examining the post-investment processes of assistance of venture capitalists.

The coding of the results of the qualitative research was done in relation to some of the variables used in the quantitative research, given that subsequently conducted qualitative research was conducted with pre-established categories, yet with an objective of producing new information and insights that could have emerged during interviews with venture capitalists.

Table 16: Qualitative research: Percentage of venture capitalists identifying specific differences in strategy, organizational capabilities and relational capital of Hungary-based private and government venture capital-backed firms

Total percentage of respondents that identified differences in strategy	62.5%
Capability to compete, competitiveness	12.5%
Product innovation	12.5%
Innovativeness	25.0%
Validation of products and services	12.5%
Sales performance	37.5%
Total percentage of respondents that identified differences in organizational capabiliies	62.5%
Organizational capabilities (processes)	25.0%
Process innovation	25.0%
Competences and skills (of individuals)	50.0%
Transparency	12.5%
Exit performance	37.5%
Capital market attractiveness	50.0%
Access to venture capital market	25.0%
Total percentage of respondents that identified differences in relational capital	37.5%
Customer contracts	25.0%
Labor, executive contracts	12.5%
Venture capital market contacts	12.5%

All interviewed venture capital managers identified some differences in strategy, organizational capabilities and relational capital of Hungary-based private and government venture capital-backed firms. The results of the qualitative research indicated that prevalent

differences between Hungary-based private and government venture capital-backed firms are in competences and skills of individuals (50% of respondents), capital market attractiveness (50% of respondents), sales performance (37.5% of respondents) and exit performance (37.5% of respondents).

During interviews, venture capital managers identified a number of structural implications of policy-driven expansion of government venture capital finance of relevance for Hungary-based private and government venture capital-backed firms.

Table 17: Qualitative research: Specific structural outcomes identified by venture capitalists (percentage of respondents)

Total percentage of respondents that identified structural outcomes	100.0%
Crowding-out of venture capital financing	62.5%
Additionality	75.0%
Complementarity between private and government venture capital	12.5%
Unattractive venture capital market structure	37.5%
Displacement of entrepreneurial processes	50.0%
Agglomeration of low-quality firms	50.0%
Decreasing competitiveness of domestic entrepreneurial sector	37.5%
Unattractive domestic entrepreneurial sector	25.0%
Positive externalities	12.5%
Negative externalities	37.5%
Competition between private and government venture capitalists	37.5%
Scarcity of competencies, skill shortage	12.5%
Economic growth	37.5%

All interviewed venture capital managers indicated that policy-driven expansion of government venture capital finance had structural outcomes of relevance for Hungary-based private and government venture capital-backed firms. The highest percentage of respondents indicated that policy-driven expansion of government venture capital finance resulted in higher levels of financing per investee firm (75% of respondents), crowding-out of private venture capital (62.5% of respondents), displacement of entrepreneurial processes (50% of respondents) and decreasing competitiveness of domestic entrepreneurial sector (50% of respondents).

Lastly, during interviews, venture capital managers identified a large number of differences between private and government venture capitalists active in Hungary of relevance for Hungary-based private and government venture capital-backed firms.

Table 18: Qualitative research: Specific differences between private and government venture capitalists identified by venture capitalists (percentage of respondents)

Total percentage of respondents that identified differences between private and government venture capitalists	100.0%
Investment performance	37.5%
Financial returns	62.5%
Investment strategy	37.5%
Restrictions on investment decisions	25.0%
Size of investments	12.5%
Exit strategy	25.0%
Exit performance	25.0%
Agency costs	12.5%
Project selection process	37.5%
Riskiness of projects	37.5%
Quality of investee firms	75.0%
Innovativeness of investee firms	25.0%
Treatment effect on investee firms	25.0%
Assistance provided to investee firms	62.5%
Positive externalities	12.5%
Incentives and compensation schemes	25.0%
Number of investee firms per venture capital manager	37.5%
Organization of resources, capabilities and competences	50.0%
Business experience	37.5%
Reputation	37.5%
Organizational structure of venture capitalists	37.5%

The highest percentage of respondents indicated that differences were quality of investee firms in portfolio (75% of respondents), post-investment assistance provided to investee firms (62.5% of respondents), financial returns (62.5% of respondents) and organization of resources, capabilities and competences (50% of respondents).

The results of the quantitative research pointed to a significant differences between private and government venture capitalists in the value and frequency of various forms of post-

investment assistance provided to Hungary-based investee firms. The quantitative research revealed a statistically significant difference between private and government venture capitalists in assistance in customers, competitors, financial management, technology management, activities with suppliers and recruitment of senior executives. In a number of other areas of assistance, a difference between private and government venture capitalists was significant, yet below the examined threshold. The results of subsequently conducted follow-on qualitative research provided new insights about entrepreneurial processes in Hungary needed for interpreting the mentioned results.

8.3.2.2 Discussion

The results of the subsequent qualitative research indicated that difference in qualities of Hungary-based private and government venture capital-backed firms were already apparent during pre-investment phase and they were further emphasized by different treatment effect of private and government venture capital finance. The results of the qualitative research revealed that different treatment effect of private and government venture capital finance during post-investment phase had significant implications for value creation.

Interviewed venture capital managers were generally supportive of government venture capital for providing finance to firms with specific qualities, in terms of life-cycle, industry and location, which were systematically unattractive to private venture capitalists. But they indicated that activities of government venture capitalists in Hungary were not limited to fixing financing gaps, thus producing a number of negative externalities. The results of this study did not indicate that expansion of government venture capital finance improved market failures of Hungarian entrepreneurial sector, examined by academic scholarship, such as absence of entrepreneurial capabilities and skills on Hungarian market.

During interviews, several venture capital managers described the evolution of private and government venture capital finance in Hungary. It was indicated that government venture

capitalists appeared in Hungary in response to the global financial crisis and shirking of the credit market. Initially, venture capital industry was flooded with managers from the financial sector, which was affected by the economic shock. Only later did the venture capital sector realize that nonfinancial business experience was more important than financial experience in venture capital finance. In the coming years, demand for venture capital managers with a blend of business experience, skills and competences significantly grew as venture capital industry gradually evolved. Several venture capital managers indicated that initial venture capital policy in Hungary had in its design the lack of knowledge about processes and competences needed in venture capital finance.

In their first years after the global financial crisis, Hungary-based government venture capitalists were considered by the market as financial investors. According to an interviewed venture capital manager involved in incorporation of one of Hungary-based government venture capitalists, initially the quality of government venture capital-backed investee firms was high, as investee firms were funded by financial instruments tailored to specific needs and business plans of companies, in terms of internationalization and market penetration.

Significant differences between private and government venture capitalists started to emerge upon government venture capital finance entering the market of early-stage ventures, which required experience and competences that government sector could not have successfully ensured. Government venture capitalists provided limited post-investment assistance to investee firms, which had inferior qualities relative to the assistance provided by private venture capitalists, according to interviewed venture capitalists.

Hungarian entrepreneurial policy took a sharp turn in 2016, triggering the oversupply of early-stage entrepreneurial finance on the Hungarian market. A venture capitalist, who was involved in the policy decisions leading to the rapid expansion of government venture capital finance described at length how the sharp turn in entrepreneurial policy occurred, through

restructuring of one of two Hungary-based government venture capitalists, at the time known as Corvinus Kockázati Tőkealap-kezelő Zrt. into Hiventures Zrt., a subsidiary of Hungarian Development Bank (Magyar Fejlesztési Bank Zrt). The information collected during interviews suggests that sudden policy shift had an ideological objective to nationalize Hungarian entrepreneurial sector and displace entrepreneurial processes in Hungary. Namely, the conservative Hungarian government feared the emergence of powerful innovative firms, such was, according to one interviewed respondent, a Hungary-based unicorn 'Prezi', which could have had an infrastructural role in the evolution of entrepreneurial sector in Hungary, promoting values that contradicted political doctrine and interests of the elected conservative government. According to interviewed venture capital managers, Hungarian government embarked on expanding venture capital finance beyond market demand, in order to displace private funding, displacing, as a result, entrepreneurial processes in Hungary. To justify their statements that new entrepreneurial policy had ideological objectives, venture capitalists offered several explanations, such as extremely poor exit performance of government venture capital-backed investee firms and lack of business orientation at Hiventures Zrt.

Few other interviewed venture capital managers joined in support of the aforementioned claims. They indicated that restructuring of Hiventures Zrt. was carried out by stakeholders, who had no knowledge or experience in venture capital industry, but had ideological objectives. During the restructuring process, an experienced management of Corvinus Kockázati Tőkealap-kezelő Zrt. was replaced by a new talent with experience in consulting, compliance and risk management.

All interviewed venture capital managers highlighted that rapid expansion of government venture capital finance that took place since 2016 led to additionality. But venture capital managers had diverging views, whether the rapid expansion of government venture capital finance was productive in improving qualities of Hungarian investee firms. It occurred

to an interviewed venture capitalist that neighbouring countries with significantly smaller venture capital market had a talent of higher quality, relative to Hungary. Interviewed venture capitalists agreed that oversupply of venture capital led to inflated expectations of Hungary-based entrepreneurs. Prevalence of uncompetitive entrepreneurial talent in Hungary they attributed to the evolutionary development of domestic venture capital market, which provided large amount of funding to entrepreneurs, relative to neighbouring countries. The availability of capital was, therefore, counterproductive in creating a long-term competitive entrepreneurial sector in Hungary and, instead, led to displacement of entrepreneurial processes, as uncompetitive investee firms were kept liquid by excessive supply of venture capital, resulting in declining quality of Hungarian entrepreneurial sector.

One interviewed venture capital manager offered a support to aforementioned claims, indicating that Hungarian entrepreneurial policy had been driven by the objective of generating short-term economic benefits, rather than improving long-term competitiveness of domestic entrepreneurial sector. An interviewed venture capital manager from one of government venture capitalists confirmed the 'economic objective' claim, claiming that his activities were a policy tool for achieving economic objectives. Several venture capital managers indicated that rapid expansion of government venture capital-backed sector made a positive contribution to the economic growth of Hungary. Yet, respondents also indicated that the expansion of government venture capital finance created demand for talent and competences that Hungarian market could not have supplied.

Venture capital managers, who indicated that rapid expansion of government venture capital finance displaced entrepreneurial processes, also agreed that rapid expansion of government venture capital reduced the attractiveness of domestic entrepreneurial sector for private investors. Yet, they had diverging views, whether rapid the expansion of government venture capital finance resulted in crowding-out of private investment. A large portion of

interviewed venture capitalists indicated that crowding-out of private venture capital occurred as a result of government actions. One interviewed private venture capital manager highlighted that he did not anticipate that crowding-out of private investment would take place, as government venture capital had been a complementary source of finance in Hungary. His views were validated by another interviewed venture capitalist, who claimed that government venture capitalists selected low-risk projects and required lower returns, relative to private venture capitalists that had substantially higher risk appetite.

The majority of interviewed venture capital managers indicated that investment strategy of private and government venture capitalists was different. In discussing the investment strategy of government venture capitalists, two venture capital managers highlighted that government venture capitalists selected low-risk early-stage projects. One of the interviewed venture capitalists indicated that, to his knowledge, government venture capitalists did not invest in Hungary-based 'first movers' and 'unicorns', but projects that could be evaluated based on validated case-studies. The collected information provided a context for understanding the significant difference between private and government venture capitalists in many forms of their post-investment assistance.

Yet, these claims also acknowledged that government venture capitalists were not an effective policy response for supporting innovative firms in Hungary. The empirical data collected by both quantitative and qualitative research provided empirical support to the findings of reviewed academic literature about innovativeness of government venture capital-backed sector in other countries (Leleux & Surlemont, 2003; Bertoni & Tykvová, 2015). Yet, due to the size of government venture capital-backed sector in Hungary, the scale of negative consequences for Hungarian entrepreneurial sector could be significant.

The interviews proceeded to highlight critical differences in the organization of resources and capabilities in private and government venture capitalists and implications of

expansion of government venture capital finance for Hungary-based investee firms. One interviewed venture capital manager highlighted that organizational structure and processes within government venture capitalists were typical of financial institutions, while their project selection processes resembled credit risk evaluation processes. According to two venture capitalists, the peculiar design of pre-investment project selection process at Hungary-based government venture capitalists was one of the key reasons why private venture capitalists did not syndicate with government venture capitalists in Hungary.

One interviewed venture capital manager highlighted that Hungarian government venture capitalists were paradoxical organizations, since they managed a large amount of funds, yet making investment decisions that were constrained by strict policies and bureaucratic processes. Other interviewed respondent indicated that process innovation in Hungarian government venture capitalists focused on design of processes for compliance and monitoring, instead of processes for pre-investment decision making, suited to specific policy objectives.

It was indicated that Hungary-based government venture capitalists lacked organizational flexibility of private venture capitalists and flexibility in dealing with each new project. Several interviewed venture capital managers agreed that, in absence of bureaucratic processes and policy constrains, private venture capitalists offered better investment terms to entrepreneurs, despite offering less capital, thus attracting higher quality ideas relative to government venture capitalists. For instance, they offer entrepreneurs terms that motivated entrepreneurs, such as a high stake in investee firms, instead of seeking collaterals and guarantees.

All interviewed venture capital managers suggested that organizational structure of government venture capitalists and their organization of resources and capabilities had implications for their investee firms. Several interviewed venture capital managers agreed that project selection processes at government venture capitalists were designed to produce high

number of investment decisions, without substantial analysis of the quality of projects. In absence of rigid processes and pressures to select a large number of projects, private venture capitalists had more flexibility to respond to specific needs of Hungary-based investee firms.

Three interviewed venture capital managers indicated that a Hungary-based government venture capital manager had more than 20 investee firms in his portfolio to monitor, while two other interviewed venture capital managers indicated that private venture capital mangers monitored less than 10 investee firms per manager. The collected information indicated that government venture capitalists were less efficient in post-investment monitoring of Hungary-based investee firms, relative to private venture capitalists and they lacked sufficient human resource and efficient processes to monitor high number of firms, which, as a result, meant that government venture capital managers were not aware of the needs of their investee firms. The mentioned information collected during interviews, provided a context for understanding the significant difference between private and government venture capitalists in many forms of their post-investment assistance.

All interviewed venture capital managers pointed to the business experience gap between private and government venture capital managers. The results collected by qualitative research provided empirical support to the findings of other studies, indicating that government sector was unattractive to experienced managers. The results of the quantitative research pointed to significant differences in the quality of networks of private and government venture capitalists for recruiting senior executives from business sectors. It appeared from the results of the qualitative research that government venture capitalists had limited access to the labour market of senior executives from business sectors. All interviewed venture capital managers highlighted that business experience gap between private and government venture capital managers had direct implications for the gap in capabilities of investee firms.

Two interviewed venture capital managers indicated that business experience gap had implications for both pre-investment selection processes and post-investment value-added activities of government venture capitalists. Venture capital managers offered several further insights about implications of the experience gap. One venture capital manager indicated that absence of business experience resulted in lack of understanding of investee firms' strategy and inefficiency in providing needed assistance. It therefore had implications for investee firms' sales and economic performance. One interviewed respondent indicated that private venture capitalists were more likely to assist investee firms in development of capabilities, due to pressures to realize financial returns and successful exit. The lack of assistance of government venture capitalists had implications for government venture-capital-backed firms' transparency, valuation and exit-performance. These results offered empirical support to the findings of the quantitative research that assistance of government venture capitalists in professionalization of Hungary-based investee firms was inferior, suggesting a range of possible negative consequences for government venture capital-backed sector.

Two interviewed venture capital managers highlighted that there were differences in exit strategy of private and government venture capitalists that complemented the findings of the quantitative research. The academic literature indicated that exit strategies of private and government venture capitalists were different. One respondent indicated that management buy-outs were the most frequent forms of exits of government venture capitalists. The scholarship identified only few instances where the policy of expanding early-stage entrepreneurial finance was successful in improving the capital market attractiveness and exit performance of firms (e.g.: Cumming, 2007; Howell, 2017).

The follow-on quantitative research identified that categories of private and government venture capitalists were different in exit strategy, with implications for exit performance of investee firms. The quantitative research showed that government venture capitalists introduced

fewer prospective venture capital investors to a high number of investee firms, relative to private venture capitalists, who pursued efficient matching of investee firms and prospective venture capital investors.

Interviewed venture capital managers indicated that difference between private and government venture capitalists was in their reputation. Two venture capitalists indicated that legitimation offered by private venture capital was higher, relative to the government venture capital's validation of investee firms. The mentioned information collected during interviews, provided a context for understanding why government venture capitalists introduced their investee firms to prospective investors with high frequency. Due to government venture capital's inferior validation, the process of matching between prospective investors and government venture capital-backed investee firms appeared to be random.

CHAPTER 9: CONCLUSION

This study presented evidence on the role of venture capital finance in entrepreneurial processes and development of resources and capabilities of Hungary-based investee firms from management and public policy perspectives.

This study was the first academic attempt to collect the data and examine the value of assistance provided by venture capitalists to Hungary-based investee firms. The results of this study indicated that venture capitalists were an important source of external knowledge for Hungary-based early-stage firms. The processes of post-investment assistance are important knowledge-sharing processes in economy, since they entail efficient and timely transfer of valuable information among market participants, with implications for innovativeness, time-to-market, competitive advantage, competitiveness and performance of early-stage firms.

An important aspect of this study is its blended research methodology, applying both an initial quantitative and a follow-on qualitative investigation of processes of post-investment assistance of venture capitalists and their implications. This blended research approach added robustness to this study and its conclusions. A subsequently conducted follow-on qualitative research provided an additional understanding of the results of the quantitative research and new insights about entrepreneurial processes in Hungary, as well as new context for examining the processes of post-investment assistance of venture capitalists and their implications.

With regard to public policy considerations, the quantitative research offered a comparative analysis of assistance provided by private and government venture capitalists to Hungary-based investee firms. This study indicated that differences in qualities of Hungary-based private and government venture capital-backed firms were emphasized by a different treatment effect of private and government venture capital finance.

The evolution of Hungarian venture capital market has had a unique, discontinuous and, at times, volatile trajectory. The most recent policy shift in Hungary, which triggered the oversupply of government venture capital finance since 2016, was sharply in contrast to the 'market principle' that played a central role in the policies stimulating the expansion of Hungarian entrepreneurial sector in the aftermath of the global financial recession. By 2020, the relative size of Hungary-based government venture capital-backed sector became one of the largest in Europe.

This study indicated that there were many anticipated and unanticipated economic and societal consequences of expansion of government venture capital in Hungary that required further research. The collected data indicated that the expansion of government venture capital finance had a number of negative outcomes, led to displacement of entrepreneurial processes and was ineffective in supporting innovative firms. Activities of Hungary-based government venture capitalists were not limited to fixing financing gaps and providing finance to firms with specific qualities, in terms of life-cycle, industry and location, which were systematically unattractive to private venture capitalists. Instead, government venture capital was oversupplied, inflating the expectations of entrepreneurs, while its availability was counterproductive in improving competitiveness of entrepreneurial sector in Hungary.

The collected data suggested that further expansion of government venture capital could enhance already prevalent market failures of Hungarian entrepreneurial sector. The unattractive structure of Hungarian venture capital market and further expansion government venture capital-backed entrepreneurial sector would turn government into the venture capitalist of last resort.

The study highlighted the complexity of organizing resources for early-stage firms, where management perspectives and a private sector business experience had a critical role. Government venture capital sector was characterized by a limited access to the labour market

of experienced talent and inefficient processes. The collected information indicated that government venture capitalists were less efficient in post-investment monitoring of Hungary-based investee firms, relative to private venture capitalists, due to lacking a sufficient number of experienced managers and efficient processes to monitor and assist high number of investee firms, which they were committed to invest in, by the policy directive.

The results of this study contributed to the scholarship by indicating that ownership and governance structure of venture capitalists was their relevant quality. The empirical data collected by this study indicated that policy-driven allocation of government sources to the 'hybrid funds' managed by private venture capitalists (e.g.: 'Jeremie' venture capitalists, 'EIF' funded private venture capitalists) and policy-driven expansion of government venture capital financing where government was *the venture capitalist* had different long-term outcomes in Hungary for innovation, productivity and competitiveness of its entrepreneurial sector.

ABBREVIATIONS

CAGR	Compound annual growth rate
CEE	Central and Eastern Europe
EIF	European Investment Fund
ERDF	European Regional Development Fund
EU	European Union
HUF	Hungarian forint
Jeremie	Joint European Resources for Micro to Medium Enterprises
R&D	Research & development
USA	United States of America

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APPENDIX 1: SURVEY QUESTIONS

I. FIRM VARIABLES

1. When did your firm receive the first round of funding from the investor?

Year

2. Please chose one of the three statements below that best describes your latest stage of development!

1. Our product is still under development and testing. We do not have a stable amount of users / early adopters.
2. We have completed all product testing. Our product has a stable amount of users and is ready for the international and/or domestic market.
3. We have high monthly growth in the number of domestic and international users from all distribution channels.

3. Please chose the industry that best describes your firm!

1. agriculture, 2. biotech and healthcare, 3. business products and services, 4. chemicals and materials, 5. construction, 6. consumer goods and services, 7. energy and environment, 8. financial and insurance activities, 9. ICT (Information and communication technology), 10. other, 11. real estate, 12. transportation

4. Are you one of the founders of the business?

Yes / No

II. FREUQENCY AND VALUE OF BUSINESS INFORMATION

1.

i) In the last one year, approximately <u>how many times</u> has the investor directly advised you or shared his opinion on financial management (e.g.: financial plan, cash flow, working capital, cost control etc.)? (*If never, please leave 'never'*)

1. Never, 2. 1 occasion, 3. 2 occasions, 4. 3 occasions, 5. 4 occasions, 6. 5 occasions, 7. between 6 and 10 occasions and, 8. more than 10 occasions.

ii) On the 5-point scale, how would you rate the <u>added value</u> of his advice and opinion?

1. Extremely valuable, 2. very valuable, 3. somewhat valuable, 4. not so valuable and 5. not valuable et all

2.

i) In the last one year, approximately <u>how many times</u> has the investor directly advised you or shared his opinion on your firm's customers? (*If never, please leave 'never'*)

1. Never, 2. 1 occasion, 3. 2 occasions, 4. 3 occasions, 5. 4 occasions, 6. 5 occasions, 7. between 6 and 10 occasions and, 8. more than 10 occasions.

ii) On the 5-point scale, how would you rate the <u>added value</u> of his advice and opinion?

1. Extremely valuable, 2. very valuable, 3. somewhat valuable, 4. not so valuable and 5. not valuable et all

3.

i) In the last one year, approximately <u>how many times</u> has the investor directly advised you or shared his opinion on the needs and demands of your firm's customers? (*If never, please leave 'never'*)

1. Never, 2. 1 occasion, 3. 2 occasions, 4. 3 occasions, 5. 4 occasions, 6. 5 occasions, 7. between 6 and 10 occasions and, 8. more than 10 occasions.

ii) On the 5-point scale, how would you rate the <u>added value</u> of his advice and opinion?

1. Extremely valuable, 2. very valuable, 3. somewhat valuable, 4. not so valuable and 5. not valuable et all

4.

i) In the last one year, approximately <u>how many times</u> has the investor directly advised you or shared his opinion on partnering with other firms for sales and marketing of your firm's products and services (e.g.: partnering with potential distribution channel partners, affiliate marketing partners, distributers for specific territories etc.)? (*If never, please leave 'never'*)

1. Never, 2. 1 occasion, 3. 2 occasions, 4. 3 occasions, 5. 4 occasions, 6. 5 occasions, 7. between 6 and 10 occasions and, 8. more than 10 occasions.

ii) On the 5-point scale, how would you rate the <u>added value</u> of his advice and opinion?

1. Extremely valuable, 2. very valuable, 3. somewhat valuable, 4. not so valuable and 5. not valuable et all

5.

i) In the last one year, approximately <u>how many times</u> has the investor directly advised you or shared his opinion on the features your firm's products and services? (*If never, please leave 'never'*)

1. Never, 2. 1 occasion, 3. 2 occasions, 4. 3 occasions, 5. 4 occasions, 6. 5 occasions, 7. between 6 and 10 occasions and, 8. more than 10 occasions.

ii) On the 5-point scale, how would you rate the <u>added value</u> of his advice and opinion?

1. Extremely valuable, 2. very valuable, 3. somewhat valuable, 4. not so valuable and 5. not valuable et all

6.

i) In the last one year, approximately <u>how many times</u> has the investor directly advised you or shared his opinion on your firm's strengths or weaknesses? (*If never, please leave 'never'*)

1. Never, 2. 1 occasion, 3. 2 occasions, 4. 3 occasions, 5. 4 occasions, 6. 5 occasions, 7. between 6 and 10 occasions and, 8. more than 10 occasions.

ii) On the 5-point scale, how would you rate the added value of his advice and opinion?

1. Extremely valuable, 2. very valuable, 3. somewhat valuable, 4. not so valuable and 5. not valuable et all

7.

i) In the last one year, approximately how many times has the investor directly advised you or shared his opinion on your firm's competitors and your firm's competitiveness? (*If never, please leave 'never'*)

1. Never, 2. 1 occasion, 3. 2 occasions, 4. 3 occasions, 5. 4 occasions, 6. 5 occasions, 7. between 6 and 10 occasions and, 8. more than 10 occasions.

ii) On the 5-point scale, how would you rate the added value of his advice and opinion?

1. Extremely valuable, 2. very valuable, 3. somewhat valuable, 4. not so valuable and 5. not valuable et all

8.

i) In the last one year, approximately how many times has the investor directly advised you or shared his opinion on technology used in your firm's product or internal process (e.g.: process monitoring technology, product testing technology, software integration, technology infrastructure solutions etc.)? (*If never, please leave 'never'*)

1. Never, 2. 1 occasion, 3. 2 occasions, 4. 3 occasions, 5. 4 occasions, 6. 5 occasions, 7. between 6 and 10 occasions and, 8. more than 10 occasions.

ii) On the 5-point scale, how would you rate the added value of his advice and opinion?

1. Extremely valuable, 2. very valuable, 3. somewhat valuable, 4. not so valuable and 5. not valuable et all

9.

i) In the last one year, approximately <u>how many times</u> has the investor directly advised you or shared his opinion on partnering with other firms for R&D (e.g.: partnering with potential R&D partners, partnering with research laboratories or centres etc.)? (*If never, please leave 'never'*)

1. Never, 2. 1 occasion, 3. 2 occasions, 4. 3 occasions, 5. 4 occasions, 6. 5 occasions, 7. between 6 and 10 occasions and, 8. more than 10 occasions.

ii) On the 5-point scale, how would you rate the <u>added value</u> of his advice and opinion?

1. Extremely valuable, 2. very valuable, 3. somewhat valuable, 4. not so valuable and 5. not valuable et all

10.

i) In the last one year, approximately <u>how many times</u> has the investor directly advised you or shared his opinion on partnering with other firms for R&D (e.g.: partnering with potential R&D partners, partnering with research laboratories or centres etc.)? (*If never, please leave 'never'*)

1. Never, 2. 1 occasion, 3. 2 occasions, 4. 3 occasions, 5. 4 occasions, 6. 5 occasions, 7. between 6 and 10 occasions and, 8. more than 10 occasions.

ii) On the 5-point scale, how would you rate the <u>added value</u> of his advice and opinion?

1. Extremely valuable, 2. very valuable, 3. somewhat valuable, 4. not so valuable and 5. not valuable et all

11.

i) In the last one year, approximately <u>how many times</u> has the investor directly advised you or shared his opinion about your firm's strategy with its existing and potential suppliers? (*If never, please leave 'never'*)

1. Never, 2. 1 occasion, 3. 2 occasions, 4. 3 occasions, 5. 4 occasions, 6. 5 occasions, 7. between 6 and 10 occasions and, 8. more than 10 occasions.

ii) On the 5-point scale, how would you rate the <u>added value</u> of his advice and opinion?

1. Extremely valuable, 2. very valuable, 3. somewhat valuable, 4. not so valuable and 5. not valuable et all

12.

i) In the last one year, approximately <u>how many times</u> has the investor directly advised you or shared his opinion on supply chain management (e.g.: your firm's inventory management, warehouse management, procurement practices etc.)? (*If never, please leave 'never'*)

1. Never, 2. 1 occasion, 3. 2 occasions, 4. 3 occasions, 5. 4 occasions, 6. 5 occasions, 7. between 6 and 10 occasions and, 8. more than 10 occasions.

ii) On the 5-point scale, how would you rate the <u>added value</u> of his advice and opinion?

1. Extremely valuable, 2. very valuable, 3. somewhat valuable, 4. not so valuable and 5. not valuable et all

13.

i) In the last one year, approximately <u>how many times</u> has the investor directly advised you or shared his opinion on your firm's quality management (e.g.: quality control, ISO certification etc.)? (*If never, please leave 'never'*)

1. Never, 2. 1 occasion, 3. 2 occasions, 4. 3 occasions, 5. 4 occasions, 6. 5 occasions, 7. between 6 and 10 occasions and, 8. more than 10 occasions.

ii) On the 5-point scale, how would you rate the <u>added value</u> of his advice and opinion?

1. Extremely valuable, 2. very valuable, 3. somewhat valuable, 4. not so valuable and 5. not valuable et all

14.

Please assign percentages to the following two statements based on the set of topics above.

In % of cases, we asked the investor for his advice and opinion on the above topics.

In % of cases, the investor gave advice or shared his opinion without us asking for it.

15.

How much do you agree with the following statement: "The investor gave us advice or shared his opinion in response to an unexpected problem or incident"?

1. Strongly agree, 2. Somewhat agree, 3. Neither agree nor disagree, 4. Somewhat disagree, 5. Strongly disagree.

How much do you agree with the following statement: "The investor's advice and opinion gave me skills to deal with similar future problems or incidents"?

1. Strongly agree, 2. Somewhat agree, 3. Neither agree nor disagree, 4. Somewhat disagree, 5. Strongly disagree.

III. FREUQENCY AND VALUE OF TRANSACTION INFORMATION

1.

i) In the last one year, approximately <u>how many times</u> has the investor introduced or connected you with a potential customer of your firm? (*If never, please leave 'never'*)

1. Never, 2. 1 occasion, 3. 2 occasions, 4. 3 occasions, 5. 4 occasions, 6. 5 occasions, 7. between 6 and 10 occasions and, 8. more than 10 occasions.

ii) On the 5-point scale, how would you rate the <u>added value</u> of this connection?

1. Extremely valuable, 2. very valuable, 3. somewhat valuable, 4. not so valuable and 5. not valuable et all.

2.

i) In the last one year, approximately <u>how many times</u> has the investor introduced or connected you with a potential sales and marketing partner of your firm (e.g.: distributer, sales partner, marketing agency etc.)? (*If never, please leave 'never'*)

1. Never, 2. 1 occasion, 3. 2 occasions, 4. 3 occasions, 5. 4 occasions, 6. 5 occasions, 7. between 6 and 10 occasions and, 8. more than 10 occasions.

ii) On the 5-point scale, how would you rate the <u>added value</u> of this connection?

1. Extremely valuable, 2. very valuable, 3. somewhat valuable, 4. not so valuable and 5. not valuable et all.

3.

i) In the last one year, approximately <u>how many times</u> has the investor introduced or connected you with a potential R&D partner of your firm (e.g.: research laboratory or centre etc.)? (*If never, please leave 'never'*)

1. Never, 2. 1 occasion, 3. 2 occasions, 4. 3 occasions, 5. 4 occasions, 6. 5 occasions, 7. between 6 and 10 occasions and, 8. more than 10 occasions.

ii) On the 5-point scale, how would you rate the <u>added value</u> of this connection?

1. Extremely valuable, 2. very valuable, 3. somewhat valuable, 4. not so valuable and 5. not valuable et all.

4.

i) In the last one year, approximately <u>how many times</u> has the investor introduced or connected you with a potential product licensing partner of your firm? (*If never, please leave 'never'*)

1. Never, 2. 1 occasion, 3. 2 occasions, 4. 3 occasions, 5. 4 occasions, 6. 5 occasions, 7. between 6 and 10 occasions and, 8. more than 10 occasions.

ii) On the 5-point scale, how would you rate the <u>added value</u> of this connection?

1. Extremely valuable, 2. very valuable, 3. somewhat valuable, 4. not so valuable and 5. not valuable et all.

5.

i) In the last one year, approximately <u>how many times</u> has the investor introduced or connected you with a potential supplier of your firm (e.g.: manufacturer of components, supplier of raw materials, law firm, accounting firm etc.)? (*If never, please leave 'never'*)

1. Never, 2. 1 occasion, 3. 2 occasions, 4. 3 occasions, 5. 4 occasions, 6. 5 occasions, 7. between 6 and 10 occasions and, 8. more than 10 occasions.

ii) On the 5-point scale, how would you rate the <u>added value</u> of this connection?

1. Extremely valuable, 2. very valuable, 3. somewhat valuable, 4. not so valuable and 5. not valuable et all.

6.

i) In the last one year, approximately <u>how many times</u> has the investor introduced or connected you with a potential senior manager or executive to be recruited by your firm? (*If never, please leave 'never'*)

1. Never, 2. 1 occasion, 3. 2 occasions, 4. 3 occasions, 5. 4 occasions, 6. 5 occasions, 7. between 6 and 10 occasions and, 8. more than 10 occasions.

ii) On the 5-point scale, how would you rate the <u>added value</u> of this connection?

1. Extremely valuable, 2. very valuable, 3. somewhat valuable, 4. not so valuable and 5. not valuable et all.

7.

i) In the last one year, approximately <u>how many times</u> has the investor introduced or connected you with a potential venture capital investor in your firm? (*If never, please leave 'never'*)

1. Never, 2. 1 occasion, 3. 2 occasions, 4. 3 occasions, 5. 4 occasions, 6. 5 occasions, 7. between 6 and 10 occasions and, 8. more than 10 occasions.

ii) On the 5-point scale, how would you rate the <u>added value</u> of this connection?

1. Extremely valuable, 2. very valuable, 3. somewhat valuable, 4. not so valuable and 5. not valuable et all.

8.

i) In the last one year, approximately <u>how many times</u> has the investor introduced or connected you with a potential corporate investor in your firm? (*If never, please leave 'never'*)

1. Never, 2. 1 occasion, 3. 2 occasions, 4. 3 occasions, 5. 4 occasions, 6. 5 occasions, 7. between 6 and 10 occasions and, 8. more than 10 occasions.

ii) On the 5-point scale, how would you rate the <u>added value</u> of this connection?

1. Extremely valuable, 2. very valuable, 3. somewhat valuable, 4. not so valuable and 5. not valuable et all.

9.

i) In the last one year, approximately <u>how many times</u> has the investor introduced or connected you with a bank executive for your firm's credit evaluation? (*If never, please leave 'never'*)

1. Never, 2. 1 occasion, 3. 2 occasions, 4. 3 occasions, 5. 4 occasions, 6. 5 occasions, 7. between 6 and 10 occasions and, 8. more than 10 occasions.

ii) On the 5-point scale, how would you rate the <u>added value</u> of this connection?

1. Extremely valuable, 2. very valuable, 3. somewhat valuable, 4. not so valuable and 5. not valuable et all.

10

Please assign percentages to the following two statements based on the set of topics above.

In % of cases, we asked the investor to connect us with a third-party.

In % of cases, the investor connected us with a third-party without us asking for it.

How much do you agree with the following statement: "The investor connected us with the third-party in response to an unexpected problem or incident"?

1. Strongly agree, 2. Somewhat agree, 3. Neither agree nor disagree, 4. Somewhat disagree, 5. Strongly disagree.

APPENDIX 2: INTERVIEW PROTOCOL MATRIX FOR QUALITATIVE RESEARCH

	Background information	**Theme 1:** Implications of assistance provided by venture capitalists to Hungary-based investee firms	**Theme 2:** Differences between Hungary-based private and government venture capital-backed investee firms
Opening interview question			
Interview question 1: Based on the information in your CV, you have had an extensive career as a venture capitalists. Do you consider yourself as an "active investor"? Follow-up question: Does business experience have an important role in being a venture capitalists? Could you possibly provide me with few examples?	X		
Key interview questions			
Interview Question 2: Can you think of some specific results that your active involvement in portfolio firms based in Hungary had on portfolio firms and more broadly entrepreneurial sector as a whole? Could you possibly provide me with few examples?		X	
Interview Question 3: What role has your network of professional and personal contacts had in development of your portfolio firms based in Hungary?		X	
Interview Question 4: It seems that business experience has very		X	X

important role in being a venture capitalist. What are the consequences of government - civil servants - acting as venture capitalists for Hungarian portfolio firms and entrepreneurial sector in general? Could you possibly provide me with few examples?			
Interview Question 5: What in your opinion are the most significant gaps and differences between private and government venture capitalists who are active in Hungary?			X

APPENDIX 3: INTERVIEW PROTOCOL FOR QUALITATIVE RESEARCH

	Background information	**Theme 1**	**Theme 2**
Interview question 1	X		
Interview question 2		X	
Interview question 3		X	
Interview question 4		X	X
Interview question 5			X