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**The role of *venture capital* funds in the National Innovation  
System in Poland**

Domain: economic sciences  
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## Summary of doctoral thesis

Selected subject: The role of *venture capital* (VC) funds in the National Innovation System in Poland as a subject corresponds to the current debate on the effectiveness and reasonability of economy stimulation and the formation of innovation level in Poland through VC funds. *Venture capital* funds can be defined as entities, which invest in undertakings at their development stage (the stage includes financing work on the product and its initial marketing). Companies, which use this type of financing, could be in the course of creation or just about to launch the business, but before the stage where product is sold in significant numbers. VC funds play an important role in the economy inter alia by financing the growth of innovative technology undertakings i.e. start-ups. This way, those funds fill the capital gap. This is because entities without financial history, operating in previously untapped sectors, find it difficult to raise funds for business development by issuing shares at the Warsaw Stock Exchange or obtaining a bank loan.

One of the main elements supporting the reasonability of research on the role of VC funds is the significant amount of public money committed to CV funds by the Polish Development Fund (PDF - Polski Fundusz Rozwoju). As the PDF requires the funds to be capable of making contributions, apart from the public support, the capitalisation of VC funds in Poland may increase by PLN 3.3 billion in the next 2-3 years. PDF's involvement caused the number of new VC funds to raise by 26 in the last year or so, but the recruitment for new entities has not been closed yet. Ultimately, the PDF wants to invest in approx. 50 entities. Other subsidies reach VC funds from programs run by the National Centre for Research and Development (Narodowe Centrum Badań i Rozwoju). In 2016, in the second round of BRIDGE Alfa, 19 VC funds received nearly PLN 440 million in total to invest in start-ups. At the same time, money available to VC funds in the competition announced in 2017 equal PLN 1 billion. The reasonability of research is also supported by the fact that VC funds have not been very active in Poland in the past. In the last few years, the average value of funds' new investments was at the level of approx. EUR 20 million, according to Invest Europe official data. Sector organisations, such as the Polish Private Equity and Venture Capital Association (Polskie Stowarzyszenie Inwestorów Kapitałowych or PSIK), estimate that the investments could be twice as much.

The growing size of VC funds market in Poland, both in terms of capitalisation and the sheer number of entities, brings also the need to research the current way, in which this market operates, and to analyse its effectiveness.

When analysing the role of VC funds in the National Innovation System, it needs to be noticed that those funds do not operate in limbo, but their specific nature requires co-operation with other entities; the funds are also subject to numerous tax laws. This is also confirmed by many examples from business practice worldwide. Those examples show that the effectiveness of VC funds largely depends on the environment, in which they operate. This environment and the entities working together to develop start-ups are colloquially called a start-up ecosystem. However, business literature uses a very similar concept - National Innovation System (NIS). This concept will be the theoretical background for the analysis of the role of VC funds' investments in technology undertakings at an early stage of development.

The rationale for the research on the role of *venture capital* funds in the National Innovation System in Poland is based on two fundamental premises.

First, despite many incentives, start-ups in Poland are still reluctant to reach for external capital. As demonstrated by the research done by the Startup Poland Foundation, undertakings of this type prefer financing their development with their own funds and undertaking's income. Only 40% of the surveyed start-ups declared development with the funds from an investor like a VC fund. Moreover, this percentage is dropping, despite the growing number of funds and available grants. In the same survey two years earlier, 55% of surveyed start-ups declared obtaining capital from an investor like a VC fund.

The second factor which encouraged the author of this thesis to carry out the research was the growing cost of public financing and grants for *venture capital* funds, which are awarded by public administration, even though - as research shows - less and less start-ups want to use this form of financing for their development.

Most research on the role of VC funds in the NIS, undertake financing at an early stage of development or good market practices in this respect, was done on the basis of data from developed markets such as Israel and the US. It is difficult to find studies on markets with less developed NIS, and Poland could be classified as such. This is why the literature describes only a few solutions, factors or phenomena, which could relate to our market.

The dissertation is composed of 5 chapters, introduction and closing remarks.

The first chapter looks at theoretical issues, which form the background to the discussion on the role of *venture capital* funds in the National Innovation System in Poland. First, the concept of NIS is explained as well as various ways, in which it is defined in the literature on this subject. In summary of this chapter, I will present my definition of the NIS, which combines elements of informal notion of start-up ecosystem with the academic understanding of NIS. Moreover, the first chapter discusses the role of new technologies in economic growth and

business development, to draw a wider context of performed research and demonstrate its research.

The second chapter describes directly the specific nature of *venture capital* funds' operations. Both theoretical and practical aspects are shown. In addition, I discuss the idea of *smart money* and the role it plays in the functioning of the VC sector. The purpose of this chapter was to put together a broad array of theory on *venture capital* funds, and to use this theory, combined with chapters three and four, as reference for material obtained during empirical research concerning the specific nature of VC funds' operation in Poland.

In the third chapter, I gathered basic information on NIS elements related to *venture capital* sector in selected countries: Germany and UK. This information was subsequently compared to the Polish market. The purpose of this chapter is to present the specific nature of VC sector in other countries, collect data and identify actions, which could be implemented in Poland to increase *venture capital* funds' involvement in the financing of technology undertakings at an early stage of development.

The fourth chapter's aim was to discuss in more detail the specific nature of *venture capital* sector's operation in Poland. It also discusses the main issues related to formal and legal environment, in which VC funds operate in Poland. Further it discusses problems associated with the taxation of VC funds. The chapter also describes entities, which work with VC funds to build innovative undertakings in the framework of the National Innovation System.

In the fifth chapter, I present the results of performed research regarding VC funds in Poland. Those results were supplemented with data needed to verify the replies received in empirical research.

In the course of the research, the following factors were identified as potential contributors to the effectiveness of financing of technology undertakings at an early stage of development by *venture capital* funds in Poland:

- to invest *venture capital* funds at various stages of development of technology undertakings;
- to diversify VC funds in terms of sources of the capital;
- to encourage management to invest also in those sectors which are more capital-consuming than IT;
- to make Polish VC funds partly independent of public financing, mostly coming from the EU.

The described factors could be boiled down to the limitation of the share of EU programs' funds in the financing of the Polish VC sector. Furthermore, as a result of empirical research, a definition was formed that corresponds to the Polish business practice and to how various entities operating in the framework of the National Innovation System understand the role, which *venture capital* funds play in that system. In line with this definition, a VC fund is an entity, which invests funds deriving from various investors (public and private) in undertakings at an early stage of development, whose business model was confirmed by initial revenues. A VC fund assumes that such a company would increase its value at least several times in a one-three year horizon, mostly thanks to the injection of capital.

Moreover, reasons were identified why technology undertakings at an early stage of development are reluctant to finance with capital in form of a *venture capital* fund's investment. In the course of the research, the following reasons were identified:

- the structure of VC sector in Poland does not correspond to start-ups' demand for capital, and this is demonstrated by the presence of capital gap in terms of value, time, sector and region;
- a major part of start-ups operating in Poland deals in producing solutions in IT sector, so the demand for their products is smaller than in the case of entities operating in other sectors of real economy;
- the quality of capital in VC funds in Poland is low;
- invested amounts are low as well, and this makes many start-ups to finance their development with their own income, savings etc.; this way - perhaps - the scale of operations would grow slower, but the founders would keep all interest.

Research hypotheses were also assumed in the dissertation and subsequently verified. Based on the performed empirical research and analysis of collected data, the first partial hypothesis, concerning the presence of capital gap in the *venture capital* sector, was confirmed. In addition, it was determined that VC funds mostly invest between PLN 1 million and PLN 3 million in the projects, whose business model was already confirmed by first revenues. This financing usually reaches ICT projects, due to low costs of software production as compared e.g. to expenses carried by creation of new biomedical technologies. The collected information led to the observation that the capital gap in the Polish VC sector is not a spot feature i.e. does not mean capital deficiency in just one market segment, but is present in many

planes. The dimensions, in which capital gap demonstrates in the Polish *venture capital* sector, are: time, sector, value and region.

The second partial hypothesis, concerning the impact of growing non-financial benefits on greater interest in form of *venture capital* funds' investments, was verified negatively. According to information obtained in the empirical research, entrepreneurs value this type of efforts, but such efforts rarely are a decisive factor in acceptance of the investment offer.

The third partial thesis, concerning the impact of law and tax conditions on the functioning of VC funds in Poland, was verified positively. The following were identified as factors which shape the way, in which *venture capital* funds operate in Poland:

- double taxation of *venture capital* funds;
- no tax incentives to invest in undertakings;
- no stability of the law;
- VC sector's dependency on public funds derived from European Union programs.

The research to verify the fourth partial hypothesis, concerning the mismatch between available funds and the number of start-ups in Poland, run into a difficulty. This is because some of the respondents assessed VC sector in the perspective of what would happen in the recent future, when money from PFR programs would reach VC funds. In their opinion, when this happens, there will be definitely too much money in relation to the demand on the part of start-ups. Ultimately, this hypothesis was verified positively.

Based on the performed empirical research, the primary hypothesis of the dissertation was verified positively; the hypothesis claimed that an increase in the effectiveness of undertakings' financing by *venture capital* funds could be achieved through changes in the National Innovation System and in support mechanisms for those funds.

The thesis also indicates the necessary changes and specifies the impact those changes could have on entities operating within the framework of the National Innovation System. Listed among primary actions leading to improved effectiveness of undertakings' financing by providing of VC funds to create capital groups i.e. entities with VC funds which could invest in projects at various stages of development and provide *follow-on investment* are:

- provision of financing for entities investing in sectors with higher capital needs e.g. biotechnology;
- elimination of delays in the closing of competitions for public financing, which are awarded by Polish intermediates in the framework of European Union e.g. NCBiR, PFR or PARP;

- the building of framework for VC funds to create a diverse investment policy with respect to the development stage, at which the target start-up is, the sector and the time horizon;
- greater transparency of tax law environment, in which *venture capital* funds operate in Poland;
- encouragement for co-investments, in particular with entities from outside Poland.

The analysis of *venture capital* sector and start-ups in connection with the author's prior experience<sup>1</sup> demonstrated that the best research method would be to have in-depth interviews with people involved in VC funds' operations concerning start-ups. In the course of the analysis of the National Innovation System in Poland, it turned out that to assess the role, which VC funds have in that system, three groups of entities operating within the National Innovation System are of key importance:

- VC funds;
- start-ups;
- business environment institutions.

30 in-depth interviews were held in total - 10 for each group's representatives. The sample was selected purposefully to reflect, as much as possible, the nature of start-ups, to have various experience and be at various stages of development, among other things. The common element was to be in contact with VC funds e.g. such entity as a shareholder or even experience with negotiations with a VC funds, which did not end with an investment. For the business environment institutions, the sample selection presumed diversity of entities, but all had to have had direct co-operation with VC funds. VC funds, in turn, were selected primarily due to different sources of financing and investment strategies. The selected research method did not permit generalisation and transposing the results onto the entire NIS in Poland. However, it helped identify phenomena, factors etc., the presence of which requires further confirmation through quantitative tests.

The conclusions from in-depth interviews were additionally supplemented with the analysis of available data. The main data sources were the reports of Invest Europe (former: European Venture Capital and Private Equity Association). The information was additionally supplemented with Eurostat resources and the OECD report "*Entrepreneurship at a Glance*".

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<sup>1</sup> The author prepared and analysed the research *Polskie start-upy. Raport 2015* (Polish Start-ups. 2015 Report), organised by Startup Poland Foundation in 2015.

The data on Polish VC funds come also from the websites of the National Capital Fund (Krajowy Fundusz Kapitałowy) and the National Centre for Research and Development (Narodowe Centrum Badań i Rozwoju). A slight portion of data was obtained directly from funds' representatives. Knowledge about funds, which use financing in the framework of the National Capital Fund, was also sourced from the Fund's report assessing its activities.

Information about the size of British and German markets, discussed in the thesis, also comes from Invest Europe reports. In addition, transaction data were obtained from Internet sources such as Crunchbase or Pitchbook.