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PERFORMANCE METRICS IN PUBLIC VENTURE CAPITAL FUNDS

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Abstract: Public venture capital funds are a unique type of financial intermediary. They pursue the goals, often conflicting, of public and private investors, which makes measuring their effectiveness a complex research challenge. This study aims to analyse the performance measurement methods used in public venture capital funds in Poland. For this purpose, in-depth interviews and a survey among managers of these entities were conducted. The study results show that the most significant emphasis is placed on financial efficiency, while non-financial determinants are mostly ignored. Considering the short history and lack of experience of many managers of public venture capital funds, this may further delay the process of development of this market.

Keywords: venture capital funds, effectiveness, performance measurement.

1. Introduction

The genesis of venture capital funds dates back to the early 1930s, when a Macmillan Committee report identified and defined the equity gap. Since then, venture capital has supported various initiatives that allow economies to increase innovation and competitiveness (Przybylska-Kapuścińska & Łukowski, 2014). This capital is most often private, and its primary purpose is the expected rate of return. Due to the very high risk of projects and high capital intensity, private venture capital (VC) funds are unwilling or unable – due to insufficient resources (Avots, Strenga & Paalzow, 2013) – to engage in such areas essential for the development of the state as, for example, biotechnology, medicine, rural development and innovative agriculture (McMillan, Narin & Deeds, 2000). Public venture capital funds were

created to eliminate this market imperfection. Private entities often manage funds but they are partially (or entirely) financed with public funds. In addition to their commercial objective (rate of return), these funds also pursue public goals such as the development of entrepreneurship, employment growth, support of innovation, and elimination of the equity gap. In addition, the expected effects of their existence can include the restructuring of the country, the development of specific sectors and the internationalisation of the economy (Świderska, 2008).

The unique nature of public VC funds stems from the presence of both public and private investors in a single fund. Venture capital funds have several external stakeholders. As they have different expectations about the performance of public VC funds, the evaluation of this performance should be multi-criteria and based on a variety of objectives that characterise all stakeholder groups. Already in the case of the first venture capital fund, there were divergences between investors regarding the fund's objectives (Lerner, 2009). There are dozens of interrelated determinants of performance in venture capital funds. Each of these can be measured with different metrics. So far, most studies on the effectiveness of venture capital funds, especially in Poland, have focused on the impact of their operations on portfolio companies, innovation, or the economy (Mazurek-Czarnecka, 2016; Świderska, 2008; Tamowicz, 1995). How the managers themselves evaluate the effectiveness of the funds has not yet received sufficient attention from researchers. This paper aims to fill this research gap and identify effectiveness indicators used in public venture capital funds. Therefore, the research question is: how do public venture capital funds managers measure its effectiveness?

The author conducted in-depth interviews and surveys among managers of public venture capital funds in Poland to answer this question. Thus the study offers contributions for both theoreticians and practitioners. First, it fits into the stream devoted to the effectiveness of venture capital funds, but treating these entities not only as financial intermediaries, but also as an organisation that has internal goals. Secondly, it shows which areas of organisational effectiveness currently do not receive enough attention from venture capital fund managers.

2. Literature review

For decades, venture capital has stimulated innovation and competitiveness in economies (Dessi & Yin, 2012; Fabrizio, 2007; Lerner, 1999); however, research on the venture capital market only begun to develop intensively in the 1980s. (Drover et al., 2017). The first studies focused primarily on clarifying the investment process, defining the role of individual actors, and building a theoretical foundation for further research (Bygrave, 1988; Elango, Fried, Hisrich & Polonchek, 1995; Florida & Kenney, 1988; Gorman & Sahlman, 1989; Robinson, Jr. 1987). Based on these theoretical foundations, subsequent VC research mostly fell into one of three areas: micro, macro, and mesoeconomic.

The stream devoted to the microeconomic perspective is primarily oriented towards three groups of studies, trying to explain: the managers' attitude and how investors make decisions (Cumming, Fleming & Schwienbacher, 2009; Drover et al., 2014; Kirsch, Goldfarb & Gera, 2009; Matusik, George & Heeley, 2008); the entrepreneur's perspective, including what characteristics determine that some receive funding and others do not (Giot & Schwienbacher, 2007; Hsu, 2004; Kaplan, Klebanov & Sorensen, 2012); and the relation between the investor and the entrepreneur (Bengtsson & Hsu, 2015; Franke, Gruber, Harhoff & Henkel, 2008; Shepherd & Wiklund, 2009).

Studies of venture capital funds from a macroeconomic, or overall market, perspective can be divided into those that analyse the exogenous determinants of VC activity, and those that compare the functioning of VC markets in different countries. Public venture capital funds at this level have a dual-task. On the one hand, they should contribute to market development and thus attract private investors (crowding in), while on the other, they can also substitute for private venture capital funds (Colombo, Cumming & Vismara, 2016). The results in this regard are inconclusive. Brander, Du & Hellmann (2015) noted that markets with a higher share of public VC funds have higher levels of VC funding per firm and more VC-funded firms overall, suggesting that public VCs vastly augment rather than crowd out private financing through VC. Hood (2000) came to the same conclusion in the Scottish market. However, a similar relation was not observed by Armour and Cumming (2006) and Bertoni, Colombo & Quas (2015). The differentiating factor here may be the institutional environment (Bruton, Ahlstrom, & Li, 2010) and an appropriately designed public support mechanism (Cumming & Macintosh, 2003). When making investment decisions, venture capital funds consider both the country's approach to entrepreneurship (Ahlstrom & Bruton, 2006), whether other funds are investing there, and public support availability (Ramana & Matthew, 2013; Sorenson & Stuart, 2008). At macroeconomic level, it was also noted that syndicated investments by domestic and foreign funds are more likely to be successful than domestic investments (Guerini & Quas, 2016).

Research on the mesoeconomic perspective, i.e. venture capital organisations, is considered the essential part of the entrepreneurship literature (Drover et al., 2017) and focuses on how funds manage risk and their role as financial intermediaries and the credibility provided to portfolio companies. The first group includes works that point to risk management strategies such as providing capital in funding rounds (Guler, 2007; Li, 2008) or various forms of managerial control (Kaplan & Strömberg, 2004). This group of studies examines the effects of public venture capital funds, including their private counterparts. This reseaech is most often concerned with the impact on innovation, divestment (exit), sales and employment growth, and value created in portfolio companies (Colombo et al., 2016). It was also noted, among other things, that while public VC funds have a lower probability of exiting through IPOs (Initial Public Offering) or Mergers and Acquisitions, public-private

syndicates perform better than private funds (Cumming, Grilli & Murtinu, 2017). Another significant difference was indicated by Buzzacchi Scellato, and Ughetto, (2013), noting that private venture capital funds exit quickly from investments with low returns. Public funds can hold such companies in their investment portfolios longer if they generate social benefits. Public venture capital funds are mostly an effective tool to support innovation (Audretsch, 2002), including university spin-offs (Knockaert, Wright, Clarysse & Lockett, 2010). They invest more often than private funds. Portfolio companies backed by private funds, on the other hand, have higher levels of innovation (Murray, 1998) and are more likely to file patent applications (Bertoni & Tykvova, 2012). It is interesting to note that although public venture capital funds are intended to contribute directly to job creation, studies show that this impact is negligible, and this has been confirmed both in Europe (Grilli & Murtinu, 2014) and Australia (Cumming & Johan, 2016). Only Balboa, Martí and Zieling (2007) suggest that VC funds have a positive impact on employment, but this only applies to private funds.

The most important area this work directly fits in is the stream of research on venture capital funds as financial intermediaries. The existing studies can be divided into three areas within which the funds are examined, i.e. evaluation of the fund's performance, evaluation of how the fund influences the portfolio companies, and systemic evaluation for a given market.

When evaluating venture capital funds, by far the most commonly used indicators are costs, investment value and number of fund employees on the input side, as well as patents, internal rate of return (IRR) and investment exits (including IPOs in particular) in terms of results (Balboa, Martí & Zieling, 2007; Brander, Du, & Hellmann 2012; Haro-de-Rosario, Caba-Pérez & Cazorla-Papis, 2014).

There is a growing interest in non-parametric methods, notably Data Envelopment Analysis. Its effectiveness in evaluating venture capital funds has been confirmed in many works (Jeon, Lee & Kim, 2009; Haro-de-Rosario, Caba-Pérez and Cazorla-Papis 2014; Zhang, Chen & Wang, 2016). However, it should be pointed out that this method serves primarily to determine a particular type of efficiency, namely technical efficiency (Domagała, 2007).

Ambiguous research results concern the impact of venture capital funds on the innovativeness of portfolio companies. On the one hand, it is indicated that they have a moderate effect on the commercialisation of new technologies (Chen, 2009), while on the other, managers effectively selected companies with high growth potential, and VC funds influenced the growth of portfolio companies, but not their innovativeness (Peneder, 2010). One explanation for this inconsistency may be that funds view patents as signals of a start-up's value, but are more likely to rationalise rather than increase patent generation by companies (Lahr & Mina, 2016).

When evaluating the effectiveness of the entire venture capital market, evaluation according to three indicators dominates: (1) innovation – most often measured by the number of patents, (2) employment – new jobs created, and (3) IPO – as the

most important measure of a startup's success. Attention is also paid to, among other things, the size of the syndicated network and the quality of portfolio companies (Hood, 2000; Pierrakis & Saridakis, 2017; Bottazzi & Da Rin, 2002).

Although the Polish venture capital market is still at an early stage of development, several works describe its functioning. They mainly focus on the birth and development of the venture capital market in Poland (Sobańska-Helman & Sieradzan, 2004; Tamowicz, 1995), their role in financing enterprises (Kowalik, 2016; Mazurek-Czarnecka, 2016), or the principle of operation (Panfil, 2005; Przybylska-Kapuścińska & Mozalewski, 2011). The few results on the effectiveness of these entities include studies by Zasępa (2013; 2015) and Świderska (2008).

3. Methodology

To understand how the managers of these funds perceive the effectiveness of public venture capital funds, I completed:

- three in-depth interviews with managers of public funds in Poland;
- nine questionnaires addressed to fund managers (other than those interviewed).

Taking into account that there are currently over 50 funds operating within PFR Ventures, it can be concluded that nearly 20% of the market was surveyed.

Initially, invitations to participate in the study were sent out to 30 fund managers due to the prevailing coronavirus pandemic; only consent for one interview and two surveys were received back. It is reported in the literature that access to data in the case of capital venture funds is one of the biggest problems when conducting research (Landström, 2007). This applies to both quantitative and qualitative data, and the global pandemic has only compounded this problem. Therefore, the remaining respondents for both interviews and surveys were obtained using the snowball sampling method. This method involves recruiting additional study participants through current participants. Although it is a non-random method associated with a small sample size, it is often used when data is difficult to access, especially in linking private investors, innovation and entrepreneurship. It has been used in work on venture capital funds (Bocken, 2015; Mason & Harrison, 2002), business incubators (Baraldi & Ingemansson Havenvid, 2016; Kepenek & Eser, 2016) and accelerators (Pauwels, Clarysse, Wright, & Van Hove, 2016). The sample size, while small, is not out of line with research in a similar subject area. For example Scheela and Jittrapanun (2012) used information from 20 investors, Wright, Robbie, and Ennew, (1997) examined 13 interviews, and Berglund (2011) 12 interviews.

3.1. In-depth interviews

The interviews included three managing partners whose funds benefited from various public support programmes in Poland including 3.1 POIG, 3.2 POIG (KFK), BRIdge

Alfa (National Centre for Research and Development), and PFR Starter FIZ (Polish Development Fund).

During the interview, the respondents answered 11 questions about four areas of fund operations:

General questions:

1. How do you define a public venture capital fund?
2. How do you define the effectiveness of a (public) venture capital fund?

Investment process questions:

3. What is the investment process in your fund?
4. What makes your fund's investment process different from others?

Questions about the effectiveness of the fund and portfolio companies:

5. What are the fund's short-term and long-term objectives?
6. What KPIs do you use to evaluate the fund's performance?
7. What short-term and long-term objectives do you set for your portfolio companies?
8. What KPIs do you use to evaluate the performance of the portfolio companies?

Questions about the market and its prospects:

9. What barriers and problems have you faced in the market?
10. How have you overcome them, and what remains a challenge?
11. What changes do you expect in the strategy of your fund?

3.2. Survey

The second research stage was a public VC fund managers survey in Poland. It aimed to identify what tools and indicators are used by venture capital funds to evaluate their performance. A survey template is included in Appendix 1. Nine managers responded, five funds were located in Warsaw, two in Poznań, one in Kraków and one in Lublin. The respondents represented funds in the full spectrum of capitalisation, ranging from very small (under $100 000) to those in the $50-100 million range.

4. Results and discussion

4.1. Interviews

Definition of a public venture capital fund and its effectiveness.

A public fund was considered one whose "*leading/main shareholder is a state authority (publicly funded)*". It was pointed out that the public investor through the fund should be an *"anchor investor"* who first invests in a risky project and thus provides such a portfolio company with its credibility, which enables it to attract the attention of private investors.

In all three interviews, the respondents referred only to efficiency in financial terms. It was pointed out, for example, that "*a fund is efficient if it brings a return to its all shareholders (LP)*" and that the main task of the managers is to make a profit.

Fund investment process

The respondents indicated that venture capital funds are "*a traditional model for supporting innovative projects*". At the same time, they emphasised openness to co-investments and stressed "*support in the globalisation of services and products and access to new investors for portfolio companies"*. One of the respondents also pointed out that "*there are too small funds in Poland which, while keeping to market standards of management fees, do not have the resources to have separate structures to manage the companies in their portfolios*". This leads to another phenomenon, which was also mentioned in one of the interviews, i.e. "*during the portfolio construction period, unfortunately everyone in the EU focuses on looking for portfolio companies and relations with own investors, or if a company performs well or very poorly, only then anything is done in it*".

According to the respondents, one of the reasons that led to too-small funds is the lack of incentives for institutional and private investors to invest in venture capital funds.

All the interviewees indicated that they are open to co-investments and operate more globally. They also emphasised that one of the problems in the previous programmes was, for example, the "Polish element", which had to be characterised by portfolio companies. This meant that the fund could not co-invest in foreign companies, and therefore its ability to raise partnership funds was minimal.

Effectiveness of the fund and portfolio companies

In the area of objectives, the respondents indicated that a high rate of return was the most important. Yet, they added that "*a globally recognised brand and value brought to portfolio companies also matters*".

Within the indicators used to evaluate the funds, the respondents mainly pointed to financial measures, portfolio value, the number of offers coming in, IRR, return to investors, response time to offers, and length of the investment process. This confirms that the fund is evaluated primarily, and sometimes only, from an operational and financial perspective.

In the case of portfolio companies, the choice of indicators was determined by company characteristics. It was reported that these could be monthly site visits, Gross Merchandise Value, Customer Acquisition Cost, Churn Rate, ARPA, MRR, number of trips etc., as well as revenue pattern, burn rate and other financials depending on the sector. One interviewee pointed out that even when such information is collected, it is often not analysed; it is more looking at how the project/ idea is performing, and as for KPIs (Key Performance Indicators), "honestly no one has time for the rest".

The market and its future

The fundamental problems in the Polish market include the asymmetry of information, lack of institutional investors, the state of the law (including tax law), and the lack of incentives for individual and institutional investors to invest in venture capital funds.

4.2. Survey

The managers used a variety of performance measurement and management tools. Most respondents (7) indicated Key Performance Indicators (KPIs) and Management by Objectives (MBO) (3 respondents). Only one fund used a performance measurement system.

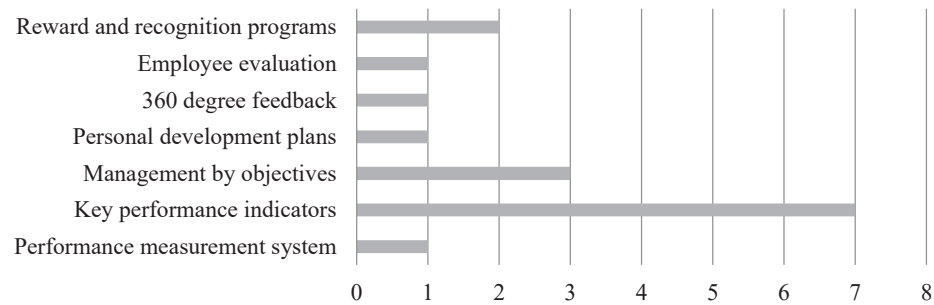

Fig. 1. Performance measurement and management tools used by public VC funds

Source: own work.

Investors primarily demand information about portfolio companies and return data from funds (see Figure 2). They are much less interested in other indicators, while those like RVPI and DPI were not used by funds at all.

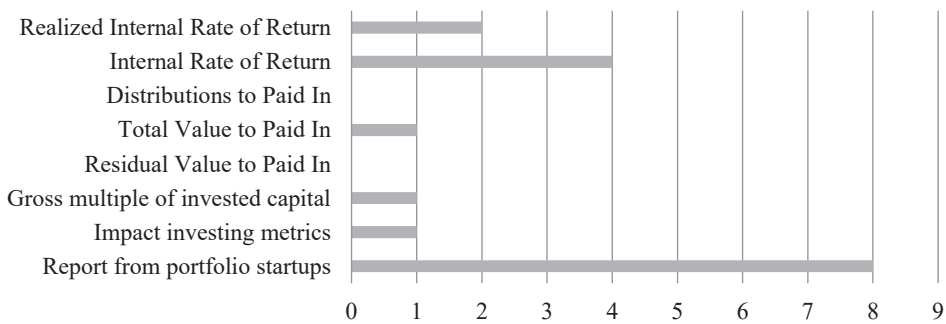

Fig. 2. Indicators required by investors (LP) of public VC funds

Source: own work.

Later in the survey, fund managers were asked to indicate how often they measure the given indicators on a scale containing five levels: never, seldom, sometimes, regularly, and as often as possible.

As can be seen, indicators like TVPI, DPI, RVPI are not important for managers. The survey results confirm the findings from the interviews – the rate of return and operating costs are the most important.

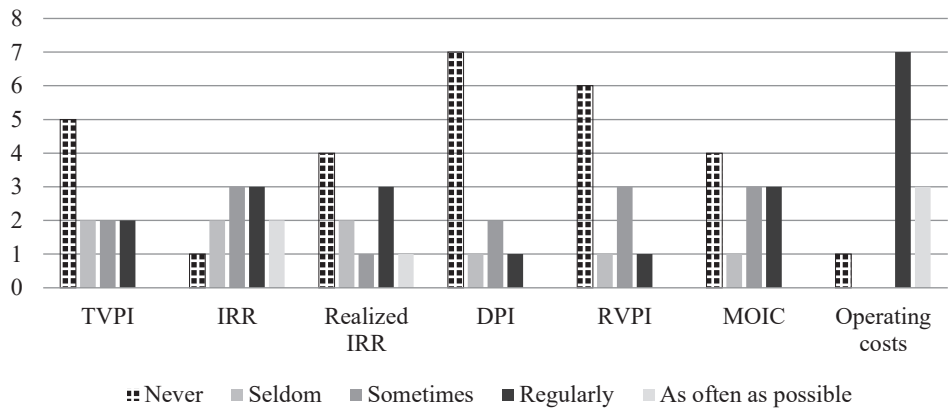

Fig. 3. Financial indicators used by public VC funds

Source: own work.

Additionaly, in the area of stakeholders, it can be seen that the satisfaction of investors is treated higher than that of portfolio companies and that the most commonly controlled indicators are marketing costs and the number of applications received.

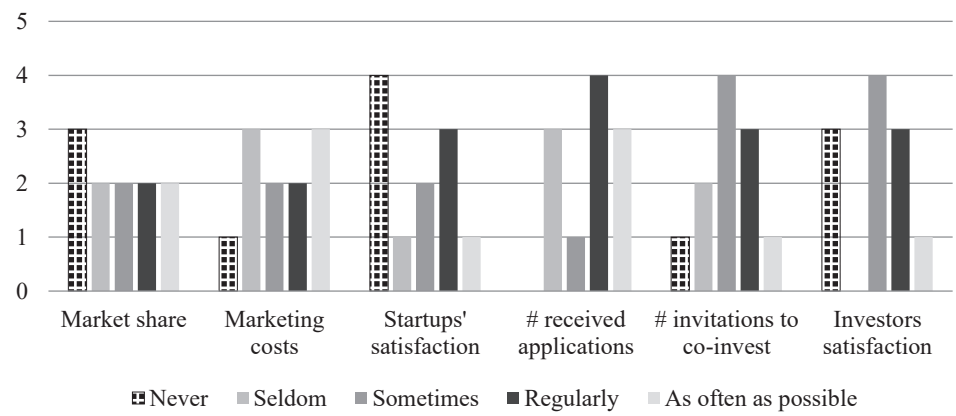

Fig. 4. The use of stakeholder metrics in public VC funds

Source: own work.

Among the process metrics, it is worth noting that what matters to the funds is whether companies receive subsequent funding rounds, whereas what matters far less is how much time they spend on different processes.

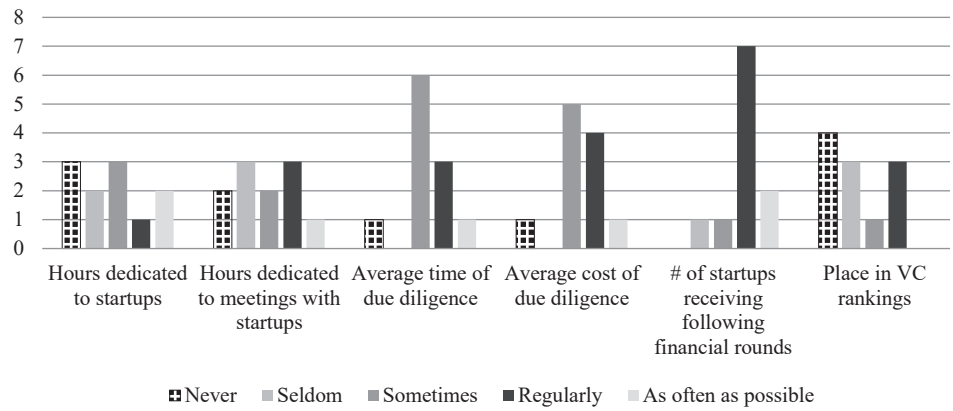

Fig. 5. The use of process metrics in public VC funds

Source: own work.

It is only the number of new partnership (syndicate) funds that is a development indicator now regularly analysed by most funds; the other indicators are mostly not analysed at all, or only occasionally.

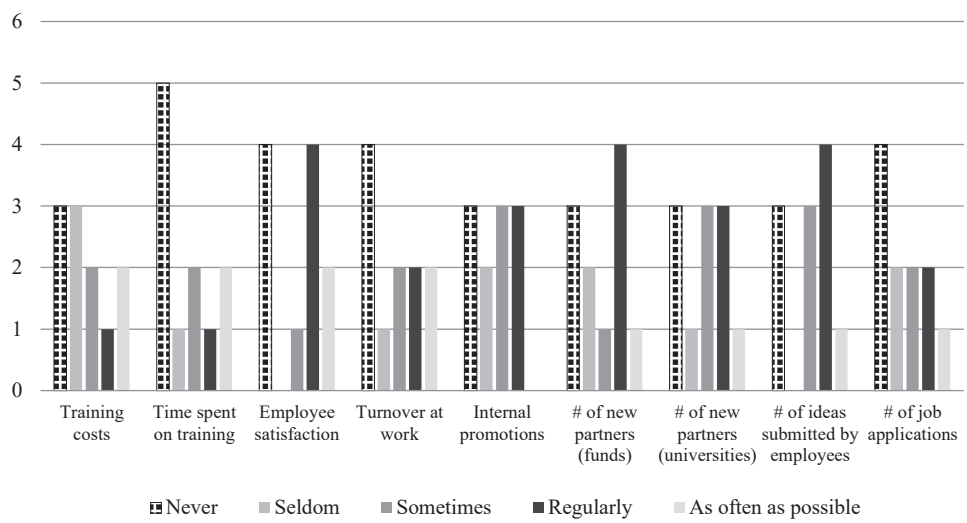

Fig. 6. The use of development metrics in public VC funds

Source: own work.

The results obtained from the survey confirm the information received during the interviews. Managers of public venture capital funds primarily focus on financial aspects and pay less attention to other areas of the organisation. Therefore, these funds are dominated by traditional performance measurement systems, which modern systems have systematically replaced since the early 1990s, which only confirms the opinion of one of the managers that funds in Poland are traditional organisations investing in innovative ideas. Therefore, there is a lot of room for improvement in this area.

5. Conclusion

Public venture capital funds can be one of the most effective tools used by economic policy to support innovation and entrepreneurship. Their unique ability to operate in conditions of information asymmetry allows them to select and support very risky projects with extraordinary growth prospects. The successful performance of this task depends on having a unique set of competencies, both investment and often specialised for a given high technology sector. In developed markets, knowledge and skills have been accumulated in society for nearly 80 years. It is not easy to have a similar potential in countries where these markets are just emerging, which is why many countries have decided to actively support the development or even create an indigenous venture capital market almost from scratch. So far, spectacular success in this area has been achieved only in Israel. The literature gives several reasons why public intervention in the venture capital market does not reach its intended goals. This paper focuses primarily on the problem identified by Lerner (2009) – how to measure the effectiveness of public venture capital funds.

Even in the first venture capital fund, investors disagreed over which objectives to prioritise. Often the interest of the public investor conflicts with the intentions of private investors. Additionally, in emerging markets that have been backed by multi-billion dollar public support programs, there is a significant risk that not all funds will be able to engage a cadre with the right competencies. This, in turn, can be a catalyst compounding the problems described earlier.

The study was only able to reach a narrow range of public venture capital fund managers, which is a fundamental limitation of the study and makes it impossible to apply to the entire population directly. Nevertheless, this paper can serve as a starting point for further research, including in particular the non-financial determinants of the effectiveness of public venture capital funds. Furthermore, it would be helpful to investigate how the implementation of different performance measurement systems improves the performance of funds in various aspects. Above all, it is worth examining whether including non-financial indicators of organisational effectiveness in strategic management will contribute to the better performance of funds. The last research area that requires further analysis is a study comparing the effectiveness of funds using different performance measurement methods. In this way, it would

be possible to determine the impact of the measurement system itself on the results achieved.

All the above may positively contribute to the further development of Poland's venture capital funds market. Although many problems identified require attention, when observing the changes that have taken place in this market over the last decades, one can look optimistically to the future. Further funds and supported portfolio companies will also provide new data that will allow for empirical research and, consequently, a better understanding of this type of public support on the Polish capital market.

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MIERNIKI EFEKTYWNOŚCI WYKORZYSTYWANE W PUBLICZNYCH FUNDUSZACH *VENTURE CAPITAL*

Streszczenie: Publiczne fundusze venture capital stanowią unikatowy typ pośrednika finansowego. Realizują one cele, często sprzeczne, inwestorów publicznych oraz prywatnych. To sprawia, że pomiar ich efektywności jest złożonym wyzwaniem badawczym. Celem tej pracy była analiza metod pomiaru efektywności stosowanych w publicznych funduszach *venture capital* w Polsce. Przeprowadzono wywiady pogłębione oraz badanie ankietowe wśród zarządzających tymi podmiotami. Wyniki badania pokazują, że największy nacisk kładziony jest na efektywność finansową, a ignorowane są w większości determinanty niefinansowe. Krótka historia i brak doświadczenia wielu zarządzających publicznymi funduszami *venture capital* mogą dodatkowo opóźnić proces rozwoju tego rynku.

Słowa kluczowe: fundusze *venture capital*, efektywność, pomiar efektywności.

Appendix

Performance metrics – Venture Capital

The questions in this section concern the functioning of the Fund. For example, the question on „marketing costs" refers to the costs that the fund spends to promote itself.

How often do you track the following metrics [VC – financial perspective]?

	Never	Seldom	Sometimes	Regularly	As often as possible
TVPI: Total Value to Paid-In-Capital	☐	☐	☐	☐	☐
IRR: Internal Rate of Return	☐	☐	☐	☐	☐
Realised IRR	☐	☐	☐	☐	☐
DPI: Distribution to Paid-in-Capital	☐	☐	☐	☐	☐
RVPI: Residual Value to Paid-in-Capital	☐	☐	☐	☐	☐
MOIC: Multiple on Invested Capital	☐	☐	☐	☐	☐
Operating costs	☐	☐	☐	☐	☐

- Place for your comments

How often do you track the following metrics [VC – customer perspective]?

	Never	Seldom	Sometimes	Regularly	As often as possible
Market share	☐	☐	☐	☐	☐
Marketing costs	☐	☐	☐	☐	☐
Founders satisfaction (portfolio startups)	☐	☐	☐	☐	☐
Number of received applications	☐	☐	☐	☐	☐
Invitations to co-investments	☐	☐	☐	☐	☐
Investors satisfaction	☐	☐	☐	☐	☐

- Place for your comments

How often do you track the following metrics [VC – process perspective]?

	Never	Seldom	Sometimes	Regularly	As often as possible
Number of hours spend on the development of the portfolio company	☐	☐	☐	☐	☐
Number of hours dedicated to meetings with portfolio companies	☐	☐	☐	☐	☐
Average time of due diligence	☐	☐	☐	☐	☐
Average cost of due diligence	☐	☐	☐	☐	☐
Number of startups receiving subsequent rounds of funding	☐	☐	☐	☐	☐
VC industry awards/rankings	☐	☐	☐	☐	☐

- Place for your comments

How often do you track the following metrics [VC – development perspective]?

	Never	Seldom	Sometimes	Regularly	As often as possible
Investment in training/workshops for staff	☐	☐	☐	☐	☐
Time spent to employee training	☐	☐	☐	☐	☐
Employee satisfaction	☐	☐	☐	☐	☐
Employee turnover	☐	☐	☐	☐	☐
Internal promotions	☐	☐	☐	☐	☐
Number of new partners (syndicates)	☐	☐	☐	☐	☐
Number of new partners (universities and research institutes)	☐	☐	☐	☐	☐
Number of employee suggestions/ideas	☐	☐	☐	☐	☐
Number of applications for employment	☐	☐	☐	☐	☐

- Place for your comments

Are there any other comments you would like to make about VC performance management and start-up reporting?

If you want to receive a copy of the research results please leave your email address: