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Master Thesis – Direct Research

Assessing the Market Opportunity for a Fund of Funds in the European Impact Investment Ecosystem

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List of Abbreviations

AIIF	Allianz Impact Investment Fund
EIB	European Investment Bank
EMCAF	Emerging Market Climate Action Fund
EU	European Union
DPI	Distributed to Paid-in Capital
FVI	Final Value of Investment
FoF	Fund of Funds
GP	General Partner
H	Hypothesis
HFoF	Hedge Fund of Funds
IPO	Initial Public Offering
IRR	Internal Rate of Return
IVI	Initial Value of Investment
LBO	Leveraged Buy Out
LP	Limited Partner
MOIC	Multiples in Investment Capital
PE	Private Equity
PEFoF	Private Equity Fund of Funds
PIC	Paid-in Capital
RQ	Research Question
RoI	Return on Investment
RVPI	Residual Value to Paid in Capital
SDG	Sustainable Development Goal
SFDR	Sustainable Finance Disclosure Regulation
SRI	Socially Responsible Investment
TVPI	Total Value to Paid-in Capital
UK	United Kingdom
UN	United Nations
US	United States
VDR	Virtual Data Room
VC	Venture Capital

Abstract

The demand for impact investments has significantly increased in the EU over the last decade as businesses and public authorities seek solutions to address social and environmental challenges. While the interest in more sustainable investments is growing, investment capital for impact is still rather low compared to traditional investments due to the perception of a higher risk profile and lower returns. This paper responds to these concerns by providing empirical evidence about the market and performance of Impact VC in Europe. Furthermore, the development of a European Impact FoF is assessed to close the financing gap and make impact investing more attractive to risk-averse investors. A financial model was developed based on empirical findings and industry practices to answer the research question. The findings reveal the market for Impact VC is large enough to build a FoF. Furthermore, different investment strategies are being evaluated and challenged with existing research on FoF portfolio design. The paper concludes that fund asset allocation, number of portfolio funds, and average ticket sizes are crucial factors to increase the FoF's returns while a diversification strategy does not certainly result higher returns than a concentration strategy. Lastly, the researcher suggests the development of an early-stage concentrated PEFoF to maximize returns.

Keywords: Impact Investing, Fund of Funds, Venture Capital, Financial Modeling, Investment Strategies

1. Introduction

What if there was an investment instrument that could make early-stage investments into impact ventures more attractive and less risky, while still providing sufficient returns to investors? What would be the potential of such an instrument, and is it the right time and market to enter? This paper explores the state of the art of FoFs and its potential within the impact investing ecosystem in Europe. Furthermore, it assesses the market of Impact VCs and investigates segments and trends within. Learnings from academia connected with investment industry practices will be applied to assess the market potential of an Impact FoF.

2. Fund of Funds

1.1 Concept & Structure of FoFs

A FoF is a pooled investment fund with a portfolio consisting of other of funds (Chen, 2022). The concept of FoFs dates its origins back to the 1960 and has been steadily growing since then. It is also known as a multi-manager fund and encompasses various types of FoF, such as HFoFs that invest in hedge funds, PEFoFs that invest in LBO or VC funds, and FoFs that invest in stock funds, bonds, or real estate funds (Stein et al., 2008). FoF investments currently account for over 10% of capital in PE, including both VC and buyout (Weidig et al., 2004). The aim of a FoF's strategy is to accomplish extensive diversification through an appropriate asset allocation, with investments in various fund categories. A FoF can be designed as a mutual fund, PE fund, hedge fund, or investment trust (Chen, 2022). Typically, the structure of FOFs follow a limited partnership model where a GP manages the investments and portfolio while LPs provide the investment capital. FOFs are either fettered or unfettered. Fettered FOFs only invest in portfolios managed by a single investment company, while unfettered FOFs invest in funds controlled by managers from different companies (CFI, 2023). VC and PE funds typically follow the '2 and 20' rule. This GPs charge a 2% management fee on the investment, as well as

a performance fee, also known as carried interest or incentive fee, which represents 20% of the investment gains (Harris et al., 2018; Gompers and Lerner, 1999). FoFs demonstrate a similar structure but with lower fees. Hereby, management fees circulate around 1,5% and incentive fees commonly accumulate 20% of profits (Johan and Najar, 2010). However, it has been demonstrated by research that the capacity to net fees has caused incentive fees to decrease by an average of 16 basis points or 1.6% (Reddy et al., 2007). Netting mitigates financial contract risks through the consolidation of multiple financial obligations (Hargrave, 2020). Dependent on the structure, and the lifetime of the FoF the netting impact on incentive fees can even be higher (Reddy et al., 2007). Last, but not least FoF have organizational and operational expenses. Setting up and maintaining the fund and its infrastructure incurs organizational expenses. Legal expenses typically account for two-thirds of these expenditures, while the remaining one-third covers travel expenses, accountant fees, and establishing a VDR (Seber, 2022). The acquisition, holding, and disposal of investments, as well as service provider fees and costs (such as those for lawyers, consultants, custodians, administrators, and accountants), are all considered operational expenses (Steinmann, 2014).

1.2 Advantages & Disadvantages

The main benefit of FoFs is the provision of a diversified fund portfolio, which can diminish potential risks and volatility for investors (Weidig et al., 2004). Thereby, FoFs can attract more risk-aversive investors to contribute to VC and PE funds, while increasing the overall investment capital available. The difference in available investment capital, value creation, and market development between Europe and the US has been extensively debated in research. The evidence indicates that the US is significantly more advanced than Europe (Hege et al., 2009). Thereby, FoFs could help closing the funding gap for risk capital in Europe. Furthermore, different forms of diversification including asset class, manager, strategy, geographic, and

vintage diversification can be added to FoFs. Research has also shown that especially VC FoFs create more risk reduction through diversification than other FoFs with a focus on buyouts (Harris et al., 2018). In addition, FoFs provide retail investors with access to financial products that would typically be beyond their means. Ordinary retail investors are generally unable to directly invest in funds like VC, PE, and hedge funds due to their high minimum investment requirements, transaction costs, lack of distribution channels and information (Stein et al., 2008). FoFs are more expensive than traditional mutual funds or ETFs, as LPs are paying for the management of both the FoF and the related operating expenses of the portfolio funds. This so-called double cost structure has caused a lot of controversy about the effectiveness of FoFs compared to traditional mutual funds (Brown et al., 2004). FoFs have historically provided lower returns than direct investments in funds. While FoFs generally reduce risk, FoFs focusing on buyouts underperform direct fund investment strategies. VC FoFs are on a par with direct investments in VC but do also not outperform direct investment strategies (Harris et al., 2018). LPs can therefore not expect IRRs exceeding direct investments in funds. Last, but not least FoFs can be less transparent than traditional funds as investors may not have the same access to information about the portfolio funds compared to direct VC investments.

1.3 Performance & Risks of FoFs

Whilst research indicates that FoFs concentrating on buyouts or those that are generalist in nature yield considerably lower returns than direct fund investing, FoFs within VC perform similarly to those investing directly, even after the deduction of fees Harris et al., 2018). Hereby, Buyout funds focus on acquiring certain classes of securities of high-growth companies in mature industries. As buyout funds invest into more developed companies, they can promote lower levels of risk than VC funds, but also provide lower IRRs. VC FoF managers are more likely to overcome the extra layer of fees through smart fund selection or access than buyout

FoF, according to the available evidence (Harris et al., 2018). FoFs performance is also closely connected the optimal balance between risk reduction through diversification and the expected RoI. Research has attempted to determine if the integration of additional funds aids in diversifying a portfolio without compromising the characteristics of the invested funds (Stein et al., 2008). Most diversification benefits are achieved by building a portfolio of around six active funds. Additionally, the marginal increases in the number of funds are mostly insignificant since it is impossible to substantially increase the portfolio's Sharpe Ratio with a certain number of funds. However, the number of funds is also influenced by operational expenses and the size of assets (Brands & Gallagher, 2005). The challenge of portfolio building has been widely discussed and builds an important factor for the success of a FoF (Louton & Saraoglu, 2006; O'Neal, 1997; Park & Staum, 1998; Saraoglu & Detzler, 2002). FoFs often create expensive portfolios resembling index funds by selecting too many funds (Connelly, 1997). Overall, literature is controversial and does not provide a concluding answer on the optimal level of diversification for FoF. Risks of FoFs are strongly connected to the management team as strategies of investing in direct funds can be constrained by the manager selection skills and limits on fund access (Harris et al., 2018). Research based on historical fund performance data has demonstrated that the FoF investment risk is considerably lower than that of a direct fund investment. However, problems arise as the FoF risk profile is not well understood due to the opaque and illiquid markets, and the limited access to performance figures, that can be presented to potential investors (Weidig et al., 2004). As FoFs are connected to higher fees due to their double-cost structure, the success of the investment is heavily reliant on the skills of the FoF's management team. These skills are essential in the process of building FoF as the possibility of choosing one or several funds from a family of funds with similar strategies and exposure introduces the risk of high correlations among underlying funds. Therefore, it is crucial for the management team to identify the structured holdings or risk

factors of target funds, including factors that influence individual fund performance. FoF management teams can mitigate the risk of inefficient double or multiple exposures to the same assets or companies (Stein et al., 2008).

3. Venture Capital & Impact Investing

3.1 Venture Capital

VCs have become a crucial intermediary within financial markets, bridging the gap for early-stage funding. They purchase equity or equity-linked stakes from start-ups representing both high-risk and potentially high-reward investments (Gompers & Lerner, 2001). VCs invest in the different life stages of start-ups from ideation to maturity dependent on the partners track record, industry expertise, and capital available (**Appendix A**). Around 80% of start-ups fail, leaving VC funds with negative returns, while a single exit can tenfold the initial investments (Zider, 1998). VC funds therefore follow a power law, where one single investment can yield larger returns than all other investments combined (Ressi, 2023). PE & VC funds follow a J-curve for IRRs between the inception and determination, leading to a typical lifetime of 7 to 10 years. In the early stages there is typically a decline in value also called the valley of tears before the fund begins to show positive returns in later years (Meyer & Mathonet, 2005). Research on VC returns has demonstrated different results. The Cambridge Associates US PE and VC Index is a semi-annual report benchmarking return (**Appendix B**). Since 2010 annual VC funds IRRs ranged from 21% to up to 43% (Slotsky, 2022). Research conducted by Invest Europe, Europe's leading PE and VC association, concluded that European VCs' net annual returns hit 23.07% across the last 10 years, rising to 31.44% across the five years before 2022 (Invest Europe, 2023). A multitude of research efforts from the last decades analyzes average returns of VC, however results are very dispersed. Leading research includes "Building a venture capital index" by Peng, "Is it worth it? The rates of return from informal venture capital investments"

by Mason and Harrison, and “The risk and return of venture capital” by Cochrane (Peng, 2001; Mason & Harrison, 2002; Cochrane, 2005). Research has proven that there is a significant correlation between VC index and NASDAQ for returns and volatility (Peng, 2001). Moreover, it gives reason to suspect a correlation between VC returns and overall financial market conditions. Despite past index findings on fund returns, VCs usually target a 25-30% annual return rate (Zider, 1998) leading to a MOIC of 3x for a fund that typically runs for 10 years. Ruhnka et al. propose a commonly accepted VC return guideline that states approximately 30% of investments will be successful, while another 30% will constitute sideways deals, which are only marginally profitable and unable to achieve the portfolio's target return of 25-35%. The remaining 40% will be losers, that will be written off (Ruhnka, J. C. et al., 1991). This distribution is also supported by empirical studies such as DeHudy et al. who reported a VC survey of 218 portfolio investments of which 31% returned 2x to 10x, 30% returned 1x to 2x and 40% resulted in a partial or total loss. Cambridge Associates annual PE and VC index report highlighted that Net IRRs to LPs circulated around 25,56% for early-stage VC funds and at 11,94% for late-stage VC funds (Hand et al., 2020).

3.2 Impact Investing

Interest and activity in impact investments has increased significantly in the last decade as businesses, public authorities, and communities seek solutions to tackle social and environmental challenges (Ormiston et al., 2015). The Global Impact Investing Network (GIIN) defines impact investing as “investments made with the intention of generating positive, measurable social and environmental impact alongside a financial return” (Hand et al., 2020). While research indicates that impact funds generate ex-post 4.7 percentage points lower IRRs contrary to conventional VC funds (Barber et al., 2020), the market for impact investments has gained significant attention in recent years. To reach our climate goals and make our world

greener, more social, and livable, impact investments are indispensable. Research has drawn evidence that SRI funds have an increasing demand for responsibility (Bialkowski and Starks, 2016), including social signaling and preferences (Riedl and Smeets, 2017). Nevertheless, impact investing has also become subject to greenwashing with institutional investors branding purely profit-oriented investments as impact in industries that are related to positive externalities such as education or health (Starks et al., 2017). Based on a database of over 1,720 impact investors, GIIN estimated the size of the market in 2020 at 715 billion Dollars (Hand et al., 2020) growing to 1.164 trillion Dollars in 2022 (Hand et al., 2022). The report also highlighted that the majority players expect the market to grow while showcasing the increasing cumulative number of investments into impact (**Appendix C**). This growth and interest into impact investments is especially reflected in the Europe, where the EU has increased the available funding for impact investors from 1% in 2020 to 5% in 2022 (Lewis, 2022). Furthermore, Europe represents the region with the highest share of impact funding as a total of VC investment at 18% followed by the United States (8%) and Asia (4%). However, the US presents almost the double amount of impact funding with $69B compared to Europe with $35B in 2022. Europe experienced a strong growth rate of 5,5x in impact VC investments, while the US is only growing at a rate of 3,0x. Europe created 34 new future unicorns in 2022, only 4 less than the US, highlighting Europe's pathway of becoming a pioneer in impact investing (King, 2022, **Appendix D**).

3.3 Rise of Impact FoFs

Impact FoFs have recently gained a lot of traction with large asset management companies such as Golding or Allianz launching dedicated impact strategies. Investment firms aligning with the SDGs adopted by the UN are expected to attract investors more easily (Triodos Investment Management, 2022). In 2021, Allianz Global Investors built an innovative blended finance $500

Million FoF called EMCAF in partnership with the EIB. This early-stage equity focused fund aims to finance greenfield climate mitigation and adaptation projects in emerging markets (EMCAF, 2021). In 2019, Allianz already initiated its first closed impact 10-year FoF, AIIF, focusing on renewable energies, social housing, healthcare, education, sustainable land use and agriculture, timber industry and microfinance (AllianzGI, 2019). Golding Capital Partners, based in Munich, is a prominent independent asset manager for alternative investments in Europe. In 2021, they started raising a $300 Million Impact FoF pursuing a net IRR of 12 to 14% (Stolzenburg, 2021). In 2023, Golding Capital Impact fund was both classified under Article 8+ and 9 of the SDFR introduced by the EU (Stolzenburg, 2023). The SDFR regulations were implemented by the EU to provide more transparency, trust, and credibility to investors who seek to invest into impact-driven funds (European Commission, 2021). Zurich-based Alpha Associated started discussions for a $300 Million impact FoF in 2022, demonstrating that other PE investors are following the example of Allianz and Golding Capital (Mitchenall, 2022). According to industry experts a FoFs approach could close the complexity gap in impact investing. Impact investing adds complexity as not only financial, but also social return has to be considered. Additionally, investors suffer from diseconomies of scale as funds are typically smaller in the impact universe compared to traditional VC funds (Steele, 2022). Although the market of impact investments has flourished in the last few years, it still represents a small fraction compared to traditional investments. To reach the climate goals by 2030 provided by the UN, the demand for investments in impact is more crucial than ever before. While research has drawn evidence that FoFs reduce risk while providing sufficient IRRs compared to direct fund investments, they could close the funding gap and become the key to increase the lack of impact investment capital while also creating value in both financial and social return.

4. Methodology

4.1 Research Questions & Hypotheses

Recent studies indicate a growing trend in impact investing, bolstered by incentives from government bodies (Hand et al., 2022; Lewis, 2022). Literature has also demonstrated that FoFs with a focus on early-stage funding, also referred to VC, are roughly on a par with traditional direct VC investments (Harris at al., 2018). Despite the common belief that impact investments yield lower RoI due to higher risks compared to standard investments (Barber et al., 2020), an Impact FoF could close the funding gap by reducing risk through diversification. Research highlights that a FoF's success largely hinges on the capabilities and experience of its partners (Harris at al., 2018). Therefore, the construction of the FoF, which includes its structural design, portfolio assortment, and risk management, is essential for its prosperity. Furthermore, the proposed FoF design is decisive to convince potential LPs to invest during the FoF fundraising process. The following primary research question and underlying research questions and hypotheses were derived:

Main Research Question (RQ): Is there a market opportunity for a FoF in the European impact investment ecosystem?

RQ1: Is the European Impact VC market large enough for a FoF?

H_0: European Impact VC market size < 10 billion Euros

H_1: European Impact VC market size ≥ 10 billion Euros

RQ2: Does diversifying or concentrating portfolio funds in a FoF affect returns?

H_0: There is no significant difference in the FoFs expected returns between different levels of portfolio fund diversification, indicating that the number of portfolio funds does not influence investment returns.

H_1: There is a significant difference in the FoFs expected returns between different levels of portfolio fund diversification, indicating that increasing the number of portfolio funds leads to higher investment returns. In more concise terms:

H_0: $\mu 1 = \mu 2$ (μ = DPI/Net IRR)

H_1: $\mu 1 \neq \mu 2$

RQ3: How does a balanced versus a concentrated asset allocation strategy impact returns?

H_0: There is no significant difference in the FoFs expected returns between a multi-stage diversified allocation strategy and a concentrated asset allocation strategy (investing in specific segments), indicating that asset allocation strategy does not influence investment returns.

H_1: There is a significant difference in the FoFs average returns between a multi-stage diversified asset allocation strategy and a concentrated asset allocation strategy, indicating that a balanced asset allocation results in higher investment returns:

H_0: $\mu 1 = \mu 2$ (μ = DPI/Net IRR)

H_1: $\mu 1 \neq \mu 2$

4.2 Research Design & Methods

This paper adopts a quantitative, desk-based research approach employing a deductive, top-down methodology. Hypotheses are formulated and analyzed through literature review and benchmarking, drawing on industry-standard financial modelling techniques and secondary data. This research paper tests and evaluates various investment scenarios by adjusting input variables within the developed financial model. Conclusions can be made about the key factors that distinguish a successful fund structure. Furthermore, an evaluation of the financial potential of a European Impact FoF and the necessary steps for establishing such a fund can be conducted. Lastly, the research aims to critique previous studies on FoF growth and the development of fund portfolios. To analyze the market of Impact VC and assess its potential in

terms of size and distribution a descriptive data analysis method was chosen. Descriptive analysis represents the process of utilizing historical and present data to identify relationships and trends (Cote, 2021). A range of visualizing tables and charts is deployed in Excel to highlight key market characteristics and trends. The descriptive data analysis combined with the results of the different investment strategies run in the financial model aim to answer the hypotheses.

4.3 Data Collection

The Impact VC dataset was built based on secondary data sources including datasets from market research firms, firm registries, and company news pages. In the first step, an initial dataset featuring 72 European Impact VCs was exported from Dealroom (Renoldi & Belych, 2022), a global provider of data on startups and tech ecosystems. The dataset was complemented with VCs listed on Vestbee, a leading platform in central and western Europe connecting global investors with startups (Groszkowska, 2022). Further, an article published in Impact Shakers provided insights for funds that were closed in 2022 (Braeckman, 2023). Last but not least Shizune, a platform to find investors in specific industries and stages based on an algorithm (Shizune, 2023), was used to search for Impact VCs on a country-level. Unicorn Nest was used to find additional similar VCs while screening every individual fund, and to extract more data focusing on the preferred rounds, average ticket sizes, numbers of investments and portfolio companies of the VC (Unicorn Nest, 2023). Data gaps were identified by counter screening every entry through the VC's websites and PitchBook, a financial data company from the US (Pitchbook, 2023). By including multiple raw data sources missing datapoints were added, outliers in form of inactive or bankrupt funds were removed, and a database including a range of market-relevant entries was formed. Summarized a dataset with 128 active Impact VCs across Europe was built featuring the "name", a short "description" of the fund, date "founded",

"preferred round" of financing, location with both "city" and "country", the "number (#) of rounds", "portfolio size", "AUM", and the "number (#) of exits (**Appendix E**). The dataset of European Impact VCs features 128 European VC firms with a strong focus on impact investing into social, sustainable, and environmental-friendly business models.

5. Analysis

5.1 Impact VC Market Analysis

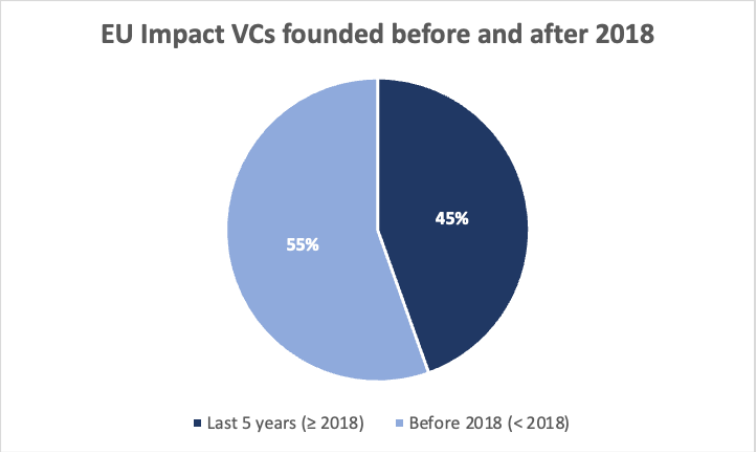

Figure 1. European Impact VCs Launches, based on personal analysis.

Figure 1 demonstrates the development of VC firm foundations within the past five years versus the years before. 71 Impact VCs representing 55% of the total number of VCs in the dataset were founded before 2018. 57 of Europe's Impact VC ecosystem, accounting for 45%, were founded in the last five years. 23% of all Impact VCs in Europe were founded within the last two years. *Figure 2* visualizes the distribution between the three preferred rounds Seed, Series A, and Growth. The segmentation of the VCs into these three categories is based on the typical start-up financing stages (**Appendix A**). the This figure is based on the number of funds and not the AUM. Seed focused Impact VCs represent the majority with 59 VC firms making up 46%, closely followed by Series A focused VCs with 44 VCs accounting for 34%. 25 late-stage Impact VCs in Europe represent 20% of the market.

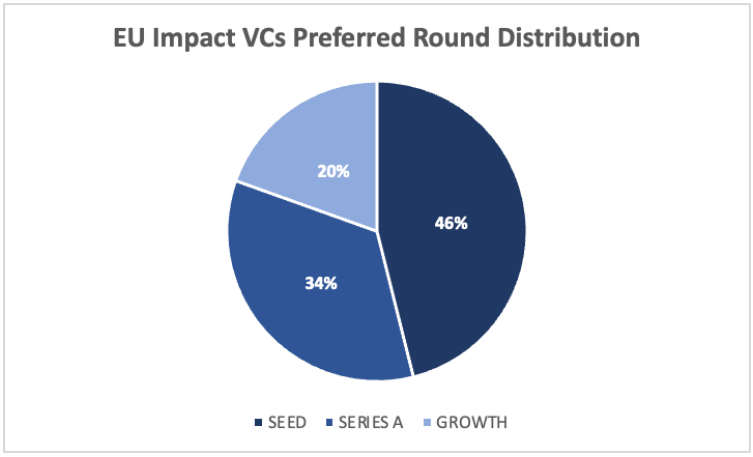

Figure 2. European Impact VCs Pref. Round Distribution, based on personal analysis.

The EU Impact VC ecosystem is distributed across 18 countries (**Appendix F).** Although it is widely distributed 62% of VCs originate from 4 countries. Led by the UK with 24%, both Germany and the Netherlands with 24%, and closely followed by France with 12%. The leftover 38% of Impact VCs are scattered across 14 EU countries. The European Impact VC market holds approximately 47,2 Billion Euros of AUM leaving an average of 368,8 Million Euros AUM per VC firm. Building upon *Figure 2.*, *Figure 3.* features the distribution of AUM across three defined preferred rounds: Seed, Series A, and Growth. Hereby, only 14% of the total AUM are represented in Seed VCs, 26 in Series A VCs, and the majority of 60% in Growth Funds.

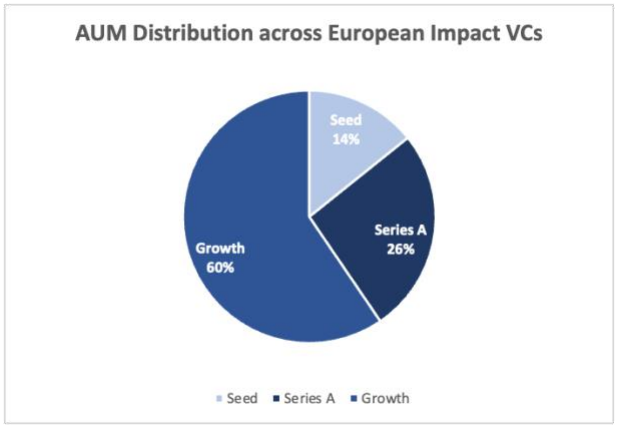

Figure 3. Deuringer, Julius. Distribution of AUM across European Impact VCs.

Figure 4. demonstrates the Average AUM of European Impact VCs across the preferred investing stages. The averages do not indicate the average fund sizes, as expecially VCs that have been actively operating for many years have multiple funds. Growth Impact VCs have on

average 1.1 Billion Euros in AUM, Series A oriented VCs approximately 280 Million Euros in AUM, and Seed VCs 114 Million Euros in AUM.

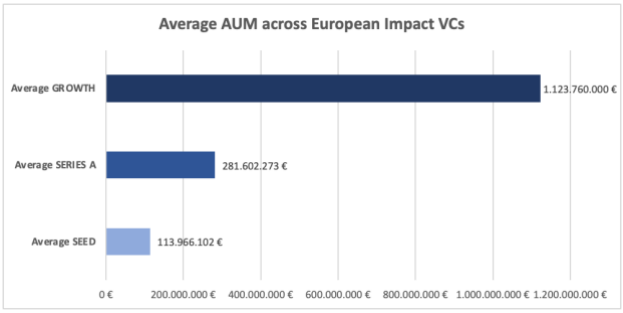

Figure 4. Average AUM across European Impact VCs, based on personal analysis.

5.2 Proposal of a FoF Model

5.2.1 Model Introduction

The financial model to evaluate different portfolio construction and investment strategies is divided into two spreadsheets. The first spreadsheet covers the "Model Inputs", meaning all assumptions and input variables that have an effect on the financial model (**Appendix G)**. The second spreadsheet displays the financial model (**Appendix H**). The Model Inputs sheet is divided into three sections: 1. Capital & Fund Structure Assumptions, 2. Portfolio Construction Assumptions, and 3. Risk & Return Assumptions.

5.2.2 Capital and Fund Structure

The fund size represents the Paid-in Capital (PIC) and can therefore also be referred to the AUM. The fund size of 250 million Euros was chosen to represent 0,5% of the overall Impact VC market in Europe and based on benchmarking and the fund sizes Golding Capital's and AllianzGI's Impact FoFs. The Investable Capital represents the capital available to invest after deducting all fund fees and operational expenses. GP Commit represents a specific percentage of the fund, the GP is required to personally invest. Organizational expenses include expenses in forming the fund, the GP, and any fund-related vehicles (Steinmann, 2014). These expenses

can range from 50k-300k+ dependent on the fund size, structure, and pricing of the respective legal firm (Kemeny, 2017). For the example of this model a one-time initial operational expense of 150k Euros was chosen. For the annual operating expenses 100k Euros were defined. The annual management fee was chosen based on GP Commit and therefore equals to 1,5% of the fund. In VC funds management fees are typically recycled and reinvested to maximize RoI. However, for the simplicity of this model, we assume the fund only commits one-time investments into VC funds. The carried interest was chosen based on industry standards and is equal to 20%. The investment period typically ranges from 3-5 years, and an average investment period of 4 years was chosen for this model. VC LP agreements commonly have a specified lifetime of 10 years (Gompers & Lerner, 1999). To ensure the majority of investments will close in time a FoF lifetime of 12 years was chosen. The EMCAF Impact FoF has a lifetime of 17 years, but also a longer investing period of 5 years (EMCAF, 2021). Preferably, the majority of investments should therefore be closed within the first 1-3 years.

5.2.3 Portfolio Construction

The second model input section is divided into Portfolio Distribution and Average Ticket Size (**Appendix G**). These are the key sections to test and evaluate different investment strategies. The dataset was segmented into three different types of VCs when it comes to preferred round. Seed-focused VCs, Series A focused VCs, and Growth focused VCs. The reasoning behind this segmentation are the different levels of risk and return according to the investment stage. Due to increasing start-up valuations across the investment stages, seed-staged investments provide sufficiently more equity at a lower cost of capital. It should be noted that early-stage VCs do typically support follow-on rounds when the respective milestones and pre-defined KPIs are achieved. The average ticket size has a major effect on the total number of portfolio companies in the fund. Large ticket sizes result in a higher equity stake within an invested fund, while

smaller ticket sizes enable a broader diversification and a higher number of investments. To keep the model coherent, average ticket sizes should be adjusted according to the VC preferred round. The fund size of a seed-focused VC ranged from 25-50 million AUM, Series A funds 50-150 million, and growth funds starting with Series B above 150 million EUR AUM.

5.2.4 Risk and Return Assumptions

The risk and return table (**Appendix G**) are used to assess the returns of different investment strategies within the financial model. There MOICs for the three VC fund segments are based on 4 different exit types: write-off, small, medium, and large. While VCs typically target an IRR of 25-30%, there is a sufficient risk of not achieving this threshold or returns of specific ventures at all. A write-off refers to the removal of a non-performing investment from a fund's balance sheet and assigning a value of zero (Antal, 2023). Other exit scenarios are trade sales, stock market exits (IPO), or the sale of shares to other funds, financial sponsors, or back to the company shareholders (Cumming & Johan, 2008). These exit scenarios can either provide moderate returns to the fund or in certain occasions, should an individual fund overperform also present exceptional returns. Therefore, in addition to write-offs small, medium, and large exits were chosen as possible scenarios. Typically, early-stage focused funds can have higher returns coupled with a higher risk profile compares to late-stage focused funds. The reasoning behind this is simple and related to the start-up valuations, as earlier venture stages allow more equity to be acquired at a lower cost or investment volume. Based on research conducted by Cambridge Associates including over 1,8 thousand US venture capital funds (1,161 early stage, 210 late stage, and 436 multi-stage funds), the pooled return to LPs over the last 30 years was at 25,56% for early-stage VC funds and at 11,94% for late-stage VC funds (Cambridge Associates, 2018).

5.2.5 Financial Model

The financial model is divided into five sections: Fund Investment Distribution, Investment Cadence, Fund Operating Expenses, Fund Return Analysis by Segment, and Return Analysis – Fund and LPs (**Appendix H**). Fund Investment Distribution demonstrates the total amounts invested per segment based on the portfolio distribution inputs and average ticket sizes inputs. The number of investments is always rounded off to ensure the total amount invested does not exceed the capital available. Therefore, the actual fund size is not equal to the investable capital. The uninvested capital will be added to the returns in the return analysis as this model. In a real case scenario, uninvested capital would either be used for follow-up rounds or smaller tickets, which are not considered in this model for simplicity purposes. The investment cadence gives an overview over the average number of investments per year per segment over the investing period of the first four years. The fund operating expenses summarize organizational and operational costs. Management fees are accordingly also added in this section. The Fund Return Analysis by Segment provides expected values of exits for the different exit types based on segment. The number of exits is therefore also given in fractional numbers as all assumptions are based on probabilities. The sum of the exits of all segments equals the total return of the fund. The last section, Return Analysis – Fund and LPs, gives a broader overview of the distribution of returns, expenses, and multiples. To calculate the FVI the Total Exit Returns are multiplied with the Uninvested Capital. Carried Interest is calculated by multiplying 20% with the final profits which care calculated by subtracting the Paid-in Capital and Operating Expenses from FVI. The Distributed Capital represents the total returns distributable to the LPs. Lastly, the fund multiples are calculated. MOIC focuses only on the overall fund multiple by dividing IVI with FVI. TVPI is equal to DPI and is calculated by diving the distributed capital by the Paid-in Capital. Gross IRR is calculated by dividing MOIC by the fund lifetime of 12

years. Net IRR is calculated by dividing DPI by the fund lifetime of 12 years and provides insights on the Net Return for LPs.

5.3 Investment Strategies

To test the financial model and explore the optimal fund structure seven investment strategies were deployed as displayed in *Table 1*. The first three strategies work with multi-stage diversified portfolios and changes in the average ticket sizes resulting in higher or lower ownership/equity stakes. The other four strategies focus on a segment-concentrated asset allocation with medium ownership changes. Therefore, average ticket sizes are adjusted accordingly to gain 20% in equity stakes of the respective portfolio funds. The first investment strategy (**S1**) keeps segment diversification across Seed, Series A and Growth fairly balanced, and a 20% equity stake for all segments based on the respective average ticket sizes. The 2nd Investment strategy **(S2)** focuses on low ownership due to lower average ticket sizes. Thereby, the number of invested funds is increasing and diversifying the portfolio. The 3rd investment strategy **(S3)** represents the counteracting strategy of having a more concentrated FoF with high ownership and a low number of funds. **S4**, **S5**, and **S6** are segment concentrated investment strategies with a focus on only one segment and medium equity stakes of 20%. **S7** builds upon S6 and differentiates with low ownership and a higher number of invested growth funds.

	Model Inputs								
	Portfolio Distribution (%)			Average Ticket Size (€)			Equity Stake (%)		
	Seed	Series A	Growth	Seed	Series A	Growth	Seed	Series A	Growth
S1 (Multi-stage diversified & medium ownership)	40%	30%	30%	10.000.000 €	20.000.000 €	30.000.000 €	20%	20%	20%
S2 (Multi-stage diversified & low ownership)	40%	30%	30%	5.000.000 €	10.000.000 €	15.000.000 €	10%	10%	10%
S3 (Multi-stage diversified & high ownership)	40%	30%	30%	15.000.000 €	30.000.000 €	45.000.000 €	30%	30%	30%
S4 (Seed concentrated & medium ownership)	100%	-	-	10.000.000 €	-	-	20%	-	-
S5 (Series A concentrated & medium ownership)	-	100%	-	-	20.000.000 €	-	-	20%	-
S6 (Growth concentrated & medium ownership)	-	-	100%	-	-	30.000.000 €	-	-	20%
S7 (Growth concentrated & low ownership)	-	-	100%	-	-	15.000.000 €	-	-	10%

Table 1. Investment Strategies Model Inputs, based on personal analysis.

6. Results & Discussion

6.1 European Impact VC Market

To answer **RQ1** and determine whether there is a big enough market (≥ 10 billion EUR) for an impact FoFs across Europe the developed dataset with a sample size of 128 VC firms was analyzed. This database gives a unique overview of the European Impact VC market, and it represents the most accurate and detailed database ever created in the field. With over 47 billion Euros AUM, the European Impact VC market provides a sufficient size to position a medium-sized Impact FoF with 250 million Euros AUM. Not only is the market big enough, but also expected to further grow steadily and the number of new and existing organizations investing into impact projects has been increasing year-by-year. While the market is growing, the demand for impact investments is rising too (Ormiston et al., 2015). This shift towards impact investments is also supported by the EU building the pathway for more responsible investments with the SFDR (J.P. Morgan, 2023). While the number of new Impact VCs has tremendously increased within the last five years with over 57 new firms, the development of FoFs making impact investments more attractive for risk-averse investors has only started. Led by AllianzGI, EIB, and Golding Capital are providing proof of concept for an Impact FoF. Therefore, $\mathbf{H_0}$ is rejected in favor of $\mathbf{H_1}$ and there is a large enough market for an Impact FoF across Europe.

6.2 Structure of an Impact FoF

Firstly, the performance of investment strategies with a multi-stage diversified portfolio coupled with different levels of ownership are evaluated. *Table 2* demonstrates the results of the financial model for the seven investment strategies. The “Expected Exit Values” in S1/S2 are exactly the same supporting academic findings that at a certain point marginal increases in the number of funds become largely insignificant (Brands & Gallagher, 2005). However, a FoF with 13 active funds provides higher expected exit returns than a FoF with only eight active funds, challenging the academic findings that a FoF with 6 active funds optimally balances risk

and return (Brand & Gallagher, 2005). At first glance, S3 (multi-stage diversified – high ownership) simply provides lower returns than S1/S2 when comparing the expected exit values. However, challenging the strategies in *Table 3* shows that 20 million Euros were left uninvested in this strategy. With an additional investment into a seed fund (average ticket size of 15 million Euros), FVI would very likely exceed 494,550 million Euros and get closer or even cross the FVI's of S1/S2 of 509,550 million Euros. In a multi-stage diversified portfolio it is therefore important to adjust the asset allocation based on the available capital and individual average ticket sizes. Based on the return analysis given in *Table 4*, both DPI and Net IRR were higher with an increasing number of portfolio funds, answering **RQ2**. Summarizing, $\mathbf{H_0}$ is rejected in favor of $\mathbf{H_1}$, indicating that there is a significant difference in FoFs average returns between different levels of portfolio fund diversification, indicating that increasing the number of portfolio funds leads to higher investment returns. Secondly, the performance of segment-concentrated investment strategies, given in "Seed", "Series A", and "Growth", are being evaluated. The number of investments varies, and a balanced 20% equity stake was chosen per investment. Therefore, S4 has invested in 20 funds compared to S6 with only six investments. Based on the chosen MOIC in the "model input risk and return assumptions", S4 with a focus on seed funds provides the highest expected values compared to the lowest given in S6.

	Financial Model Results (1)							
	Number of Investments (#)				Expected Exit Values (€)			
	Seed	Series A	Growth	Total	Seed	Series A	Growth	Total
S1 (Multi-stage diversified - medium ownership)	8	3	2	13	248.000.000 €	180.000.000 €	78.000.000 €	506.000.000 €
S2 (Multi-stage diversified - low ownership)	16	6	4	26	248.000.000 €	180.000.000 €	78.000.000 €	506.000.000 €
S3 (Multi-stage diversified - high ownership)	5	2	1	8	232.500.000 €	180.000.000 €	58.500.000 €	471.000.000 €
S4 (Seed concentrated - medium ownership)	20	-	-	20	620.000.000 €	-	-	620.000.000 €
S5 (Series A concentrated - medium ownership)	-	10	-	10	-	600.000.000 €	-	600.000.000 €
S6 (Growth concentrated - medium ownership)	-	-	6	6	-	-	234.000.000 €	234.000.000 €
S7 (Growth concentrated - low ownership)	-	-	13	13	-	-	380.250.000 €	380.250.000 €

Table 2. Investment Strategies FM Results, based on personal analysis.

The Return Analysis in *Table 3* indicates that the highest return for the fund ("Carried interest") and LPs ("Distributed Capital") is achieved with S4 solely focusing on Seed VC funds.

Focusing only on Growth funds with an equity stake of 20% per fund would result in a loss for both the FoF and the LPs in this model. As 23,55 million Euros were left uninvested in S6, an alternative strategy S7 was developed with a lower equity stake. Nonetheless, the prospect of annually attaining a quantity of new growth funds within the range of three to five appears markedly unfeasible. Consequently, securing an adequate number of portfolio funds to implement such a strategy in a practical real-world setting remains highly improbable.

	Financial Model Results (2)							
	Return Analysis (€)							
	Paid-in Capital	Investable Capital	Invested Capital	Univested Capital	FVI	Cost of Investment	Carried Interest	Distributed Capital
S1	250.000.000 €	203.550.000 €	200.000.000 €	3.550.000 €	509.550.000 €	46.450.000 €	42.620.000 €	420.480.000 €
S2	250.000.000 €	203.550.000 €	200.000.000 €	3.550.000 €	509.550.000 €	46.450.000 €	42.620.000 €	420.480.000 €
S3	250.000.000 €	203.550.000 €	180.000.000 €	23.550.000 €	494.550.000 €	46.450.000 €	39.620.000 €	408.480.000 €
S4	250.000.000 €	203.550.000 €	200.000.000 €	3.550.000 €	623.550.000 €	46.450.000 €	65.420.000 €	511.680.000 €
S5	250.000.000 €	203.550.000 €	200.000.000 €	3.550.000 €	603.550.000 €	46.450.000 €	61.420.000 €	495.680.000 €
S6	250.000.000 €	203.550.000 €	180.000.000 €	23.550.000 €	257.550.000 €	46.450.000 €	-7.780.000 €	218.880.000 €
S7	250.000.000 €	203.550.000 €	195.000.000 €	8.550.000 €	388.800.000 €	46.450.000 €	18.470.000 €	323.880.000 €

Table 3. Investment Strategies FM Results (Return Analysis), based on personal analysis.

Table 4 compares the investment strategies in terms of "Return Multiples". The MOIC range from 1,03 to 2,49 with a Seed focused FoF presenting the highest MOIC and a growth focused FoF the lowest MOIC. However, when just looking "FVI" compared to the "Invested Capital", S3, with a portfolio of eight funds presents a higher multiple. TVPI is slightly lower, as expenses and the carried are subtracted. Compared to direct investments into VC, FoF are being outperformed. The double cost-structure leads to lower Net IRRs in comparison. While pooled horizon returns have hit over 25% for early-stage VC and over 12% for late-stage VC in the US (Hand et al., 2020), FoF Net IRR range from 11% (S6) to 17% (S4) based on this model. Looking at **RQ3**, the returns of segment-concentrated investment strategies given with S4/S5 provided the highest returns. Therefore, $\mathbf{H_0}$ is rejected in favor of $\mathbf{H_1}$, indicating that there is a significant difference in the FoF's average returns between a multi-stage diversified asset allocation strategy and a concentrated asset allocation strategy, indicating that a balanced asset allocation results in higher investment returns.

	Financial Model Results (3)				
	Multiples (#; %)				
	MOIC	MOIC2*	TPVI/DPI	Gross IRR	Net IRR
S1 (Multi-stage diversified - medium ownership)	2,04	2,55	1,68	17,0%	14,0%
S2 (Multi-stage diversified - low ownership)	2,04	2,55	1,68	17,0%	14,0%
S3 (Multi-stage diversified - high ownership)	1,98	2,75	1,63	16,5%	13,6%
S4 (Seed concentrated - medium ownership)	2,49	3,12	2,05	20,8%	17,1%
S5 (Series A concentrated - medium ownership)	2,41	3,02	1,98	20,1%	16,5%
S6 (Growth concentrated - medium ownership)	1,03	1,43	0,88	8,6%	0,0%
S7 (Growth concentrated - low ownership)	1,56	1,99	1,30	13,0%	10,8%

**MOIC2 is calculated by dividing FVI by Invested Capital*

Table 4. Investment Strategies FM Results (Multiples), based on personal analysis.

The investment strategies provide insights into the major factors influencing the performance of a FoF. In terms of asset allocation early-stage oriented PEFoFs result in higher returns than late-stage oriented PEFoFs. Furthermore, a balanced number of FoFs similar to existing Impact FoFs around 13 active funds resulted in the most promising exit values. It is important to consider the interdependence between the average ticket size and number of funds. The lower the average ticket size, the lower the equity stake per fund, and the higher number of funds within the portfolio. FoF managers have to find the "sweet spot" with the optimal number of funds by challenging different scenarios within a financial model based on fund structure and AUM. Late-stage VC investments present less risk and a lower probability of write-offs (*Table 1*). Given the size and growth of the Impact VC, as well as the results and learnings from the financial model, the research question whether the is a market opportunity for a FoF in the European impact investment ecosystem can be answered. There is a sufficient market coupled with interest from investors and support from public authorities. Furthermore, the results of the financial model demonstrated that a FoFs can compete with industry index returns for PE. While the pooled horizon returns for PE reached a Net IRR of 13% over the last 25 years (Cambridge Associates, 2023), results of this research demonstrated Net IRRs ranging from 11% to 17%. Therefore, this research paper suggests the development of a European Impact FoFs with a focus on early-stage VC.

6.3 Limitations & Future Research

While risks and returns of VC and FoFs have been widely discussed in academics, more detailed and segmented research is required to evaluate the performance of PEFoFs. While Cambridge Associates already provide significant insights into returns of early-stage compared to late-stage VC in the US, there is lacking research on the performance of European VC. In addition to that, early-stage VC is scattered into pre-seed, seed, and Series A, where each stage of funding promotes unique risk and return dimensions. Furthermore, research on VC fund performance is lacking in terms of outcome performance. While there is research on average returns of VC funds, and also start-up failure and return probabilities, there is no sufficient research providing insights into exit scenarios and respective probabilities. The probabilities used for different exit types in the model inputs are based on logic assumptions. To receive more accurate and real-world driven model results, more research on this topic should be conducted in the future. The financial model was also limited by empirical findings on organizational and operational expenses and are therefore biased by the researcher's perception. Therefore, the effect of increasing costs with an increasing number of funds on the FoF's returns was not included. In general, more qualitative research on FoF structure and fees would be beneficial for both academia and industry. While this paper and the underlying model focus dominantly on risks and returns, FoF structure, and portfolio design, the incorporation of an impact thesis was not discussed. Although VC were carefully chosen based on their industry investment focus such as climate, sustainability, etc., more transparency in form of certifications of the individual VCs should be included when screening different funds. Lastly, there is a lack of empirical studies on financial modelling in VC and PE. Further research on building financial models tailored to early-stage investments should be conducted based on industry insights and best practices. This knowledge would be extremely valuable in improving the presented model and provide more accurate insights into different portfolio investment strategies.

7. Conclusion

This paper assessed the market opportunity of a FoF in the European impact investment ecosystem. It was found that the development of an Impact PEFoF is viable and would provide sufficent returns alligned with industry standards. Based on extensive market research, this paper revealed that the European Impact VC market has over 47 billion Euros in AUM across 128 active VCs, which supported the conclusion that the market is sizable and poised for growth, making it a viable opportunity for an Impact FoF. This conclusion is supported by a rising interest in impact investing coupled with support from public authorities, as highlighted in the literature review. The financial model showed that early stage concentrated FoFs focusing on seed VC funds offer higher returns, albeit with increased risk. Furthermore, a diversified portfolio with more funds generally resulted in higher returns compared to a concentrated FoF with fewer investments. The paper also highlights the relationship between average ticket size and the number of funds in the portfolio. Lower average ticket sizes led to a more diversified portfolio, potentially resulting in higher returns. However, FoF managers must strike a balance based on the specific fund structure and AUM. Late-stage VC investments, while presenting lower risk, were associated with lower returns. Despite these findings, the paper acknowledged limitations and need for future research, particularly the need for more detailed research on VC and FoF performance in the European context. The study also stressed the importance of incorporating an impact thesis and transparent certifications when screening impact funds. In conclusion, the research suggests a market opportunity for a European Impact FoF, whos success will require the expertise of PE and VC professionals with a strong track record and industry knowledge. Further research and refinement of financial models tailored to early-stage investments are essential to enhance decision-making in this field.

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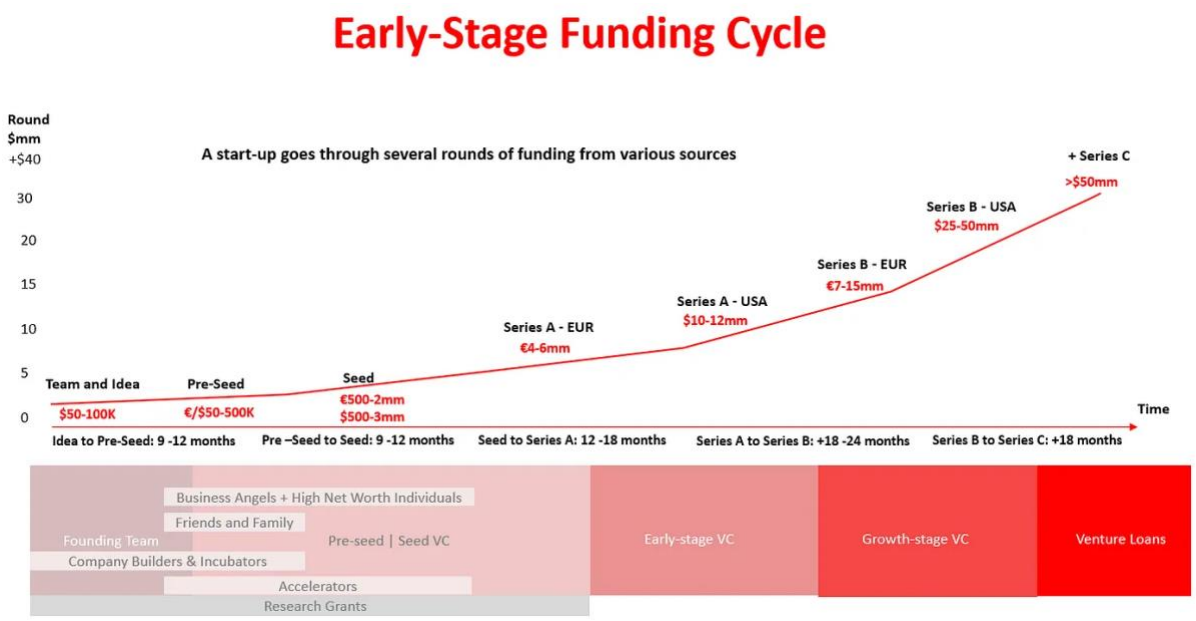
Appendix A – Early-Stage Funding Cycle



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Appendix B – US VC Horizon Pooled Return (Net to LPs)

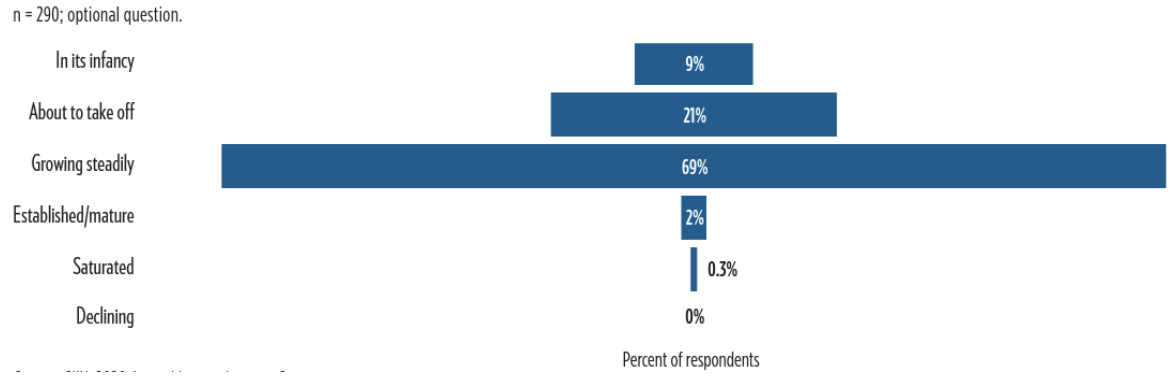
US Venture Capital: Fund Index Summary: Horizon Pooled Return
Net to Limited Partners

Index	1-Quarter	YTD	1-Year	3-Year	5-Year	10-Year	15-Year	20-Year	25-Year	30-Year
Cambridge Associates LLC US Venture Capital Index®[1]	**5.99**	**10.16**	**17.18**	**7.43**	**16.03**	**10.22**	**10.29**	**21.70**	**29.78**	**19.65**
US Venture Capital - Early Stage Index[1]	**6.80**	**11.13**	**19.40**	**7.61**	**17.35**	**10.61**	**10.07**	**77.26**	**43.37**	**25.56**
US Venture Capital - Late & Expansion Stage Index[1]	**5.13**	**11.30**	**17.56**	**7.63**	**12.98**	**10.56**	**11.14**	**9.16**	**11.51**	**11.94**
US Venture Capital - Multi-Stage Index[1]	**4.90**	**8.10**	**13.36**	**7.04**	**14.86**	**9.47**	**10.43**	**9.16**	**14.00**	**12.43**
Bloomberg Barclays Government/Credit Bond Index	-0.33	-1.90	-0.63	1.83	2.29	3.78	3.71	4.73	5.15	6.16
Dow Jones Industrial Average Index	1.26	-0.73	16.31	14.07	12.96	10.78	9.57	7.60	10.59	11.21
Dow Jones US Small Cap Index	4.84	4.21	14.62	8.63	11.31	10.46	10.85	9.17	10.55	—
Dow Jones US TopCap Index	3.46	2.79	14.48	11.81	13.39	10.21	9.58	6.65	9.58	—
Nasdaq Composite Index*	6.33	8.79	22.31	14.62	17.15	12.60	10.75	7.13	9.93	10.32
Russell 1000® Index	3.57	2.85	14.54	11.64	13.37	10.20	9.54	6.74	9.70	10.46
Russell 2000® Index	7.75	7.66	17.57	10.96	12.46	10.60	10.50	8.03	9.59	9.85
S&P 500 Index	3.43	2.65	14.37	11.93	13.42	10.17	9.30	6.46	9.60	10.35
Wilshire 5000 Total Market Index	3.83	3.04	14.66	11.85	13.36	10.23	9.73	6.86	9.65	10.33

Cambridge Associates, US Venture Capital: Fund Index Summary: Horizon Pooled Return (Cambridge Associates LLC, 2018), page 8, figure 1.

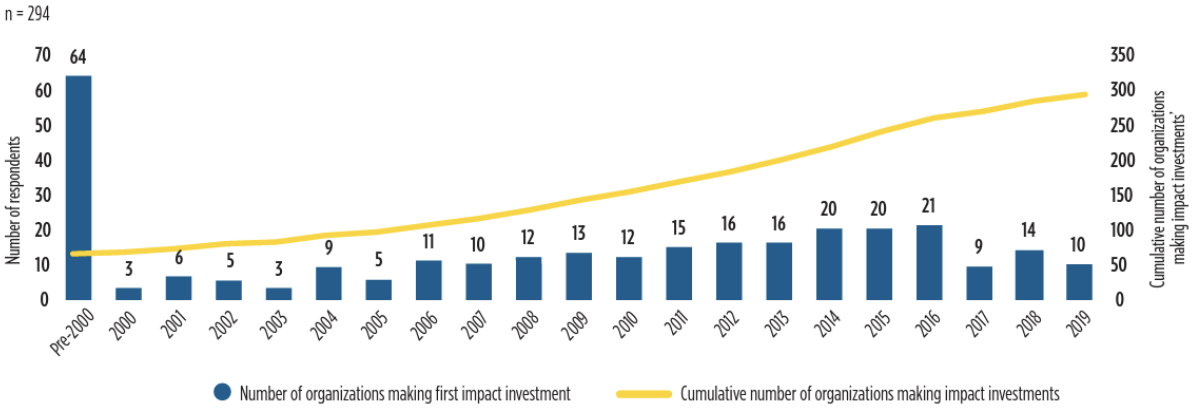
Appendix C – Impact Investments Market (GIIN)

Impact Investment Market Growth



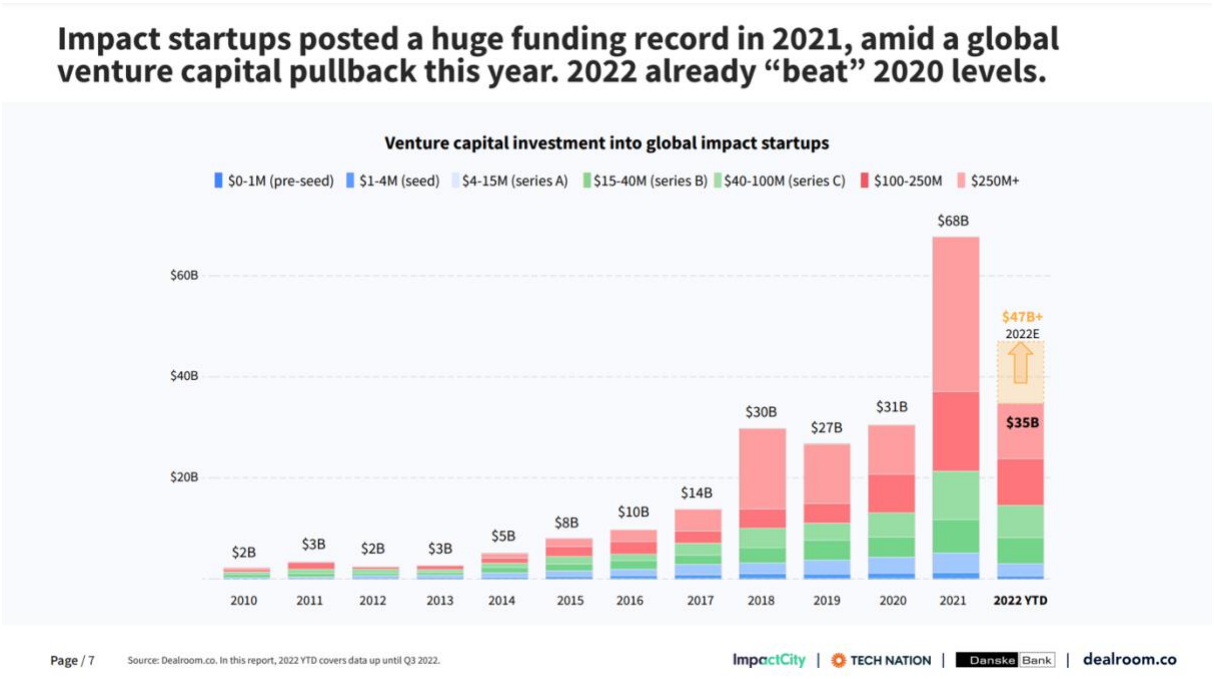
Hand, D., Dithrich, H., Sunderji, S., & Nova, N. 2020. Annual Impact Investor Survey 2020. GIIN. Page 7, figure 9. https://thegiin.org/research/publication/impinv-survey-2020/

Number of Impact Investments (2000-2019)



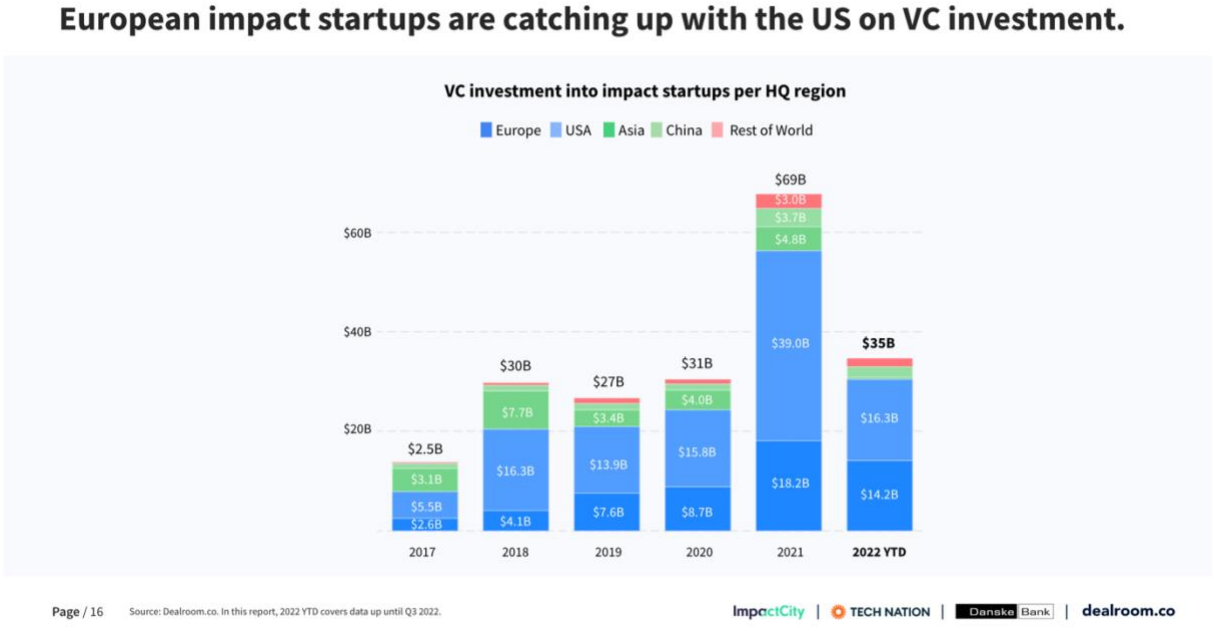
Hand, D., Dithrich, H., Sunderji, S., & Nova, N. 2020. Annual Impact Investor Survey 2020. GIIN. Page 4, figure 4. https://thegiin.org/research/publication/impinv-survey-2020/

Appendix D – Impact VC & Start-ups (Dealroom)



King, S. 2022. The state of Impact Startups & VCs in 2022 | Dealroom.co.

Dealroom.co. https://dealroom.co/blog/the-state-of-impact-startups-vcs-in-2022



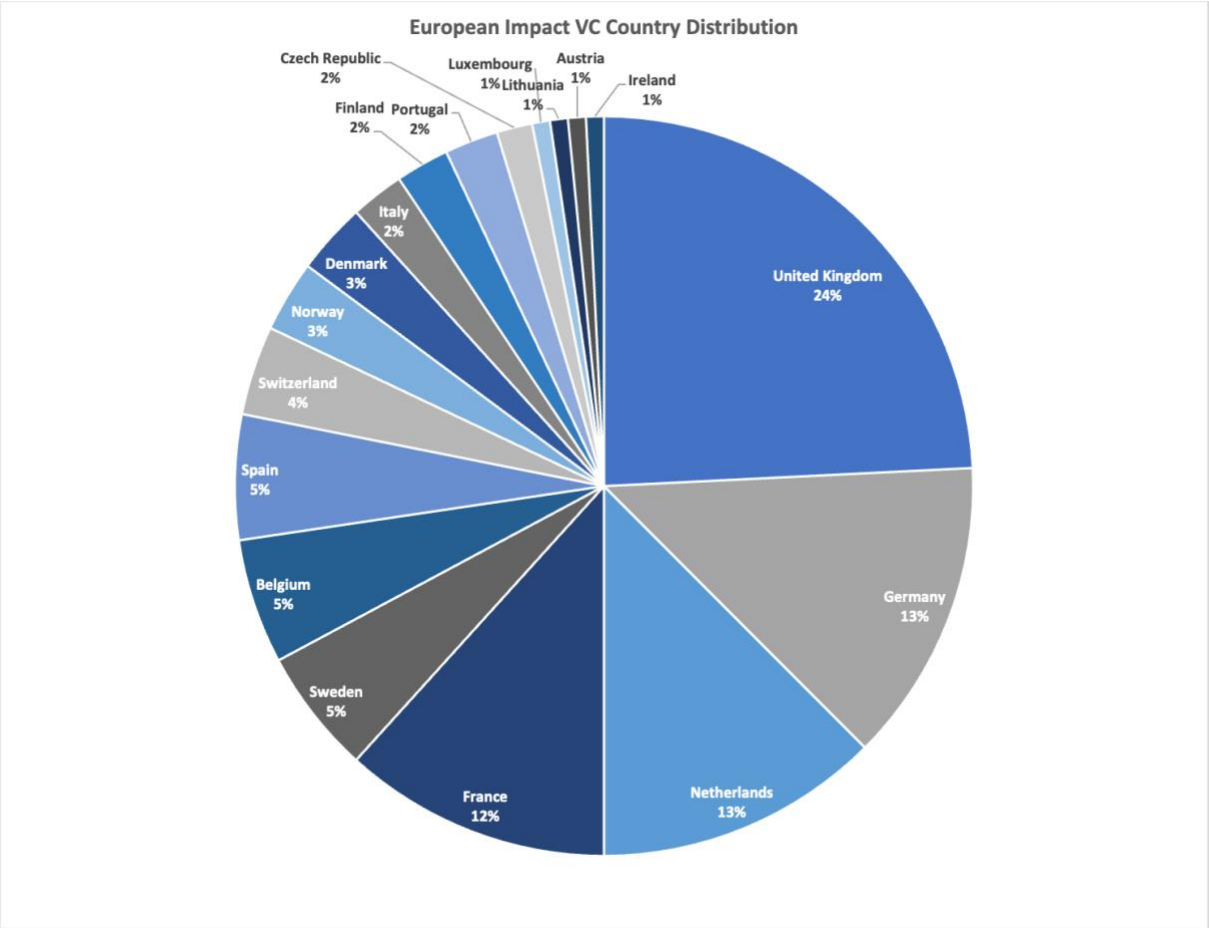
King, S. 2022. The state of Impact Startups & VCs in 2022 | Dealroom.co.

Dealroom.co. https://dealroom.co/blog/the-state-of-impact-startups-vcs-in-2022

Appendix E – Dataset of European Impact VCs

ID	Name	Description	Founded	Preferred Round	City	Country	# of Rounds	Portfolio size	AUM	# of Exits
1	2150	We provide Con	2020	SERIES A	London	United Kingdom	24	18	312.000.000,00 €	0
2	4Impact	Venture Capital f	2019	SERIES A	The Hague	Netherlands	19	19	114.000.000,00 €	1
3	Ada Ventures	Ada Ventures is a	2018	SEED	London	United Kingdom	60	52	84.000.000,00 €	2
4	Aenu	AENU is an impa	2022	SERIES A	Berlin	Germany	24	19	100.000.000,00 €	-
5	Alantra Energy Transition Fund	Alantra is a globa	2022	GROWTH	Madrid	Spain	25	24	210.000.000,00 €	10
6	Almi Invest Greentech	Investing for net	2017	SEED	Stockholm	Sweden	586	503	305.000.000,00 €	-
7	Alter Equity	Alter Equity spec	2009	SERIES A	Paris	France	21	27	150.000.000,00 €	1
8	Ananda Impact Ventures	Invests in Europe	2010	SERIES A	Munich	Germany	49	38	200.000.000,00 €	1
9	APVentures	AP Ventures is ar	2018	GROWTH	London	United Kingdom	26	17	451.000.000,00 €	-
10	Aqua-Spark	Aqua-Spark is bu	2013	SERIES A	Utrecht	Netherlands	22	37	450.000.000,00 €	-
11	Ascension VC	Ascension is an e	2015	SEED	London	United Kingdom	246	167	83.000.000,00 €	12
12	Astanor Ventures	Investing across	2017	GROWTH	Brussels	Belgium	40	36	800.000.000,00 €	2
13	Aster Capital	Aster is a Climate	2000	SEED	Paris	France	191	64	500.000.000,00 €	13
14	BackingMinds	Backing great un	2016	SEED	Stockholm	Sweden	21	15	75.000.000,00 €	0
15	Bethnal Green Ventures (BGV)	We're Bethnal Gi	2012	SEED	London	United Kingdom	146	146	300.000.000,00 €	3
16	Blue Horizon Corporation	Company accele	2016	GROWTH	Zurich	Switzerland	110	83	940.000.000,00 €	7
17	BlueImpact	We focus on pre	2017	SEED	Berlin	Germany	13	12	75.000.000,00 €	-
18	BlueOcean Ventures	BlueOcean Vents	2007	SEED	Geneva	Switzerland	22	20	28.000.000,00 €	9
19	BlueYard Capital	Venture capital f	2016	SERIES A	Berlin	Germany	69	51	560.000.000,00 €	1
20	BonVenture Management	Partner for socia	2003	SERIES A	Munich	Germany	26	60	150.000.000,00 €	2
21	Borski Fund	Borski Fund inve	2019	SEED	Amsterdam	Netherlands	16	13	40.000.000,00 €	0
22	Bridges Fund Management	Bridges is a speci	2002	GROWTH	London	United Kingdom	53	53	1.400.000.000,00 €	8
23	Capagro	From smarter ag	2014	SERIES A	Paris	France	30	23	324.000.000,00 €	-
24	Citizen Capital	Finance and supp	2008	SERIES A	Paris	France	33	37	296.000.000,00 €	2
25	Clean Growth Fund	Empowering ear	2020	SERIES A	London	United Kingdom	15	12	115.000.000,00 €	-
26	Climate VC	Climate VC is a U	2022	SEED	London	United Kingdom	0	0	41.000.000,00 €	-
27	Climentum Capital	We invest in Eur	2022	SERIES A	Copenhagen	Denmark	10	10	150.000.000,00 €	-
28	Contrarian Ventures	Hands-on, comm	2017	SERIES A	Vilnius	Lithuania	40	23	112.500.000,00 €	3
29	Creas	Invests in compa	2009	SEED	Madrid	Spain	20	20	30.000.000,00 €	10
30	Demeter Partners	Demeter is a maj	2005	SERIES A	Paris	France	178	178	1.000.000.000,00 €	15
31	Den Sociale Kapitalfond	Den Sociale Kapi	2011	SEED	Copenhagen	Denmark	-	-	39.000.000,00 €	-
32	DOEN Participaties	DOEN Participat	1991	SERIES A	Amsterdam	Netherlands	63	42	150.000.000,00 €	3
33	ECAPITAL	Venture capital f	2006	SERIES A	Münster	Germany	87	72	280.000.000,00 €	26
34	EIT InnoEnergy	InnoEnergy's dea	2008	GROWTH	Eindhoven	Netherlands	176	119	140.000.000,00 €	2
35	Emerald Technology Ventures	Investing in susta	2000	GROWTH	Zurich	Switzerland	65	54	1.000.000.000,00 €	11
36	Enion Venture Partners	Investing in early	2021	SEED	Barcelona	Spain	0	0	25.000.000,00 €	-
37	EQT Future	Investing behind	2021	GROWTH	Stockholm	Sweden	3	3	350.000.000,00 €	-
38	ETF Partners	We invest in inno	2006	GROWTH	London	United Kingdom	54	41	2.100.000.000,00 €	15
39	European Circular Bioeconomy I	ECBF is a growth	2020	GROWTH	Bonn	Germany	12	10	300.000.000,00 €	0
40	Extantia Capital	Climate-first ven	2020	SERIES A	Berlin	Germany	11	9	100.000.000,00 €	0
41	Faber Ventures	We invest in teac	2012	SEED	Lisbon	Portugal	47	36	53.000.000,00 €	3
42	Founders Future	Created by entre	2018	SEED	Paris	France	86	83	216.000.000,00 €	3
43	Future Planet Capital	Future Planet Ca	2016	SEED	London	United Kingdom	239	134	400.000.000,00 €	11
44	Future Positive Capital	Pan-European ea	2017	SEED	Paris	France	27	17	57.000.000,00 €	1
45	Gateway Ventures	We connect inve	2015	SEED	Vienna	Austria	38	38	23.000.000,00 €	-
46	Giant Ventures	Giant builds and	2019	GROWTH	London	United Kingdom	43	39	520.000.000,00 €	3
47	Global Cleantech Capital	We invest in ente	2022	GROWTH	Amsterdam	Netherlands	9	9	75.000.000,00 €	-
48	Global Social Impact Investmen	Improving the liv	2021	SEED	Madrid	Spain	-	-	50.000.000,00 €	-
49	Good Soil VC	GOODsoil focuse	2017	SEED	London	United Kingdom	3	10	41.000.000,00 €	0
50	Goodwell Investments	Investment firm	2006	SERIES A	Amsterdam	Netherlands	26	16	330.000.000,00 €	0
51	Green Angel Ventures	Green Angel Syn	2017	SEED	London	United Kingdom	37	28	10.000.000,00 €	-
52	Green Generation Fund	Investing in the t	2021	SERIES A	Berlin	Germany	18	12	100.000.000,00 €	-
53	Grid VC	We invest to tech	2017	SEED	Espoo	Finland	8	8	3.000.000,00 €	-
54	Growth Impact Fund	We offer social p	2022	SEED	London	United Kingdom	-	-	29.000.000,00 €	-
55	Helen Ventures	Helen Ventures i	2019	SEED	Helsinki	Finland	12	12	50.000.000,00 €	-
56	IBBVentures	IBB Ventures is fo	1997	SEED	Berlin	Germany	228	149	120.000.000,00 €	28
57	Icos Capital	Icos is a collabor	2005	GROWTH	Rotterdam	Netherlands	30	28	987.000.000,00 €	1
58	Impact Expansion	Impact Expansio	2023	GROWTH	Brussels	Belgium	3	3	120.000.000,00 €	-
59	IMPACT Partners	Socially orientec	2007	GROWTH	Paris	France	180	180	330.000.000,00 €	0
60	Impact Ventures UK	Impact Ventures	2007	SEED	London	United Kingdom	25	25	35.000.000,00 €	2
61	Impact X Capital	We are a double	2018	SERIES A	London	United Kingdom	21	17	130.000.000,00 €	1
62	Indico Blue Fund	Supporting the t	2022	SEED	Lisbon	Portugal	-	-	50.000.000,00 €	-
63	Infinium Partners	Invest in and cre	2021	SEED	London	United Kingdom	5	4	25.000.000,00 €	-
64	Innovating Justice Fund	Investing in acce	2022	SEED	The Hague	Netherlands	-	-	10.000.000,00 €	-
65	Inven Capital	Invests in small t	2014	GROWTH	Prague	Czech Republic	36	19	500.000.000,00 €	4
66	Inventures Investment Partners	The First Europe	2011	SEED	Brussels	Belgium	32	31	40.000.000,00 €	3
67	Investir & +	Investment struc	2005	SERIES A	Paris	France	21	24	255.000.000,00 €	2
68	Jenson Funding Partners	Capturing the op	2012	SEED	London	United Kingdom	42	35	88.000.000,00 €	-
69	Junction	Energy transitior	2022	GROWTH	Antwerp	Belgium	5	5	125.000.000,00 €	-
70	Katapult VC	Katapult Amplifi	2016	SEED	Oslo	Norway	138	138	50.000.000,00 €	-
71	Kiko Ventures	An approach tha	2021	SERIES A	London	United Kingdom	12	12	427.000.000,00 €	-
72	Lightrock	They support dri	2009	GROWTH	London	United Kingdom	138	109	4.000.000.000,00 €	12
73	MSM	Invests in and su	2018	SEED	Lisbon	Portugal	44	28	45.000.000,00 €	1
74	Munich Venture Partners	Munich Venture	2004	GROWTH	Munich	Germany	33	17	196.000.000,00 €	6
75	Mutuelles Impact	Mutuelles Impac	2022	SEED	Lyon	France	-	-	80.000.000,00 €	-
76	Nesta Impact Investments	Nesta Investmen	2000	SERIES A	London	United Kingdom	43	37	120.000.000,00 €	0
77	Nina Capital	Investing in neec	2019	SEED	Barcelona	Spain	55	43	58.000.000,00 €	1
78	Norrsken VC	We are a venture	2016	SERIES A	Stockholm	Sweden	62	51	205.000.000,00 €	2
79	Nysnø Climate Investments	Making profitabl	2017	SERIES A	Stavanger	Norway	20	20	466.000.000,00 €	3
80	Octupus Ventures	We back founde	2008	SERIES A	London	United Kingdom	391	253	2.170.000.000,00 €	33
81	Oltre Impact	Italian Impact In	2006	SERIES A	Milan	Italy	19	30	123.000.000,00 €	2
82	Opes Impact Fund	Opes Impact Fun	2013	SERIES A	Milan	Italy	42	42	283.000.000,00 €	0
83	Pale blue dot	Seed stage Clima	2020	SEED	Malmö	Sweden	32	24	87.000.000,00 €	0
84	Planet A Ventures	Planet A Venture	2020	SERIES A	Berlin	Germany	17	20	160.000.000,00 €	0
85	Planetary Impact Ventures	Businesses that c	2020	SEED	Humlebæk	Denmark	1	1	14.000.000,00 €	0
86	Polestar Capital	We help realise s	2022	GROWTH	Hilversum	Netherlands	-	-	650.000.000,00 €	-
87	Ponooc	Leading investor	2014	SERIES A	Amsterdam	Netherlands	30	21	140.000.000,00 €	-
88	Progress Tech Transfer Fund	Investment fund	2018	SEED	Milan	Italy	21	15	40.000.000,00 €	0
89	Propel Capital	Propel Capital is	2014	SEED	Stockholm	Sweden	170	170	10.000.000,00 €	21
90	Purple Orange Ventures	Purple Orange Ve	2018	SEED	Berlin	Germany	14	11	20.000.000,00 €	1
91	PurposeTech	We invest in pur	2022	SEED	Prague	Czech Republic	-	-	2.000.000,00 €	-
92	Racine2	We back high im	2022	SERIES A	Paris	France	6	6	85.000.000,00 €	-
93	Redstone VC	Redstone is a fur	2014	SEED	Berlin	Germany	87	69	52.000.000,00 €	4
94	ResponsAbility	Impact investme	2003	GROWTH	Zurich	Switzerland	-	280	4.800.000.000,00 €	-
95	Revent Capital	Revent is a tech f	2020	SEED	Berlin	Germany	189	18	50.000.000,00 €	0
96	Ring Capital	Empowering imp	2017	GROWTH	Paris	France	29	29	500.000.000,00 €	3
97	Rockstart	We invest in amt	2011	SEED	Amsterdam	Netherlands	236	192	75.000.000,00 €	12
98	Rubio Impact Ventures	A hands-on impa	2014	SERIES A	Amsterdam	Netherlands	33	38	150.000.000,00 €	7
99	Salonica Maroon	We typically inve	2020	SERIES A	London	United Kingdom	0	0	75.000.000,00 €	0
100	Sandwater	We fund acceler	2021	SERIES A	Oslo	Norway	19	19	55.000.000,00 €	-
101	Satgana	Next generation	2022	SEED	Luxembourg	Luxembourg	12	12	30.000.000,00 €	-
102	Seaya Andromeda	Seaya Andromed	2022	SERIES A	Madrid	Spain	4	4	300.000.000,00 €	-
103	SEB GreenTech VC	SEB Greentech V	2021	SEED	Stockholm	Sweden	8	8	26.000.000,00 €	-
104	SET Ventures	Venture capital f	2007	GROWTH	Amsterdam	Netherlands	59	30	400.000.000,00 €	10
105	Shamrock Ventures	Investing in Tech	2022	SEED	Amsterdam	Netherlands	14	14	10.000.000,00 €	-
106	Shaping Impact Group	Our mission is to	2010	SEED	Brussels	Belgium	18	18	50.000.000,00 €	-
107	SHIFT Invest	Early stage VC fo	2009	SERIES A	Amstelveen	Netherlands	48	39	110.000.000,00 €	6
108	Shift4Good	Shift4Good Is A \	2022	SERIES A	Paris	France	8	8	300.000.000,00 €	-
109	Ship2B Foundation	Equity4Good is a	2020	SEED	Barcelona	Spain	30	41	30.000.000,00 €	3
110	SI2 Fund	Si² Fund invests i	2012	SEED	Brussels	Belgium	3	11	28.000.000,00 €	0
111	Statkraft Ventures	Invests in Europe	2015	SERIES A	Düsseldorf	Germany	43	33	150.000.000,00 €	5
112	Sustainable Ventures	Accelerate your	2011	SEED	London	United Kingdom	45	44	25.000.000,00 €	1
113	SWEN Impact Partners	SWEN Capital Pa	2017	GROWTH	Paris	France	-	-	6.900.000.000,00 €	-
114	Systemiq Capital	Systemiq Capital	2016	SEED	London	United Kingdom	20	12	115.000.000,00 €	1
115	TriplePoint Ventures	We are generalis	2011	SEED	London	United Kingdom	57	48	2.700.000.000,00 €	1
116	Una Terra	Una Terra was bc	2021	SERIES A	Zurich	Switzerland	5	5	200.000.000,00 €	-
117	Unconventional VC	VC investing in p	2017	SEED	Copenhagen	Denmark	7	10	30.000.000,00 €	0
118	ValaCap	We construct po	2016	SEED	London	United Kingdom	31	31	40.000.000,00 €	1
119	Veg Capital	Provides early-st	2019	SEED	York	United Kingdom	20	33	46.000.000,00 €	2
120	VentureWave Capital	VentureWave Ca	2018	SERIES A	Dublin	Ireland	7	6	290.000.000,00 €	0
121	Verdane Impact Fund	The preferred gr	2022	GROWTH	Oslo	Norway	-	-	300.000.000,00 €	-
122	VNT Management	Venture capital f	2002	SERIES A	Vaasa	Finland	17	18	157.000.000,00 €	3
123	Voulez Capital	A European VC fi	2018	SEED	London	United Kingdom	1	4	4.000.000,00 €	0
124	We are Jane	For our portfolic	2019	SERIES A	Roeselare	Belgium	1	1	46.000.000,00 €	0
125	WorldFund	World Fund is a l	2020	SERIES A	Berlin	Germany	13	11	350.000.000,00 €	-
126	XAnge	For 20 years, XAr	2004	SERIES A	Paris	France	214	136	650.000.000,00 €	27
127	Zero Carbon Capital	ZCC is an early-st	2019	SEED	Havant	United Kingdom	17	22	50.000.000,00 €	0
128	Zinc	We invest in four	2022	SEED	London	United Kingdom	-	-	32.000.000,00 €	-

Appendix F – European Impact VC Market Country Distribiution



Appendix G – Assumptions & Inputs

Excel Export 1: Capital & Fund Structure Assumptions + Portfolio Construction Assumptions

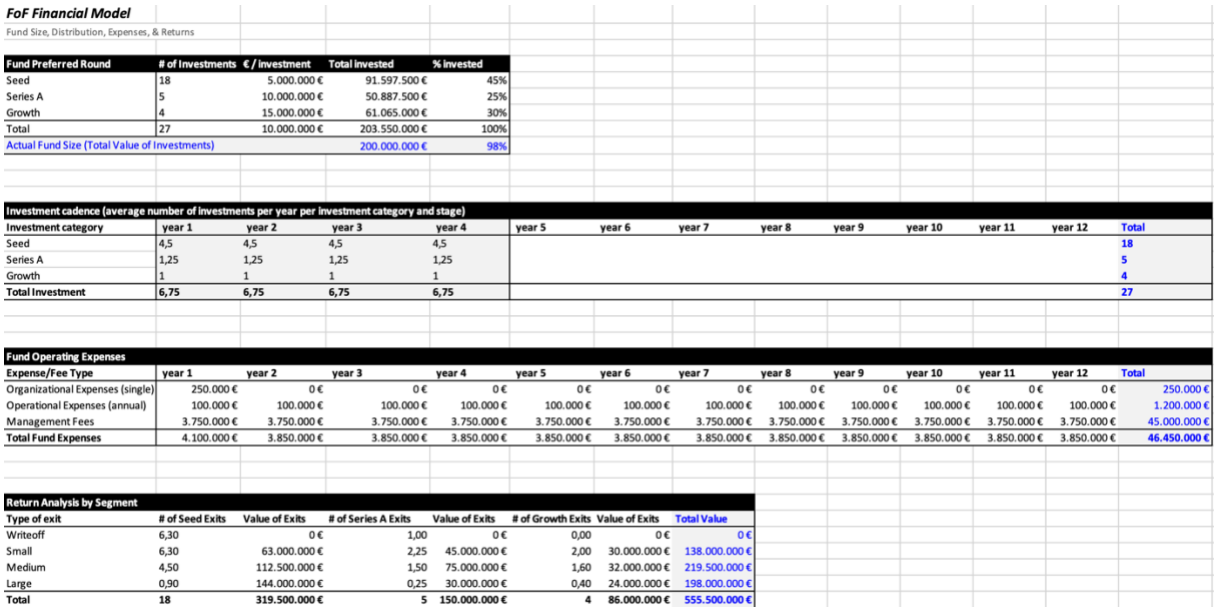
Capital and Fund Structure Assumptions		
Size, Expenses, fees, and lifetime		
Detail	Unit	Assumption
Paid-in Capital / AUM	€	250.000.000
Investable Capital	€	203.550.000
GP Commit, as % of committed capital	%	1,50%
Organizational Expenses (one time)	€	250.000
Operational Expenses (annual)	€	100.000
Management Fees (p.a), % of committed capital	%	1,50%
Management Fees Recycled	%	0,00%
Carried Interest	%	20,00%
Number of years making fund commitments	years	4
Fund of Fund Operations time period	years	12
Portfolio Construction Assumptions		
Distribution and ticket size		
Portfolio Distribution	Unit	Assumption
SEED Fund Asset Allocation	%	45%
SERIES A Fund Asset Allocation	%	25%
Growth Fund Asset Allocation	%	30%
Total	€	100%
Average Ticket Sizes	Unit	Assumption
SEED Fund	€	5.000.000
SERIES A Fund	€	10.000.000
Growth Fund	€	15.000.000

Excel Export 2: Risk & Return Assumptions

Risk & Return Assumptions					
Exit Scenarios for the different fund types					
Type of Exit	Unit	% of Investments	# of Investments	Average MOIC	Average Holding (years)
SEED VC FUND					
Writeoff	#, %	35%	6	0,00	2
Small	#, %	35%	6	2,00	3
Medium	#, %	25%	5	5,00	5
Large	#, %	5%	1	32,00	8
Sum/Weighted Average		100%	0	3,55	3,40
SERIES A VC FUND					
Writeoff	#, %	20%	1	0,00	2
Small	#, %	45%	2	2,00	3
Medium	#, %	30%	2	5,00	5
Large	#, %	5%	0	12,00	8
Sum/Weighted Average		100%	0	3,00	3,65
GROWTH VC FUND					
Writeoff	#, %	0%	0	0,00	2
Small	#, %	50%	2	1,50	3
Medium	#, %	40%	2	2,00	5
Large	#, %	10%	0	6,00	8
Sum/Weighted Average		100%	0	2,15	4,30

Appendix H – Financial Model

Excel Export 3: Fund Distribution, Fund Operating Expenses, & Return Analysis by Segment



FoF Financial Model

Fund Size, Distribution, Expenses, & Returns

Fund Preferred Round	# of Investments	€ / investment	Total invested	% invested
Seed	18	5.000.000 €	91.597.500 €	45%
Series A	5	10.000.000 €	50.887.500 €	25%
Growth	4	15.000.000 €	61.065.000 €	30%
Total	27	10.000.000 €	203.550.000 €	100%
Actual Fund Size (Total Value of Investments)			200.000.000 €	98%

Investment cadence (average number of investments per year per investment category and stage)

Investment category	year 1	year 2	year 3	year 4	year 5	year 6	year 7	year 8	year 9	year 10	year 11	year 12	Total
Seed	4,5	4,5	4,5	4,5									18
Series A	1,25	1,25	1,25	1,25									5
Growth	1	1	1	1									4
Total Investment	**6,75**	**6,75**	**6,75**	**6,75**									**27**

Fund Operating Expenses

Expense/Fee Type	year 1	year 2	year 3	year 4	year 5	year 6	year 7	year 8	year 9	year 10	year 11	year 12	Total
Organizational Expenses (single)	250.000 €	0 €	0 €	0 €	0 €	0 €	0 €	0 €	0 €	0 €	0 €	0 €	250.000 €
Operational Expenses (annual)	100.000 €	100.000 €	100.000 €	100.000 €	100.000 €	100.000 €	100.000 €	100.000 €	100.000 €	100.000 €	100.000 €	100.000 €	1.200.000 €
Management Fees	3.750.000 €	3.750.000 €	3.750.000 €	3.750.000 €	3.750.000 €	3.750.000 €	3.750.000 €	3.750.000 €	3.750.000 €	3.750.000 €	3.750.000 €	3.750.000 €	45.000.000 €
Total Fund Expenses	4.100.000 €	3.850.000 €	3.850.000 €	3.850.000 €	3.850.000 €	3.850.000 €	3.850.000 €	3.850.000 €	3.850.000 €	3.850.000 €	3.850.000 €	3.850.000 €	**46.450.000 €**

Return Analysis by Segment

Type of exit	# of Seed Exits	Value of Exits	# of Series A Exits	Value of Exits	# of Growth Exits	Value of Exits	Total Value
Writeoff	6,30	0 €	1,00	0 €	0,00	0 €	0 €
Small	6,30	63.000.000 €	2,25	45.000.000 €	2,00	30.000.000 €	138.000.000 €
Medium	4,50	112.500.000 €	1,50	75.000.000 €	1,60	32.000.000 €	219.500.000 €
Large	0,90	144.000.000 €	0,25	30.000.000 €	0,40	24.000.000 €	198.000.000 €
Total	**18**	**319.500.000 €**	**5**	**150.000.000 €**	**4**	**86.000.000 €**	**555.500.000 €**

Excel Export 4: Return Analysis – Fund and LPs

Return Analysis - Fund and LPs	Expected Values	Description	Source
Paid-In Capital (IVI)	250.000.000 €		*Investopedia*
Invested Capital	200.000.000 €		
FVI	555.500.000 €		*Investopedia*
Cost of Investment	46.450.000 €		
Carried Interest	51.810.000 €		
Distributed Capital	457.240.000 €		
MOIC	2,22		
TVPI / DPI	1,83	*Total Investment Value minus Costs, Fees and Cary divided by the total contributed capital*	*Titan*
Gross IRR	19%		
Net IRR	15%		