FLEXIBLE ADAPTATION OF INNOVATIVE INVESTMENT FUNDS ARCHITECTURES DEDICATED FOR TECHNOLOGICAL SMEs

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Abstract
The global medical crisis associated with the COVID-19 pandemic represents an extreme shock for the global economy and the multiple impacts, with economic and social effects will be a major one. The interest is to understand the strategies and actions for a robust post-crisis recovery and it is governed by a complex set of higher uncertainties. The focus will be on understanding the mechanisms of flexible adaption based on innovative investment funds architectures in the case of emerging markets scenarios that are currently not optimistic. The actual COVID-19 crisis adds a lot of complexity in the analysis of the multi-crisis processes because the uncertainty is related to the response to the medical crisis but also to the aspects related to the post-crisis recovery to find the optimal response. After a period of the lockdown of the businesses, consumer behavior is also changed and this will affect many industries. COVID-19 pandemic will turn into a multiple-crisis that can lead to a long-term and totally different recession (deep U or L), a recession that beyond the medical crisis brings in addition to the supply chain shock a demand shock and imbalances related to inflation and unemployment also. Massive interventions in money markets that benefit from quantitative easing and fixed-income instruments markets (which form the basis for LSAPs large-scale asset purchases) in 2020 proved effective and markets quickly recovered losses in March 2020 in an impressive rally in April and May 2020. The proposed research reanalyzes the investment strategies, objectives, and policies by taking into account both the dynamics of global supply chains but also the rapid technological advancements including here the market and trading infrastructures, the capabilities to integrate alternative instruments. The practical purpose of this research is to formulate strategic decision making in post-crisis recovery as essential elements of new and unknown post-crisis processes.

Keywords
I*nnovative investment funds architectures; emerging markets; COVID-19 pandemic; alternative investments.*

Introduction

The Industry 4.0 transformation has changed the global picture of economies, societies, with implications on all types of organizations. This revolution based on the digital transformation engages a synergic way of mixing a set of innovative and intelligent technologies (artificial intelligence AI, internet of things IoT, deep learning, big data, autonomous vehicles, Fintech/ blockchains). Industry 4.0 offers unique catching-up opportunities to emerging countries that can and should be accessed, starting from the idea of rapid integration of latent and emerging entrepreneurship. Industry 4.0

transformation has also led to the development of speed of change-specific capabilities: increasing the appetite for sustainable transformation; initiating actions aimed to increase the transaction value, by developing speed of change-specific capabilities, respectively a direct orientation towards the transaction value; increasing the role in the development cycle of knowledge production and problem-solving.

These opportunities provide a special basis for continuous development and flexible adaptation of technological SMEs that leverages the idea of scalability and modularity that quickly and efficiently integrates strategic elements that harmonize access to technology with critical aspects of financing in emerging markets.

An important issue concerns the reaction of financial systems to the challenge of latent and emerging entrepreneurship. SMEs in emerging markets will suffer big losses and there is a critical need to support especially those organizations with capabilities for quick recovery, like those oriented on technological innovation. In this case, it is possible to use private investment funds (open-ended funds OEFs, close-end funds CEFs, different forms of alternative investment funds AIFs like venture capital funds VCFs, exchange-traded funds ETFs, hedge funds HFs or managed futures MFs) or mixed architectures like public-private partnerships (PPPs).

The selection of investment fund architectures depends on the current realities on emerging markets, shaken by the COVID 19 pandemic, and the macroeconomic evolution of the next critical months (major uncertainties are arising from the evolution of medical aspects that influence all forecasts and economic prospects). Also, depends on how the governmental and European programs dedicated to SMEs are carried out effectively and the way in which the global supply chain is restored.

Initiatives related to private investment funds and PPPs dedicated to technological SMEs should be adapted for emerging markets in crisis and turbulent situations. The case of Romania as a new emerging capital market is expressed by a lack of understanding of the innovative SME financing alternatives, the low transparency, significant market inefficiencies (illiquidity aspects, a poor culture of entrepreneurs but also retail investors in the mechanics of capital markets). In this complex environment, there is the problem of finding architectures adapted on both branches, both on the entrepreneurs but also the investor's side. Investors search for risk-return performances in the short-medium-term and entrepreneurs are not comfortable with conventional long-term financing mechanisms. The interest is now to design reliable architecture capable to collect the private funds and to invest effectively in technological SMEs, based on a professional selection of projects, scalability, and exit capabilities. All these constraints are difficult to meet in emerging markets and the first objective is expressed by a comparative analysis of investment fund architectures (including also PPPs) reliable to engage in emerging markets.

Based on the analysis of the possibilities of diversification by using alternative investments (like venture capital funds VCFs, private equity funds PEFs) are also considered solutions based on smart strategies (Hedge funds HFs) including Sovereign Recovery Funds SRFs based on innovative partnerships and retailization.

The analysis of VCFs / PEFs implementation aspects is done for the current market context in emerging markets highlighting the efficiency of these investment vehicles but

also their market vulnerabilities. Because the investment side is sensitive to risk-return performance with doubts for long-term exposures, are considered HFs oriented on liquidity and stability. Usually, all these solutions with remarkable capabilities for SME financing, are dedicated to informed investors and institutional but we hope to attract also retail investors. This objective is a very ambitious one in the actual context and our proposal will use the public-private partnership PPP ingredient.

The conclusions are related to the actions in the actual context of the medical crisis, followed by an economic crisis. The comparative analyses are important for governmental institutions, for entrepreneurs but also for fund managers and investors, which will capitalize in the future all these new financial innovations. Future work will be oriented on discovering new flexible architectures oriented on SME financing in different situations in emerging markets.

Innovative financing strategies for knowledge, innovation, and creative construction - the case of technological SMEs in emerging markets

In the literature, the transformation from knowledge to innovation is a complex process that can be analyzed by combining the economic perspective with the managerial perspective. Innovation, as a driver of growth, is analyzed based on the value created by innovators not only starting strictly from creative destruction (replacement of products by increasing the competitiveness of the business environment). The classical idea (Schumpeter, 1934) fails to explain how these opportunities can turn into innovations. Later, in a new theory, it is shown that the entrepreneur will have to play an increasingly important role in marketing new knowledge (via spin-offs) and to quickly reformulate his response to non-commercial opportunities. In other words, in this case, the transformation of knowledge must be integrated into practical market-oriented actions in conditions of uncertainty (Kirzner, 1999).

The connecting element is defined by the innovative concept of knowledge spillover construction circle (KSCC) which is the basis of the latent and emerging entrepreneurship model (LEEM). The LEEM highlights an important aspect, the strategic role of the entrepreneur, which appears in each stage of the process, starting from the research of new knowledge to commercialization. In the knowledge spillover theory of entrepreneurship (KSTE) is presented the mechanics of knowledge spillover construction (KSC). In this case, latent entrepreneurship based on knowledge generated by actors creates opportunities for other actors (local or in the same industry). Actors able to take risks to create new vehicles or new firms to develop innovations (Agarwal, 2007) can turn these latent opportunities into emerging entrepreneurship. This represents a strategic role of entrepreneurship in creative construction (Agarwal, 2007, Caiazza, 2016). In the transformation from latent to emerging entrepreneurship, a new type of entrepreneurs takes the risk of implementing innovation and activate a leveraging mechanism that continues to attract other opportunities. In this way, the 4-step model of latent-emergent transformation LEEM captures the strategic role of the entrepreneur, starting from the research stage, to development and finally to commercialization. LEEM has been proposed for developed economies with strong markets while in the case of emerging markets although there are significant problems at the level of technological convergence, in fact, financing problems are the most critical (Figure 1).

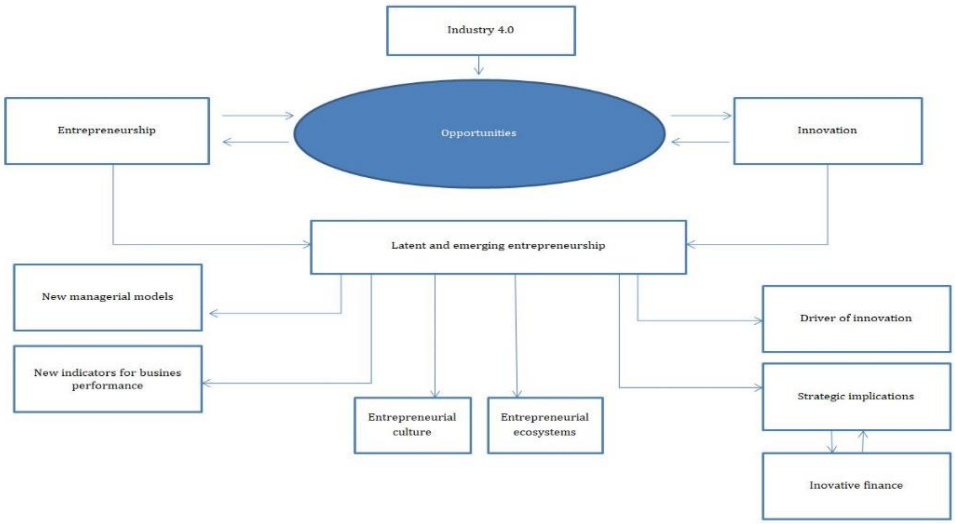

Figure 1. Industry 4.0 and Latent and Emerging Entrepreneurship

A new vision for asset allocation - the integration of venture capital and private equity as innovative alternative assets

Asset allocation is a complex problem even if we use only the classic set of assets and instruments, equity, fixed- income and money-market instruments. The diversification is in this case limited to a small set of assets strongly correlated with the markets. Although for emerging markets, the focus of investors is on liquidity, representative indices are sought and only a few elements are selected in portfolios. Romania is making the transition to emerging markets in the difficult conditions of 2020 dominated by the Covid-19 pandemic problem.

Expanding the possibilities of diversification through alternative assets is essential in streamlining transactions, especially in the case of emerging markets, and the beneficial impact on portfolio performance and stability will also provide the long-term development capacity of markets and thus increase the efficiency of capital markets.

In the literature is expressed that alternative assets used more in the short-term tactical allocations, aiming to maximize returns, as the main indicator of performance. The fruition of the lesson learned in other emerging markets and the associated success depends on how to ensure flexibility in portfolio management, solving the problem of asset efficiency, given the difficulty of managing liquidity issues (in the context of markets), information, and associated costs.

The New Alternative Investments Law (2020) will have a significant impact on the management of Alternative Investment Funds and the most important element that we propose here is the strategy of achieving the retailization advantage with a beneficial impact on the critical mass of investors in these instruments and of emerging capital market investors, in general.

Venture capital funds (VCF) and Private equity funds (PEF) have several similar characteristics, being organized as close-end funds with long investment duration and low liquidity. The volume of VCF / PEF financing is low in emerging markets due to the lack of investment culture but also of entrepreneurial culture (low interest for the capitalization of companies). There is the problem of streamlining a competitive segment of SMEs that would attract a cycle of amplification of entrepreneurial interest through strategic elements. SMEs in emerging markets are clearly disadvantaged compared to SMEs in developed markets both in terms of knowledge, technology, but especially in terms of immediate financing capacity in the hope of accessing market opportunities. There is a market inefficiency that spreads at the level of the strategic will of entrepreneurs and the simple copying of VCF / PEF from developed markets cannot create an adequate framework to attract investors, including retail ones. There is the hope of creating a critical mass to streamline these transactions.

Venture capital funds VCFs are recognized for their impressive growth (Alibaba, Alphabet, Apple, Amazon, Facebook, Microsoft) but in the real world, there are some limitations: the narrow band of technological innovations harmonized with investors' requirements, lack of critical mass of investors who understand and accept the direction of funds towards technological change; lack of support by government factors in the context of social welfare recognition. In the last decade, VCFs have benefited from new technological opportunities (and here the strength of ICT is still the decisive factor) with implications on the critical mass of investments, but also from a greater availability on the supply side of markets. These aspects have made the VCF industry more efficient by reducing financing costs and reducing implementation deadlines.

VCFs can be particularly effective in supporting latent and emerging entrepreneurship and innovation in general. However, there are several limitations in terms of implementation efficiency: the organizational structure of partnerships has become heavy-debt, and the focus on investments on more challenging sub-sectors (a reduction in the area of interest has an impact on the architecture of VCFs and how to diversify of portfolios).

The duration of the specific partnerships VCF of 7-10 years with possibilities of further extension by 2-3 years configures about 5 years of the investment, the rest of the period being dedicated to the fruiting of this investment. Although there are differences at the level of sectors in general, investors change their perception of the long-term notion. At the high VCF level, a scale-economy effect appears on the management fees line, and the competition changes the compensation structure, but the long-term effect generally erodes the investment return. Other important aspects result, such as that of attracting investors, respectively how information problems influence the persistence of a socially sub-optimal VCF structure.

VCFs face high uncertainties, much of the portfolio elements being failures while few firms contribute decisively to overall success. There is a preference for segments with favorable dynamics at the level of uncertainty in the sense of reducing it. The ability to learn quickly, specific to ICT, high tech is accompanied by other risks related to market demand in relation to a reference price. In other sectors, such as biotechnology, there is an advantage in reducing asymmetric information. VCFs can benefit in high-tech sectors and from collaborative effects resulting from Triple-Helix partnerships or programs in

which the government is directly involved (as Small business innovative research SBIR program) through competitive grants oriented to emerging fields.

Next, we go beyond the diversification through instruments (VCFs/ PEFs), and we consider the double diversification, through strategies, and we are talking about hedge funds (HFs).

The advanced design of alternative strategies - the adaptation of Hedge Funds in emerging markets

Hedge Funds (HFs) represents a private investment vehicle that manages a diversified portfolio of listed instruments and derivative, benefiting from the impact of alternative strategies. The main advantage of HF is the possibility of selecting an extensive range of alternative strategies with long-term or short-term investment objectives and which can take advantage of movements in the opposite direction to the market. It should be mentioned from the beginning that HF could not access funds through initial public offering IPOs, and the limited advertising possibilities cause a narrowing of the niche of investors. In this proposal, although the analysis addresses emerging markets, it will be shown that there are real possibilities for retailization in the case of HFs that can be intelligently exploited. Although it seems surprising that a qualitative and cultural leap is wanted from investors, this fact can be achieved practically precisely due to the significant progress in investment funds management made through artificial intelligence, decision support systems and advanced big-data.

Although they can access a diversified set of strategies, HF introduces a more limited set of investment strategies through the issue prospectus. Management aims at a single niche segment in terms of strategies and not diversification of strategies. Even in this case, although investors would like comparisons with other HFs, there is no benchmarking (Figure 2).

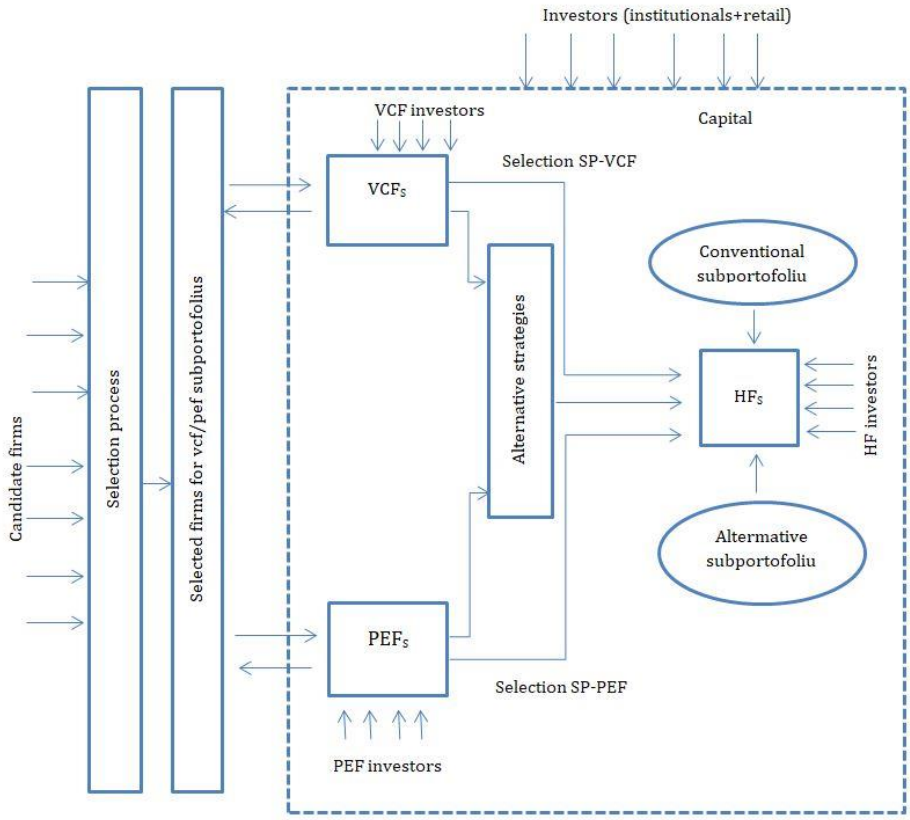

Figure 2. Design of alternative strategies

Regarding risk control, in the case of HFs it is very sophisticated for several reasons:

- derivative-based strategies cannot provide linearity of cash flows;
- HF can simultaneously contain both long and short instruments (the combinations of long stock - short stock/index/futures - offer superior performance even in bear markets);
- unlike traditional funds, HF capitalizes leverage effects and a unique ability to engage in short strategies in response to declining markets.

Table 1. Types of HFs strategies for emerging markets

Strategy	Description
Equity Long+Short	Mix between Long stock- Short stock/ index/ futures
Diversified leverage	Ability to follow various strategies with low movements but high leverage
Market neutral	Design of portfolio aims to reduce market risk and is based on the Jacobs-Levy principle (Unique Alpha)
Arbitrage 1 (fixed income)	Similar buying and selling of correlated securities, in the hope of fruiting some price discrepancies (in the dynamics of the yield curves) in the conditions of the subsequent convergence

Arbitrage 2 (merger/ sub trading)	Purchase of shares of the company that will be acquired simultaneously with the sale of the shares of the integrating company, which bears the discount at the level of the transaction price - the strategy is subject to event risk
Arbitrage 3 (Volatility differential)	Exploiting the arbitrage opportunity resulting from differences in the volatility of the options on the same underlying stock
Event-driven	Exploits spectral mispricing resulting from transactions (buy-back operations, special/ large dividends, mergers, and acquisitions, reorganizations, spin-offs) and depends on the dynamics of the transaction process, the success of the event completion, market liquidity; it does not depend on the direction of evolution of the market as a whole but it is applied in quite rare situations

Regarding the persistence of performances, the source of return from alpha (skill-based portfolio) must be mentioned at the same time as the introduction of a qualitative aspect configured by the persistence of volatility in HF returns. In emerging markets, the volatility of returns could be surprisingly lower than the developed markets aspect related to spectral phenomena related to liquidity blockages.

Managerial aspects - the implementation of dynamic capabilities for organizational resilience - the DC-MR-AIF framework

An aspect of interest in the management of AIFs (VCF / PEF / HF) portfolios in emerging markets is related to organizational resilience. Emerging markets do not have liquid and efficient markets and investors, although they have an investment culture, over-react and limit their holdings in portfolios. Romania is part of a transition process from the border to emerging markets in a current difficult context of connecting the Covid-19 crisis with other related crises (economic, social).

The idea of introducing dynamic capabilities starts from the fact that in emerging markets investors are trying to understand how to build and maintain the sustainability of competitive advantage adapted to rapidly changing environments. How dynamic capabilities can contribute to the efficiency of adaptation processes and the increase of resilience are essential aspects in maintaining the competitiveness of AIFs in turbulent conditions and restricted markets. In turbulent conditions, instability issues are leveraged and external difficulties have an amplified impact on the growth and survival potential of AIFs. Increasing resilience becomes a critical issue and includes strategic actions to maintain and adapt AIFs to markets and their movements. Simple classical diversification is not enough because in emerging markets large investors select only a few significant issuers that appear in all portfolios and are viewed strictly in terms of liquidity, as an essential quality element in this type of market.

Dynamic capabilities provide a way to understand the sustainability of competitive advantage in rapidly changing environments, how to manage resources/capabilities to respond to change in markets, while resilience includes strategic actions to maintain and adapt to markets. From here, the idea of creating a new framework that integrated the two concepts, dynamic capabilities, and managerial resilience (DCMR). Through this new framework can be better understood the strategies of rapid adaptation and reconfiguration of the AIF-portfolio. Dynamic capabilities can contribute to the

management of AIFs not only by adapting to the dynamics of capital markets but also structurally, through innovation and collaboration with other special purpose vehicles and other alternative partnerships (for example public-private-partnerships and specific instruments dedicated to accelerated retailization).

Turbulence and instability are difficult to predict (there are discontinuities, surprises, and disruptive changes) and reduce the growth potential and survival of AIFs. A distinction is made between turbulent markets (difficult to predict, with instability, uncertainty and lack of control with radical, nonlinear changes) and rapidly changing markets. In turbulent situations, the critical success factors consider agility and resilience as solutions and strategies for rapid response and respectively maintaining the energy base (liquidity, cash flows). Leadership aims at identifying routes and understanding how to combine existing knowledge and capturing and processing to adapt to opportunities; there is the problem of amplifying these capabilities to respond to opportunities. In this case, there is a special interest in analyzing the way to amplify the capabilities to create more agile portfolios and resistant to the impact of external turbulence. Managerial resilience can be used in the context of strategic actions to maintain and adapt AIF portfolios even for unexpected situations, and in this case, dynamic capabilities could synergically contribute to adaptation and resilience.

Dynamic capabilities capitalize on value-creating resource combinations that are difficult to emulate and can provide a sustainable competitive advantage in fast-changing Schumpeterian regimes. The implementation is based on the configuration of knowledge, and the exploration of market opportunities must be fast and take advantage of the capacity for learning, innovation and integration. Dynamic capabilities are related to portfolio refresh and reconfiguration in line with new market developments. Portfolios need to be flexible, adaptive and innovative because the market dynamics (including competition in the AIFs segment) are difficult to anticipate. Dynamic capabilities actually extend the Porter-5 Forces vision, resource-based view (Barney, 1991) and basic competency theory (Prahalad, & Hamel, 1990) emphasizing the ability to adapt to rapid change and unpredictable markets, and implementation is based on reconstruction tools of existing capabilities: sensing, learning, integration, coordination (Gonzales, 2009; Pavlou, 2011).

The managerial resilience of AIFs (MR-AIF) describes the need to respond to rapid changes in markets, which requires an understanding of the dynamic nature of market processes. AIFs need to consider behaviors and strategies such as agility, integration, leadership, change, and communication. Resilience is related to the prediction and prevention of unexpected threats and takes into account sensitivity, perception of change and flexible decision-making management. Resilience is defined as the ability of the system to compensate for external distortions and shocks while preserving basic functionality. Resilient AIFs should respond to these challenges and turbulent survival allows these changes to be understood in the light of various crisis scenarios. In the context of AIF-portfolio management, the ability to absorb shocks and the ability to restructure and renew the portfolio in the context in which shocks affect liquidity are pursued. The management of AIFs must be equipped with the ability to evaluate, recognize, adapt and absorb variations, changes, shocks and surprises.

The DC-MR-AIF framework, which aligns dynamic capabilities and managerial resilience, aims to survive in turbulent environments and starts from an innovative way

of planning and formulating the implementation strategy. Dynamic capabilities have been recognized as tools that allow the reconfiguration of operational capabilities starting from the Pavlou-cycle, based on four capabilities that can be viewed from the perspective of managerial resilience:

- *discovery* - the ability to recognize the triggers of turbulence and the ability to monitor changes in markets and competitors;
- *learning* - an innovative readjustment of operational portfolio management capabilities and exploitation of competitive advantage through multi-dimensional diversification;
- *integration* - combining individual knowledge (including encouraging strategic decision making) into a new operational capability better oriented to market movements;
- *coordination* - streamlining the reconfiguration of operational capabilities and monitoring the results obtained.

The DC-MR-AIF framework can contribute to the creation of new opportunities for diversification through both tools and strategies. Dynamic capabilities offer agility in detecting opportunities but also fluidity in reconfiguring portfolios in the context of market movements. They have an impact on the performance of the portfolio but this is done indirectly by reconfiguring operational capabilities into new capabilities that harmonize with the markets.

Conclusions

The Knowledge Spillover Construction Cycle Framework (KSCC) is based on the reconciliation between the managerial and financial-economic perspectives of knowledge, respectively innovation, entrepreneurship, and growth. Understanding the way of knowledge exploitation from latent to emerging entrepreneurship through KSCC can start from the necessary energy and the one available for investments that suggest unique mechanisms of creating change starting from unrealized opportunity in multiple uncertainties. The idea of creative construction is a process by which entrepreneurs use the knowledge created by existing companies and implement innovation without destroying incumbents. The creative construction cycle starts with the strategic ability and energy available to use knowledge spillovers to introduce innovation in markets. The economic perspective is complemented by the managerial perspective as a distinctive element of the transformation of the classic concept of creative destruction in the new creative construction. The process of transition from latent to emerging entrepreneurship uses a mix of macroeconomic literature with a managerial perspective on knowledge spillover and highlights the role of the entrepreneur as an agent who uses strategic capabilities in implementing activities specific to this transformation process. In emerging markets, the role of the financing process becomes essential, often overcoming the importance of technological convergence.

The main contribution of this paper is related to the use of alternative instruments and alternative strategies in building special purpose vehicles for emerging markets and based on an efficient selection and accuracy in the proportionate use of allocated funds. In addition, aspects related to the retailization process are considered as an element that brings critical mass and alternative partnerships as a way to harmonize public and private contributions managed by a private entity.

VCF / PEF financing offers a series of advantages compared to financing through the banking system, for companies lack of guarantees and for financiers, the ability to select. However, VCFs / PEFs are not well known in emerging markets due to the lack of investment culture and the lack of entrepreneurial culture that benefits from this type of financing. The next step in refining financing solutions for technological SMEs refers to alternative strategies, and are expressed by hedge funds (HFs) with central sub-portfolios represented by VCFs / PEFs and satellite sub-portfolios for liquidity and stability.

The proposed research could be continued by analyzing the solutions for creating and implementing a Sovereign Fund for Recovery, an ambitious idea for Romania but which is not well enough substantiated given the current macroeconomic conditions and the situation in the markets.

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