Emerging trends in Government venture capital policies in smaller peripheral economies: Lessons from Finland, New Zealand and Estonia

Robyn Owen, Centre for Enterprise and Economic Development Research (CEEDR), Middlesex University, The Burroughs, Hendon, London NW44BT r.owen@mdx.ac.uk

Colin Mason, Adam Smith Business School, University of Glasgow

Key sentence:

Emerging trends from the developing venture capital industries of three smaller peripheral economies (Finland, New Zealand and Estonia), demonstrate that government policy can overcome scale and distance barriers to assist in establishing venture capital to support innovative potential high growth ventures.

Supporting sentences:

Eight common policy themes for successful venture capital development are: new venture stimulation; dedicated finance policy institutions; stable, internationally harmonised tax and regulations; business angel development; inward investment; international venture capital fund development; smooth pipeline of investment; effective investment exit market.

Venture capital policy development themes are interconnected, requiring a holistic ecosystem approach.

A blueprint for successful small peripheral economy venture capital development requires an initial phase of new venture demand stimulation and ensuing simultaneity of policies to engineer venture capital development.

INTRODUCTION

Private venture capital (VC) can play a crucial role in assisting potential high growth innovative venture start-ups and scale-up, and their contribution to economic growth (Lerner, 2010; Baldock and Mason, 2015; Cumming et al, 2016). However, it is concentrated geographically, both globally and within countries (Mason, 2007; Avdeitchikova, 2012). In response, policy-makers in countries with VC gaps have introduced initiatives intended to increase supply. Indeed, Lerner (2010) has observed globally that most established VC markets have been underpinned by government support. Government support has taken two forms (Murray, 2007; Murray et al, 2012). The initial approach was the creation of state owned VC funds that were managed by government employees or private sector managers engaged by the state. However, these schemes have generally failed to generate sustainable private sector-led VC (Lerner, 2009; Nightingale et al, 2009; Cumming, 2014; Grilli and Murtinu, 2014; Munari and Toschi, 2015). Over the past quarter century state owned and managed funds have been superseded by hybrid funds, where government invests alongside private investors in privately managed funds, often on different terms and conditions, to reduce the risk and enhance returns for private investors. However, despite recent papers (Baldock, 2016, Cumming and Johan, 2016) suggesting improved impacts, concerns persist about the effectiveness of government VC initiatives in VC-deficient economies, providing further momentum to the recurring debate on the appropriate design of government venture capital initiatives.

Small peripheral economies (SPEs) experience deficiencies in their VC development on account of their size, lack of innovative businesses and distance from the locations in which VC firms are located. Where VC succeeds in becoming sustainably established, it is related to achieving a critical mass of ‘smart money in smart places’ (Block et al. 2017). Governments

in SPE countries have therefore been particularly active in seeking to address these deficiencies in order to stimulate VC investment activity. However, these disadvantages of SPEs create particular challenges for government to develop effective initiatives

This paper presents a unique insight into government strategies to develop VC in three SPEs – Finland, New Zealand and Estonia. It demonstrates emerging trends for what is working well or less well at different stages of the national VC development (Avnimelech and Teubel, 2006; Avnimelech et al, 2005). This contemporary review and critique of government VC policy provides a theoretical VC ecosystem development framework for the study. The paper then discusses the lessons learned from the three SPEs and presents a blueprint for SPE governments to develop more cohesive and comprehensive ecosystem for sustainable VC.

ADDRESSING THE CRITIQUE OF GOVERNMENT VC – DEVELOPING AN ECOSYSTEM APPROACH

Lerner (2010) provides a set of principles for government development of private VC. These draw on perceived best practice mainly from the developmental government VC fund programme models adopted in Israel (Yozma, established 1992) and New Zealand (New Zealand Venture Investment Fund, established 2002). From another perspective, Gilson's (2003) simultaneity theory for engineering VC recognises that for VC to flourish in a country it requires a range of micro-economic VC design and macro-economic institutional, regulatory and entrepreneurial development programmes operating in parallel (Cumming and Johan, 2016; Lin, 2017). Evolutionary models of VC development (Avnimelech and Tuebel, 2006; Hwang and Horrowitt, 2012) suggest that government policy will be phased and need to address place specific challenges, particularly during the early development phases. For example, focusing primarily on the national regulatory, institutional and entrepreneurial

environments before adopting international outreach programmes (such as diaspora related investment and multi-national VC fund development). Whilst Lerner (2010) pays particular attention to VC design issues, no one has yet fully addressed the specific needs of engineering VC in SPEs. This suggests that a contemporary review of public VC needs to include design, entrepreneurial ecosystem and institutional regulatory theory, cast within an evolutionary development framework, as outlined in Table 1.

TABLE 1 ABOUT HERE

(i) VC design

The lack of effectiveness of government VC funds (GVCFs) is widely attributed to various design issues (Lerner, 2010; Cumming and Johan, 2016; Baldock, 2016). Leleux and Surlemont (2003) and Armour and Cumming (2006) identify how crowding-out of private VC by GVCFs leads to failure to increase aggregate VC volume. GVCFs have also exhibited poorer performing portfolio companies than their private independent VC (IVC) counterparts (Nightingale et al, 2009; Bertoni and Tykvova, 2015; Grilli and Murtinu, 2014) in terms of innovation (e.g. patenting) and sales turnover growth. UK research (NAO, 2009; Munari and Toschi, 2015) found that smaller regional GVCFs performed poorly due to: weak management; thin markets with insufficient investible potential high growth (PHG) SME opportunities; insufficient funding (Murray, 1994, 1999); restrictions on investment (e.g. state aid caps); and inability to leverage follow-on funding investment. Other international studies (Bertoni and Tykvova, 2015; Brander et al. 2015; Colombo et al. 2016) suggest that GVC becomes more successful in terms of IPO and trade sales exits when combined with

independent VC (IVC) in portfolio companies, suggesting complementarity effects. However, as VCs generally invest close to their home location this outcome disproportionately benefits regions that are already abundant with IVC.

Whilst these studies are highly critical of GVCF, they are largely based on pre-Global Financial Crisis (GFC) data and pre-date the creation of hybrid private co-financed and led GVCFs (Baldock, 2016). From the supply-side it can be seen that many of Lerner's VC design requirements have subsequently been addressed, primarily through adoption of the hybrid model of private VC-led funds (Murray, 2007; Murray et al. 2012; Baldock and North, 2015; Cumming and Johan, 2016). Hybrid GVCFs address Lerner's principles as follows: they are led by experienced private VC fund managers; leverage private investment to increase fund size and meet the full funding needs of PHG SMEs (Cumming, 2014; Baldock, 2016); target specific stage, sector and locations, whilst seeking to avoid overly prescriptive thin markets such as narrow technology sectors and university spin-outs (Brown and Mason, 2014; Brown, 2016); typically operate as Limited Partnership (LP) legal entities with a minimum 10 year lifespan, which can be extended to accommodate longer horizon 'long game' investment, enabling portfolio firms to exit at optimal times to maximise returns; undertake regular evaluations to avoid agency failure through for example mission creep (Murray et al. 2009), avoid crowding-out, and maintain market relevance in tackling VC finance gaps (Cumming, 2014; Baldock and North, 2015). This hybrid approach also leaves investment decisions to private fund managers, with government typically operating as arms-length investor, but offers flexibility of programme adjustment in alignment to changing finance market requirements.

However, as Lerner (2010) recognised, VC design is only part of the equation. The creation of GVCFs assumes that there is a significant pool of PHG SMEs for VC to invest in to scale-up. This assumption is invalid. SPEs have a problem of thin markets (Nightingale et al. 2009) lacking sufficient PHG SMEs capable of achieving the commercial scale-up success that generates the exceptionally high financial returns sought by VC investors (Mason and Brown, 2013).

(ii) *Entrepreneurial and financial ecosystems*

Lerner (2010) and Cumming et al (2014) recognise the importance of entrepreneurial ecosystem development to avoid thin markets and generate sufficient viable deal flow of PHG SMEs for VC investment. Demand-side stimulation requires an entrepreneurial support system that involves entrepreneurship training and investment readiness programmes (Mason and Kwok, 2010) and facilitates international connectivity (Bathelt et al, 2004). This latter point is vital to SPEs. Because of their small size and remoteness from major centres of population PHG SMEs in SPEs require a born global, wider international market approach to scale-up to attract VC investment (Deakins et al. 2015). In order to maximise entrepreneurial development both Lerner (2010) and Mustar and Wright (2010) stress the importance of leveraging the local R&D base through facilitating interconnectivity between industry and university R&D.

Critically, Lerner (2010) recognises the need for learning to connect between demand and supply-sides of the ecosystem. From the demand-side this suggests a pipeline approach whereby sufficient quality PHG venture propositions can stimulate critical mass of activity

within SPEs and attract VC (Brown and Mason, 2014; Colombo et al 2016). From the supply-side this requires: informed institutional investors (including pension funds, endowments etc.) willing to accept early-stage equity investment risks and invest in VC funds; large professional VC funds of sufficient scale and managerial competence to make initial and follow-on investments and grow portfolio firms until attractive exit opportunities are identified; and a supportive network of high quality advisors (Nightingale et al, 2009). Lerner's (2010) global perspective is important here, pointing to the benefits of hiring and learning from experienced overseas fund managers in the successful GVCF programmes operating in Israel and New Zealand – a finding underlined by similar positive experiences in Europe and the UK (Baldock and North, 2015; Baldock, 2016). Lerner (2010) also highlights the importance of professional intermediaries (e.g. accountants; lawyers) in facilitating the development of a financing ecosystem (Kenney and Patton, 2005).

Recent literature also emphasizes the 'smart money' role of VC fund managers through their hands-on management and guidance of their portfolio companies (Baldock and North, 2015). However, pan-European research (Luukkonen et al, 2013) has demonstrated that IVC and GVCFs make different types of value added contribution. IVCs provided more support for professionalization, changing the management team, exit orientation, and also made greater impact on accelerating growth and providing credibility to other investors. Cumming et al (2014) attribute poorer exit performance in GVCFs to their inability to monitor, nurture and mentor their investee businesses as effectively as IVCs. Similarly, Shäfer and Shilder (2009) suggest that German public sector VC funds may not be as 'smart' as IVCs in terms of adding value. This suggests that more should be done to enhance Lerner's principle of recruiting

experienced successful high quality IVC fund managers to lead GVCF (Hood, 2000; Munari and Toschi, 2015).

Finance ecosystem theory also highlights the crucial interconnectivity of evolving finance escalators (Nightingale et al 2009; North et al 2013) to provide continuity of different forms of finance, from seed VC and business angels through to later stage VC and exit, typically via a trade sale or IPO (Initial Public Offering). An extension of this is the interconnectivity of international VC and investment markets in attracting inward investment (Lerner, 2010) and enhanced exit values (Baldock, 2016).

Increasing attention has therefore been given to how GVCFs can provide ongoing scale-up finance and avoid potential shortfalls in follow-on funding. Syndication between VCs and business angels can spread seed and early stage risk, generate greater funding streams and potential later stage and international VC connections which can open up global markets (Hopp, 2010) by breaking down the barriers of distance. Where once VCs would not travel more than one hour to portfolio firms they now syndicate internationally with key lead angels and VCs located in other countries. Improved communications systems (including broadband and Skype) have assisted this process. Evidence also suggests improved physical connectivity through fast direct city flight linkages, such as London City to Dublin or Berlin, have helped (Baldock, 2016). However, this works against peripheral regions and countries which suffer from weak connectivity (Mukkala and Tervo, 2013).

Central to the VC investment model is the need for successful exits to realise financial returns for funds and their investors which typically occurs through acquisition by a larger company. Whilst patchy, empirical evidence suggests that acquisition of young growing companies can adversely affect regional economic development in the longer term (Foreman-Peck and Nicholls, 2013; Carpentier and Suret, 2014; Xiao, 2015). Moreover, small exits are unlikely to generate significant wealth for shareholders and investors, thereby limiting the potential for entrepreneurial recycling (Mason and Harrison, 2006). Companies therefore need to be able to access several rounds of finance so that they can reach a significant size before an exit occurs, by which time they will be anchored in the local economy and less likely to be relocated following acquisition. Other exit mechanisms which avoid the sale of the company are also desirable. The most obvious is an IPO flotation on the stock market. However, only a small number of VC exits occur via IPO and, over time, VCs have become less attracted to IPO (Chaplinasky and Gupta-Mulerjee, 2013). Lerner (2010) therefore also highlights the need for effective VC exit markets, specifically small cap public feeder markets, like the UK Alternative Investment Market (AIM), and First North in Sweden and Finland, which provide opportunities for local businesses to exit VC and remain locally owned (Baldock, 2015). But here again, peripheral economies are less connected to public markets. Amini et al. (2012) highlight the under-representation of AIM-listed companies in the peripheral regions in the UK.

(iii) *Institutional and Regulatory approaches*

Gilson's (2003) VC engineering simultaneity requirements explicitly tackle the need for an appropriate and attractive institutional and regulatory environment for VC to develop. This is further developed in the emerging economies VC literature (Lingelbach, 2015, Lin, 2017)

which outlines the need for stable government, transparent light touch regulations and institutional operations. These include, for example, suitable low tax inducements, free international movement of skilled labour (notably to import experienced, highly skilled fund managers) and familiar Limited Partnership VC legal operations which guarantee the 10-year fund operation cycles that are attractive to more established US and European investment funds (Lerner, 2010). There is also a need for portfolio ventures and support services to operate in a transparent way through adoption of internationally accepted accountancy standards that establish legitimacy and trust (Lerner et al, 2013). Overall, as VC is a 'long game' political, regulatory and economic stability is critical to provide the foundation of trust for investors (Li and Zahra, 2012).

From an interventionist policy perspective, it is also important to note that GVCFs are an economic development mechanism to fill funding gaps which occur where IVCs consider the risk-reward ratio insufficient to enter the market (Baldock, 2016). In seeking to fill this gap the focus of GVCFs is likely to be on funding business propositions that are viable but may not offer the potential returns to attract IVCs. This means that GVCFs are unlikely to achieve the performance of IVCs, but may well result in other forms of positive externality gains to the economy, such as R&D spillovers and indirect employment generation for subcontractors (Baldock and North, 2015; Wilson and Silva, 2013; Griliches, 1992).

VC ecosystem building takes time – many decades - with Cetindamar (2003) establishing that it goes through development phases. Avnimelech et al. (2005) in their comparison of the development of the US and Israeli VC markets establish three key phases of development. The Israeli example is pertinent, for whilst it was founded on the peculiarities of the defence

industry, it is representative of a relatively small economy, situated a long way from the more established pools of US and to a lesser extent European VC markets in the early 1990s. The first, *pre emergent* phase, is where entrepreneurship and R&D, such as through Universities (Mustar and Wright, 2010), combine to generate demand for external early stage VC risk finance. Second, the *emergent* phase is where private VC develops to extend risk financing beyond that of the individual business angel and to provide an alternative to the limitations of corporate investment. Finally, the *consolidation* phase, is where private VC becomes sustainable without public intervention.

Whether we take a cycle of development or a simultaneity engineering perspective, the overarching requirements for establishing sustainable VC are considerable, requiring the bringing together of human and network capital to generate on the one hand potential high growth ventures to attract VC funding and on the other hand a sufficiently skilled group of private VCs capable of investing successfully to generate a sustainable industry. All of this requires a suitably constructed institutional, regulatory and policy framework which takes on best practice and adapts to local and international market conditions (Lerner et al, 2013).

Finally, from an institutional perspective, there is growing support for specialist oversight organisations with control or lobbying powers for more comprehensive and cohesive VC finance ecosystem development. Mazzucato and Penna (2016) and Breedon (2012) argue that such organisations can manage and control the finance escalator, effectively developing and monitoring interventions to ensure that there is a smooth supply and operation of VC funds from seed stage through to later 'series A-B' funds and beyond to an effective IPO exit or trade sale market. This can overcome one of the weaknesses of traditional GVCFs which take a vertical approach, only making investments within certain investment size and business stage and sector categories (e.g. seed investing in tech start-ups). Alongside this role these

institutions can encourage cross-border collaborations to ensure greater fund scale and coverage which might be particularly effective for developing VC in peripheral countries (Dittmer et al., 2014; Mazzucato and Penna, 2016). Furthermore, these institutions can lobby for VC-friendly policies, such as investor tax incentives and international regulatory harmonisation to encourage inward investment, which Lerner (2010) advocates for entrepreneurial ecosystem support and development.

METHODOLOGY AND PROFILE DEFINITION OF SMALL PERIPHERAL ECONOMY (SPE) CASE STUDIES

The paper is based on in depth case study analysis of VC development in three national SPEs; Finland, New Zealand and Estonia. A multi-method approach has been taken, combining: (i) secondary quantitative and review data of peripheral, smaller national economies to assist with selection of the 3 case study areas; (ii) 15 in-depth interviews and follow up correspondence with 5 key experts from each of the case study areas. This predominantly qualitative case study approach required sufficient numbers of in-depth structured interviews with a range of key informant experts with contemporary and recent historical knowledge of the local VC industry and its operation (Eisenhardt, 1989; Yin, 2016).

The interviewees (Table 2) comprised national policymakers, industry practitioners such as VC fund managers (including the European Investment Fund) and business angel networks, leading trade equity associations (including the European Venture Capital Association) and academic VC and equity market experts. Interviews typically took place by telephone and were at least one hour in duration, following a consistently applied exploratory topic guide approach (North et al, 2013; Baldock, 2015). Where possible, information was recorded and

transcribed and then sent to the interviewees for checking and clarification. Follow-up interviews, email correspondence and supporting literature were used for further development of key emerging themes. This 'triangulation' approach which combines qualitative interviews with corroborative secondary data sources is well established (Creswell, 2003) and provides considerable inductive case insight through structured review and pattern matching - trend analysis (Yin, 2016) to reveal why problems occur and how they are addressed and, whether, successfully resolved. This approach has potential for identifying good practice that may be transferrable to other developing VC economies (see for example, Lerner et al, 2013).

Case study selection followed a set of criteria based on a combination of the literature review and data work. Key criteria used were relatively small size of the economy in terms of population, entrepreneurial ecosystem (referring to the Global Entrepreneurial Index), and size of the national VC market (Table 3). VC markets of varying maturity – at different stages of development – were selected, in order to examine more closely the contemporary problems and coping strategies adopted in these markets (Centindamar, 2003; Avnimelech et al. 2005). The countries were also selected in terms of their peripherality in terms of distance from and access to major concentrations of global VC and potential exit investment markets (e.g. for IPOs or trade sales).

(Insert Table 2)

(Insert Table 3)

In order to examine VC policy evolution a further consideration in the selection of cases was that they should have experienced at least a decade of VC development and related

entrepreneurial finance ecosystem policy. The three country SPEs are rated within the top 25 entrepreneurial countries when gauged by the Global Entrepreneurship Index (2016). In many respects this supports the view that these SPEs are generally 'getting it right' and so have important lessons and potential best practice (Lerner et al, 2013) to impart on other SPEs (Table 3).

The three SPEs are at various stages of VC development. Estonia, the least populous (1.3m) is the least mature VC economy. New Zealand (4.5m population) is the most remote. Finland is the largest (5.4m population) and most mature VC economy (Table3). All face the challenge of being small economies with low volume investment opportunities and limited indigenous sources of VC. They are also peripheral to VC concentrations, either in global or continental terms. Finland and Estonia are located on the outer periphery of Northern Europe, the nearest substantial VC market being Stockholm, situated almost 500 kilometres away and across the Baltic Sea. New Zealand is remote, being located over 2000 kilometres across the Tasman Sea from the largest Australasian VC centre in Sydney.

These counties all currently have active policies to develop VC. The longest established VC market is Finland, which in 1967 created SITRA (Finnish National Fund for R&D) and shareholdings in Sponsor, the country's first VC company. However, private VC market growth was stimulated only following the adoption of private LP legal status in the late 1980s alongside public sector support (Luukkonen, 2006). New Zealand's (Lerner, 2010; Lerner et al., 2005) government backed VC programmes were created in the early 2000s, whilst the youngest VC market is Estonia where venture capital was stimulated by the acquisition of Skype which triggered the recycling of this finance through the establishment of a VC fund in 2005 by the local 'Skype 4' entrepreneurs (see. Figure 1). Finland's market home VC market has stabilised since the GFC, but this hides a rapid increase in foreign investment, which has

nearly doubled from 139m Euros in 2012 to 232m Euros in 2016. New Zealand's VC market has recovered well since GFC, whilst Estonia's VC market has increased rapidly with the recent introduction of the EU and state backed Baltic Investment Fund (BIF). Whilst the maturing Finnish and New Zealand seed and early stage VC markets are becoming more buoyant an increasingly common observation is of a shortage of later stage series A-B commercialisation funding (FVCA, 2018; EY, 2017).

(insert Figure 1)

SYSTEM ANALYSIS AND EMERGING THEMES

Our analysis[1] of the approaches adopted to the development of VC in these SPEs identifies eight key themes. These can be grouped within the three-tier system (VC design, ecosystem, institution) discussed earlier that emerges from Lerner's (2010) systematic principles, review of contemporary GVC theory and policy literature (Table 1). Each theme is discussed in relation to this system, drawing on key examples, which indicate the new directions in which government approaches to VC is taken.

VC Design (1)

Theme 1: An inter-regional, rather than local, funding model

VC scale is critical as Nightingale et al (2009) and Lerner (2010) highlight. Although operating in different contexts, several of the SPEs have adopted new funding models that operate at a larger geographical scale than the home country to alleviate the investment

[1] Involving extensive secondary data, literature review, policy evaluation and key informant interviews with local VC industry experts

limitations arising from small scale, and thereby attract additional investment into the local market.

Estonia exhibits a trans-national approach, collaborating with the other Baltic States through the Baltic Innovation Fund (BIF), launched by the European Investment Fund (EIF) in 2012 to boost equity investments into PHG SMEs in Estonia, Latvia and Lithuania. BIF is investing €100m into private equity and VC funds focusing on the Baltic States over four years from January 2013, through a 'fund of funds' process to attract additional private finance and implement best practice market standards for equity investing in businesses.

New Zealand's Venture Investment Fund (NZVIIF) has established, with NZ government cornerstone funding, the Global firm Day One (GD1) joint-managed fund between Auckland and Taipei based private VCs. This long-planned fund aims for an eventual closing value of NZ$45m. It has also received international investment from the US, Singapore and Hong Kong. GD1 was formally announced in February 2018 and will focus on seed funding New Zealand start-ups focusing on global markets, with a proportion expected to locate in Taiwan as a springboard for Asian market development.

Entrepreneurial-Financial Ecosystem (2)

Theme 2: An international mind- and action-set

Developing an international mind-set is a key theme of Lerner (2010). This is evident in all of the cases. Specifically, these SPEs are increasingly seeking to attract international investment and expertise. Generally, seed and early stage capital investing is undertaken by investors with

'boots on the ground'; locally based investors are more likely to have the networks to identify investable deals. Such investments require frequent, intensive investor-investee interaction, favouring geographical proximity. However, proximity is less important in later stage deals. Indeed, the value-added from non-local investors often derives from being based elsewhere – typically Silicon Valley - and can assist company market global expansion.

These SPEs are pursuing this strategy by developing 'pipelines' to investors in other regions and countries, developing links between local and non-local VCs through inward investment VC, including pitching events and sector-based showcase events. It should be noted that such activity is more practically achievable for countries that have already passed through the pre-emergent VC stage (Avnimelech et al, 2005) of entrepreneurial venture development. A notably important role has been the initial entrepreneurial and R&D development in Universities that stimulates new global market aspiring PHG ventures. This combined with the later development of international linkages between Universities, R&D centres and accelerators has attracted foreign investment (Mustar and Wright, 2010). The following examples illustrate this theme.

- New Zealand has adopted a consistently 'external facing' approach in the design and development of its early stage and growth finance market. This includes establishing a joint GVCF with Taiwan, importing expertise from Israel and the USA to help develop VC and angel market investment, and developing international linkages between New Zealand VC and angel investors and VC agencies in the USA and Asia.

- Finland's innovation policy assists globally facing new businesses through establishing a global network of technology and financing centres linked to North America and Asia. On the supply-side, a common criticism is that despite considerable government investment, VC funds in Finland remain too small. One way

this is being addressed is via catalysing international VC funds to invest in Finnish firms. Finland's developing global market approach also allows public backed VC funds to invest outside of the country where this can be seen to be widening and strengthening portfolios and encouraging further foreign investment.

- Estonia has developed the so-called '*Estonian Mafia*' model[2] which encourages global facing start-up companies. This began with the location of a government office in Silicon Valley promoting innovation exchange between Berkeley and Stanford Universities and Tallinn Tech University, allowing pre-seed entrepreneurs the opportunity to learn what the US accelerators required. Over time this has resulted in high success rates for Estonian entrepreneurs enrolling in US and UK accelerator programmes and reciprocal US and UK VC investments into Estonian businesses.

Theme 3: Focused demand-side stimulation

The development of entrepreneurial ecosystems is widely evident across the SPEs. Avnimelech et al (2005) indicate that this is a necessary evolutionary precondition for their *emergent* VC stage to take place. There is recognition that simply increasing the supply of finance will be ineffective. Without complementary demand side initiatives there is high risk that increased finance will be invested in businesses that lack the potential to grow. Consequently, new initiatives to increase VC supply must be accompanied by interventions to increase the demand for risk capital. Essentially, this comprises SME investment readiness programmes, initiatives to increase entrepreneurial activity, both technology start-ups and

[2] Estonian Business Angel Network presentation 18/06/2014

growth businesses, and a broader focus to align business support measures, notably export support and activity, all with the objective of fostering demand for VC.

- Interventions adopted in Finland to improve the demand side entrepreneurial competence gap include building start-up capability through an investment readiness programme, the introduction of tax incentives for business angels' investments, the ICT-based Vigo accelerator programme, and the merger of three universities to create Aalto University as an explicitly innovation-focused institution and entrepreneurial cultural catalyst centre.
- In Estonia, Tallinn Tech University formed the Tehnopol science park in 1998 to help foster an infrastructure for technology business start-ups, accelerate growth businesses and create an entrepreneurial culture facilitating spin-outs from five University R&D centres. It has developed an incubator with accommodation for up to 20 businesses, attracted over 150 existing businesses to locate on-site, developed specialisms in biotech and mechatronics and forged close ties with international universities and accelerators[3].

In summary, all of the SPEs see the development of the early stage and growth finance market as only one component in a much more comprehensive set of initiatives to increase entrepreneurial activity that include incubators/accelerators, mentoring schemes, events and competitions and the development of 'entrepreneurial campuses'.

[3] http://www.tehnopol.ee/en/About/Team/Supervisory-Board

Theme 4: Exit-centric approach to market development

The importance that Lerner (2010) and Mason (2017) ascribe to exit markets is now widely accepted. There is a recognition by the SPEs that the amount of money invested is not an appropriate metric to measure the success of early stage and growth finance initiatives, particularly for GVCFs. Exits – whether in the form of acquisitions or IPOs - are essential to generate economic benefits through business growth and the recycling of wealth and learning by the entrepreneurs and other shareholders (Mason and Harrison, 2006). They also create signaling effects to investors (local and non-local) and provide role models to potential entrepreneurs in the domestic market. However, many – possibly most – investments by business angels and VCs are not commercially successful, dominated by failed and 'living dead' investment[4i] For example, recent New Zealand Venture Investment Fund reporting (NZVIF, 2017 p.8), indicated that the current portfolio in 10 year funds established from 2007 is un-exited and '*largely unrealised*'.

Estonia and New Zealand each demonstrate the impact that 'blockbuster' exits have on local economies. An excellent example is the 'Skype Four' software development programmers whose share of the $2.6bn sale of the company to Ebay in 2005 enabled the establishment of their own VC fund (Ambient Sound Investments). This success helped stimulate the development of the country's VC market and provided a role model which has inspired a generation of tech entrepreneurs. Ambient Sound Investments (ASI) is a 100m Euro fund, investing directly into early stage ventures and into other funds - notably Karma Ventures Baltic States seed to series A technology fund in 2016. ASI has completed 21 early stage

[4] These are investments in businesses that may generate sufficient revenue to survive but will not grow sufficiently to attract a buyer

venture investments world-wide, including 4 with Estonian companies. In 2013 their Estonian-based portfolio company, specializing in blockchain technology and digital archive integrity achieved a successful MBO.

In summary, policy makers must recognise that successful exits are key to the creation of a functioning and sustainable local VC market, both directly through the investment they create to be re-cycled in the local market, and indirectly by their demonstrator effect to others both internally and externally. However, these typically take time and to some extent are serendipitous. Nevertheless, the implication is that both government and private investors need to adopt an exit-centric approach to making investments.

Theme 5: A functioning finance pipeline

There is broad recognition amongst the SPEs that the main funding gap is in the $250,000-$3m range spanning seed VC to series A-B. This is critical for the emergence of high growth firms: $250,000 represents the upper range raised from personal sources, grants and angel funding, while $3m is increasingly the bottom end of the private VC market. Co-investment funds - for example New Zealand Seed Co-investment Fund, established since 2006 - have effectively filled the bottom end of this gap. However, the funding of growth businesses is a pipeline, hence initiatives at one point in the funding escalator will have knock-on effects at other stages. For example, seed and start-up funds will create subsequent demand for follow-on investments. It is therefore essential that all stages in the funding escalator have adequate supply, and that intervention does not occur at just one point.

The series A-B gap is more apparent amongst more mature VC ecosystems where seed funding is established, but larger follow-on funding at the series A-B (pre and very early commercialisation) stage is lacking. This gap led to New Zealand forging inward investment

links with the US and Taiwan and the creation of the GD1 fund. Furthermore, in Finland (the most mature VC market examined), recent seed funding has been amongst the highest in Europe as a proportion of GDP, with massive increases between 2010-16 in angel investing (8m rising to 53m Euros) and foreign investment (21m rising to 216m Euros). However, Finland's established domestic VC investing which covers later investment stages has declined over the same period (from 87m to 80m Euros), leading to growing concerns over an increasing shortage of series A-B funding which needs addressing (NVPI, 2017).

It is also important to recognise that VC is not necessarily the appropriate source of finance at all stages. Sources of non-dilutive finance (e.g. grants and deferred loans) are particularly important for businesses at the pre-commercial stage. For example, Business Finland (formerly Tekes, the public agency supporting innovation) offers soft loans (with deferred repayment and up to 7 year term, at 1%) and grants for pre-commercial R&D innovation, with increased proportions of grant (65% compared with 50%) available to projects with international linkages.

Theme 6: Effective business angel networks

Developing the finance escalator also involves recognition of the importance of a strong business angel community not just as sources of early stage finance but also to provide 'smart' money through the mentoring and advising that angels provide to their investee entrepreneurs. Angel communities feature strongly in Finland and New Zealand and where they are weaker, arguably in Estonia, this has been recognised as an important barrier to development of the wider equity finance market. Angels are increasingly organising

themselves in managed angel groups, in some cases with government support. The size of these groups (from 10 to over 100 members) means that they have the financial resources and wider skills sets to make potentially smarter, larger, and follow-on, investments (Mason et al. 2016). Governments are therefore seeking to support the development of angel groups as key partners in their VC initiatives, notably as partners in co-investment funds. New Zealand's approach to developing its business angel base is particularly instructive. The emergence of over 15 angel networks (a large number, relative to the size of the country) has received policy support under the overarching operation of the NZVIF's focused supply-side capacity development intent, both through a co-investment fund and developing a suite of materials and systems (e.g. protocols, advice notes, resources) assisting increased capacity and discipline of the angel investment process (NZVIF, 2017).Estonia demonstrates how rapidly an organised angel network can establish international linkages and lever in private investment, transforming a previously barren seed stage equity market. The fledgling Estonian Business Angel Network (EstBAN) was established in 2012 with government catalyst funding to assist with administration, including 50 promotional events to generate interest and market knowledge. The first year[5] generated 83 investments in 66 companies, representing over €4.6m, with over half of investments in pre-seed and early stage companies. Notably, 85% of investments were in syndication and 43% were outside of Estonia, into Estonian businesses that have relocated internationally, or through international investor links, largely enabled by close ties with angel networks in Finland (FiBAN), St Petersburg (SoBA) and Latvia. Within three years EstBAN membership grew to 71 angels, included international investors from USA and other parts of Europe, enhanced by the use of an online 'AngelList' style investment platform[6].

[5] http://estban.ee/images/estban-the_first_year_in_retrospect.png ; http://estban.ee/about
[6] Estonian Business Angel Network presentation 18/06/2014

Where angel network seed investing is established, one way in which the ensuing series A-B finance gap can be at least partially addressed, is through government angel co-financing programmes. The success of the UK Angel Co-investment Fund established in 2013 (Owen and Mason, 2017) has led to a similar European Investment Fund (EIF) European Angel Fund which match-funds angel syndicate investments to generate more substantial early stage venture funding. In 2017 Finland established a 30m Euro joint Tekes-EIF funded European Angel Fund to enable angel investment to address its growing series A-B finance gap.

Institutional and Regulatory (3)

Theme 7: An open and attractive regulatory system

The emerging VC market literature strongly advocates the adoption of global standards and regulatory harmonisation approaches. This creates the necessary stability and confidence to attract skilled inward investment and develop the local investment market (Avnimelech et al, 2005; Lerner, 2010; Lingelbach, 2015). It appears to be particularly important for each of our SPEs, where there has been concerted government effort to foster international collaboration by providing a more attractive regulatory market to encourage foreign inward investment. Estonia in particular has recognised that the lack of a LP legal structure has held back entry of skilled overseas private VCs into the market. Lerner (2010) noted that New Zealand adopted this approach in the early 2000s, enabling the government backed NZVIF to attract high performing US investors through its match funding approach.

Alongside the provision of a more harmonized, internationally recognised regulatory environment for VC has been the provision of a more attractive, simplified tax regime to

attract foreign companies and investors. For example, Finland now recognises that more foreign VC investment is required to stimulate the domestic market and improve business growth. One approach has been through the recently developed government backed Tekes annual €20m catalyst fund, which can relatively easily invest *pari passu* alongside foreign VCs investing in Finland and offers attractive tax concessions on investment returns.

In summary, the clear trend to emerge from these SPEs is that they are working towards improved incentives and support for inward investment by non-local VCs, through a mix of networking and promotion, tax incentives, co-finance schemes and the international regulatory harmonisation of VC activity.

Theme 8: Dedicated institutions and agencies in immature markets

The SPEs exhibit a range of institutional contexts that largely reflect differences in the relative maturity and development of their various entrepreneurial early stage and growth finance markets. Where the market is less mature, such as in New Zealand, a dedicated SME finance agency has played an important wider policy setting and advocacy role than simply the management and distribution of finance. The NZVIF is central to developing New Zealand's entrepreneurial finance sector, leading delivery of a VC Fund and a Seed Co-investment Fund that has developed the angel investment market. It also plays wider policy advocacy and market development roles, helping maintain the momentum of industry development, providing consistent focus on building the capability of the investor community (e.g. bringing in skilled US VCs investors) as the key to creating a sustainable market (strongly advocated by Lerner, 2010).

Such a model may not be appropriate in all cases. However, when the market is small, the networks are not fully formed, and significant public investment is required, they can help to provide policy consistency, delivery capacity, and provide a clear advocacy function to promote market growth. On the other hand, their absence or poor design can be detrimental to the development of VC markets. This is illustrated by government intervention in Finland's entrepreneurial finance markets, the most established VC market examined. Veugelers et al. (2009) demonstrate that lack of co-ordination and control over a proliferating range of policy measures, which have included small, restricted regional funds and insufficient monitoring (advocated by Lerner, 2010; Murray et al., 2009), has led to under-performance of its GVCFs. The funds with an evergreen approach experienced a lack of fund management performance incentive, leading to entrenchment and mission creep in supporting poor performing portfolio companies. Consequentially, these funds demonstrably failed to adapt to changing market needs over time, add value to portfolio business management, and encourage entrepreneurial activity (Murray et al, 2009).

CONCLUSION: CREATING A BLUEPRINT ECOSYSTEM FOR SUSTAINABLE VC

The paper supports the view (Lerner, 2010; Lerner et al 2013; Baldock and Mason, 2015; Cumming et al, 2016) that developing local sources of VC is a basic tenet of economic development policy-making. However, GVC initiatives to fill gaps in the supply of private IVC have generally been unsuccessful, often through failure to recognise that VC requires a supportive ecosystem in which to operate. This paper builds on the literature (Avnimelech, 2005; Lerner, 2010; Baldock 2016), to offer a holistic overarching model based on evidence from the approaches of three SPEs which highlight how government initiatives have

successfully fostered the development of venture capital to close the funding gap for young PHG businesses and thereby promote economic development.

(Insert figure 2)

Building on more recent contributions of Hwang and Horowitt (2012) and Wilson and Silva (2013), our research reveals eight strong, interconnected, themes that underpin the venture capital development policy in the three SPEs studied. From this we propose an overarching entrepreneurial-financial ecosystem model (Figure 2) to provide a blueprint for future development of venture capital in SPEs. It is acknowledged that emerging SPE VC markets will be at different stages of development and exhibit different cultural and institutional characteristics. A fundamental point, underlined in Avnimelech et al (2005) is that an initial phase of entrepreneurial demand stimulation (3) is required to attract venture capital investment. Once this has occurred, as in our three SPE cases, a range of policies are then required simultaneously (Gilson, 2003) to successfully engineer VC development. The basic principles of the model apply to all of our cases and offer clear guidelines for future policy development in SPEs.

The model highlights the key dual and interconnected roles of government regulatory/tax policy (7) and dedicated policy and delivery institutions (8). The latter may involve state investment banks, or holding funds, with the ability to provide comprehensive overarching policy to deliver government funding, including GVCFs. Our findings suggest that dedicated institutions (such as the NZVIF), are particularly well placed to plan and co-ordinate the

range of different types of public financing instruments required, monitor their performance and adjust accordingly over time. They also provide an important lobbying mechanism in collecting evidence and advocating key wider government policy interventions that support entrepreneurial activity.

The model also highlights the interconnectivity between the financing schemes (5) and a range of other factors required to facilitate the successful development of a small market VC ecosystem. These include linkages to entrepreneurial development through ongoing demand-side stimulation policies (3) and to business angel investors (6) through the development of enhanced business angel networks and co-financing arrangements to leverage greater investment in seed and early stage business financing.

Supporting Lerner's international thesis, the model also highlights the crucial importance of enlarging the SPE investment market through cross-border investing (2), which can increase the scale of venture capital, import expert investors to upskill the industry, open up global market connections and opportunities for portfolio firms and improve exit opportunities (4). There is also a need to grow the scale and market reach of regional and national GVCFs (1), enabling them to invest across borders (Dittmer et al., 2014), to ensure that they have sufficient size and capacity to develop a sustainable investment cycle and the encouragement of overseas business angel and VC investment (Hopp, 2010). This can be achieved in the following ways: supporting international business angel network and VC collaborations; GVC incentives to foreign VCs; international linkages between innovation institutions (e.g. universities, R&D centres); and assisting born global start-ups to enter overseas

incubator/accelerators with encouragement of reciprocal foreign corporate accelerator investments into the home market (Wilson and Silva, 2013).

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Table 1: A Contemporary Framework of VC Development Guidelines

Literature strand	Guidelines from the Existing Literature
(i) VC design	1. Private market led – investment by experienced private VCs 2. Resist overengineering – avoid micro management 3. Consider lead time – longer horizon investment 4. Consider appropriate fund scale – not too small or big 5. Regular evaluation – assess delivery and programme relevance 6. Avoid agency problems – mission creep and self-serving 7. Flexibility to adjust to changing market needs
(ii) Entrepreneurial and SME Financial Ecosystems	1. Develop entrepreneurial ecosystem – entrepreneurial education and international linkages 2. Leverage R&D base – connect industry with R&D and universities 3. Education – VC market knowledge; entrepreneur finance knowledge; network support base of wider professional intermediaries (e.g. Accountants & Lawyers)
(iii) Institutional & Regulatory	1. Create stable government and regulatory environment to develop national and international legitimacy and trust base 2. Adopt global VC standards – notably Limited Partnership and transparent accounting operations 3. Facilitate global interconnectivity – free market approach to skilled labour movement, encouraging business and trade, offer suitably low tax inducements 4. Understand that VC is a long game, requiring holistic integrated policy which may be phased, but also requires simultaneity of actions within the ecosystem

Table 2: Structured Interviews by country and respondent type

Respondent Type	Estonia	Finland	New Zealand	European*
Policymaker	1	1	1	
Government agency/VC	1	1	1	1
Business Angels	1	1	1	
Trade Association	1	1		1
Academics	1	1	2	

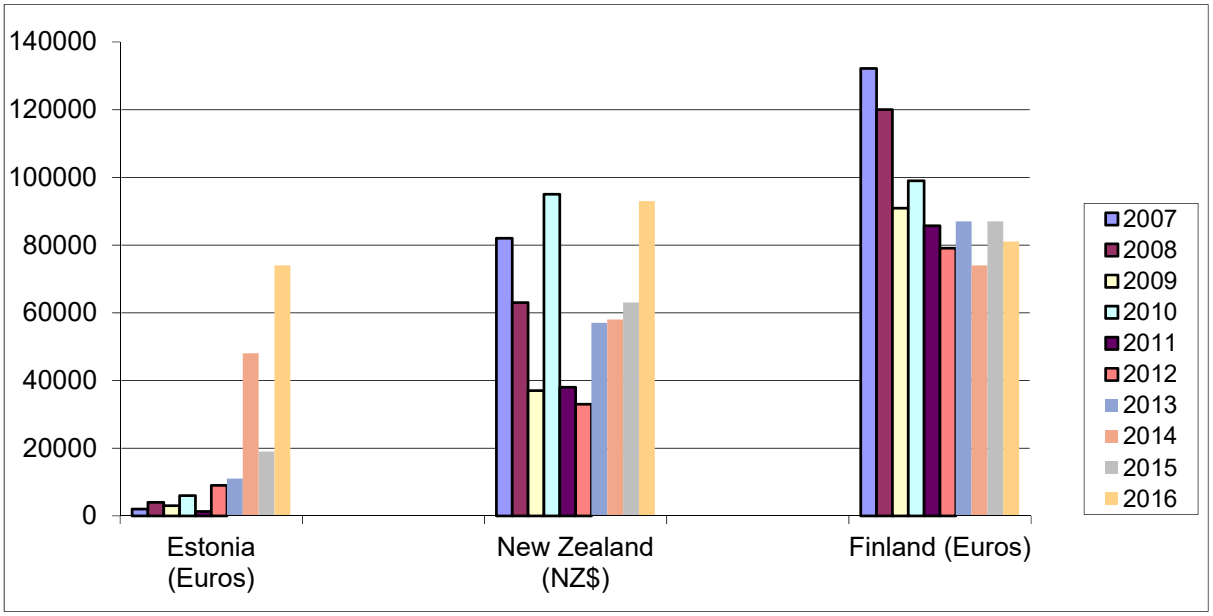
*European: includes 2 additional interviews with: (i) European Investment Fund; (ii) European Venture Capital Association (now Invest Europe).

Table 3: Key Population, Venture Capital Investment and GDP Metrics

Measure	**Finland**	**New Zealand**	**Estonia**
Population	5.4m	4.5m	1.3m
Distance from VC centre in km	484	2155	426
VC centre investment 2015-16 (Euro)*	Stockholm 760m	Sydney 237m	Stockholm 760m
Maturity of VC market	50 years	20 years	15 years
Total VC investment 2012 (Euro)*	79.1m	20.8m	8.6m
Global Entrepreneurship Index (GEI) Score% and top 25 Rankings 2016			
Policy	74 (19)	96 (1)	84 (3)
Infrastructure	76 (4)	66 (21)	55 (-)
Education	88 (6)	92 (1)	65 (-)
Entrepreneurial	76 (2)	58 (-)	65 (15)
Finance	63 (19)	82 (6)	50 (-)
Overall GEI ranking	8	2	22

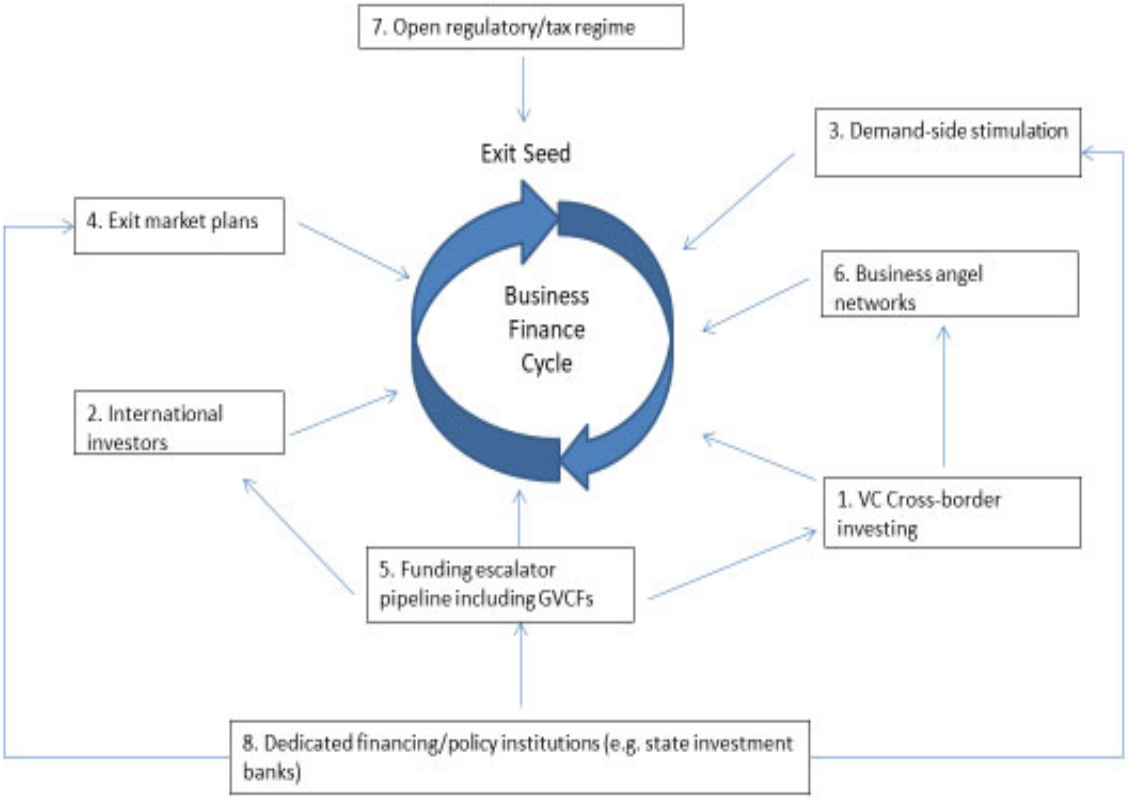
Sources: * currencies converted to Euro, based on annual average exchange rates.

Figure 1: Total Annual Venture Capital Investment 2007-16 (000s)



Sources: Estonia – ESTVCA; Finland - FVCA; New Zealand – EY Private Equity and VC Monitor

Figure 2. The Entrepreneurial-Financial Ecosystem Model



Author Biographies

Robyn Owen is Associate Professor of Entrepreneurial Finance at the Centre for Enterprise and Economic Development Research (CEEDR), Middlesex University Business School. She is also Co-chair of the Institute for Small Business and Entrepreneurship (ISBE) Special Interest Group for Entrepreneurial Finance and a Research Fellow with the ESRC Centre for Understanding Sustainable Prosperity (CUSP). Her research focuses on early stage venture finance policy.

Colin Mason is Professor of Entrepreneurship at the Adam Smith Business School, Glasgow University. His entrepreneurial finance research has notably focused on the role of business angels.

[i]