Policies for financing entrepreneurship through venture capital: learning from the successes of Israel and Taiwan

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Abstract: The success of Silicon Valley as a hub for rapid-innovation growth has motivated policy-makers around the world to initiate policies trying to mimic it. These policy initiatives raise the question of whether globalisation should encourage innovation policy-makers to aim for institutional convergence and close imitation, or for institutional hybridisation and local experimentation. This paper explores this question by focusing on venture capital creation policy. Using two national cases, Israel and Taiwan, we show that policy effectiveness is not the result of simple imitation. Instead, policy performance is determined by degree of fit with local financial conditions and the position of the local ICT industry within global production networks. We then consider the implications of our study for understanding the development of national VC industries and the industries they fund. The primary message being that there is no singular model for venture capital market development. Instead, policy-makers need to understand the local context with its assets and liabilities. Of particular importance are local financing conditions, firm capabilities, and the existing position of local firms within the global production networks of the ICT industry.

Keywords: innovation policy; entrepreneurship; venture capital; public policy; Silicon Valley; Israel; Taiwan; information and communications technology.

Reference to this paper should be made as follows: Klingler-Vidra, R., Kenney, M. and Breznitz, D. (2016) 'Policies for financing entrepreneurship through venture capital: learning from the successes of Israel and Taiwan', *Int. J. Innovation and Regional Development*, Vol. 7, No. 3, pp.203–221.

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1 Introduction

For policy-makers worldwide, venture capital (VC) has had a remarkable allure, because it appears to offer an easy-to-imitate institutional fix to what officials see as a clear market failure[1]. The success that Silicon Valley venture capitalists have had in finding and financing new innovative firms has inspired policy-makers to attempt to build their own national VC industries. The hope is that VCs can undertake the difficult task of selecting and funding high-risk, early-stage firms (Mims, 2014). Accordingly, the ultimate policy goal is not the creation of a VC industry as such but, rather, capturing the by-products of effective VC investment: jobs, technological advances, and tax revenues (Breznitz, 2007a; Kenney et al., 2002; Kortum and Lerner, 2000; Lerner, 2009; Sunley et al., 2005).

During the past four decades, over 40 countries have implemented policy attempting to create local VC industries (Brander et al., 2014; Klingler-Vidra, 2015; Wright et al., 2005). Partly stemming from these policy attempts, VC has spread widely, as has the limited partnership (LP) as an organisational form (Aizenman and Kendall, 2008; Guler and Guillén, 2010; Mayer et al., 2005; Megginson, 2004). Although all these attempts consciously tried to recreate what was seen as the ideal – Silicon Valley's VC cluster – most experienced limited success in creating vibrant entrepreneurially-based, high-technology industries (Lerner, 2009).

It is now widely accepted that simply making VC available cannot guarantee the establishment of Silicon Valley-like entrepreneurial activity (Lerner et al., 2014), but that has not stopped jurisdictions from continuing to try. Some believe that the failures are mostly due to failing to transplant key aspects of the Silicon Valley VC model, such as stock markets receptive to small firms (Black and Gilson, 1998), the cultural institutional context (Bruton et al., 2009), or an insufficient number of returnees from Silicon Valley[2]. This logic suggests that failures are the outcome of the local VC creation policies, as formulated and implemented, diverged too far from the US model. We argue to the contrary – that the most successful VC policy cases are those in which local

policy-makers developed local context-relevant models, rather than close replicas of the US model[3]. VC creation policies succeed only in places where policy-makers matched the VC industry with local conditions, as well as with the co-evolving relationship between the local information and communication technology (ICT) industry and investors, global or domestic, and financial markets.

This paper explores the experiences of two of the most celebrated VC industries outside Silicon Valley, Israel and Taiwan, which, through conscious policy efforts, were able to build a VC industry. It is motivated by a research question of fundamental importance to policy-makers the world over: which factors should they consider when designing VC policies? The aim of this analysis is to identify the determinants that can assist policy-makers in developing strategies that may be successful in their particular local contexts[4].

Both Israeli and Taiwanese policy-makers modified the Silicon Valley 'model' and, instead of simply imitating it, tailored various policies and institutions to fit both local context and the nodes their local firms occupied within the global ICT production networks. The two countries' VC policies followed the same pattern of their overall innovation policy strategies. Specifically, Israel and Taiwan pursued markedly different strategies with regards to positioning their ICT industry's within the global production networks (GPNs) and their foreign-versus-domestic financing strategies (Breznitz, 2007a). Despite their differences, each country's policies encouraged the formation of a local VC industry, which in turn encouraged the continued development of the local ICT industries along their very different development trajectories.

Their experiences allow us to probe the question of whether VC policy should be premised upon, and target, institutional convergence and imitation or encourage institutional hybridisation and local experimentation (Berger and Dore, 1996; Jacoby, 2001; Westney, 1987). We argue that it is not the degree of convergence that drives VC policy performance, but the fit of VC policy with the local context, in particular, the types of entrepreneurial firms in the local ICT ecosystem and the nature of financing, and financial exits, available for ICT firms.

Using the comparative method of similarity (in this case, holding the outcome – success – constant), our case studies aim to allow a full examination of variance in our two areas of interest (Alexander and Bennett, 2005; Dion, 1998; Eckstein, 1975; Gerring, 2007; Ragin and Becker, 1992). By 2000, Israel had become the world's second-largest VC market on an absolute basis and the world's largest on a per capita basis (Baygan, 2003). Additionally, the Israeli case also offers the opportunity to examine a 'failed' VC policy within the same socio-political and business context. The highly celebrated Yozma program that kick-started the Israeli VC industry, came on the heels of the failure of the Ministry of Finance's Inbal program. Taiwan became the world's third-most-active VC market by the early 2000s (AVCJ, 2005). Its VC market is "arguably the most successful engineered venture capital market in the world" [Gulinello, (2005), p.848].

2 Theory

There are two continuing debates between global convergence and divergence with regard to political and economic systems. Broadly speaking the proponents of convergence suggest that economies develop on more or less linear paths, with global markets diffusing only the most effective models, while making the cost of adhering to a

less optimal one prohibitive. Accordingly, one can consider the current epitome – Silicon Valley – as an end point in the development of high-technology entrepreneurial clusters; it then follows that those countries seeking to develop their ICT industries should copy and replicate as many of Silicon Valley's features and institutions as possible. This has led to policies to establish elite universities, create science-based industrial parks, mandate changes in university-industry relationships to foster more commercialisation, and establish local capital markets for both the supply side (e.g., venture capitalists) and the outcome side (NASDAQ-like stock markets aimed at 'new' companies). The main theoretical assumption behind the diffusion of these policies is that there is one correct path that will lead to convergence and economic success (Klingler-Vidra and Schleifer, 2014; Berger and Dore, 1996; Knill, 2005).

We find ourselves at the other side of this debate, as we expect variance across national political economic configurations. In our conceptualisation, growth relies more on hybridisation and localisation of new policy ideas emanating from the international system. In our formulation, we integrate several streams of literature to explore the impact of VC policies[5].

Following Breznitz (2007a) we argue that the performance of VC policies in Israel and Taiwan can only be understood if two critical factors are taken into account. First, the embeddedness of the local ICT industry within the GPN and the national innovation systems. For example, in Taiwan most local ICT companies employ a business model that operates either as original design manufacturer (ODM) operations or close followers to overseas leaders. In Israel, most ICT firms employ business models for novel product development that have greater similarity to those of Silicon Valley start-ups. For these reasons the financial exits available to investor are remarkably different between the two cases. This is critical because high-technology firms are particularly dependent upon their regional innovation systems for support (Pellikka, 2009). Indeed, there is general consensus that there is a path dependence by which "new industries emerge from related industries" [Brekke, (2015), p.202]. This suggests a powerful linkage between entrepreneurship, regional development, and the emergence of a local VC industry (Feldman et al., 2005). It is the position of local firms in the GPN that conditions the investment opportunities that the local firms offer VC firms.

Specific to the relationship between the existing ICT industry and VC, evolutionary innovation economists, such as Teubal (1983), find that effective VC creation policies are those that fit the specific stage of local high-technology growth within which they are implemented (Avnimelech et al., 2005). This contradicts a widely-held belief that the supply of VC is a critical prerequisite for the creation of a high-technology industry that does not yet exist (Feldman, 2001; OECD, 1996; Zhang and Wong, 2008). To put it in the Silicon Valley vernacular, 'the entrepreneurs' came first, not the VCs.

The second factor is the political-economy view about the role that foreign financiers and foreign capital markets should play in the local ICT industry (Breznitz, 2007a). Each country's policy context and insertion in the global economy shapes the sources of capital available for the local VC industry and the types of financial exits (e.g., the NASDAQ versus the local stock exchange and foreign versus local mergers and acquisitions). It also shapes the organisational structures of the VC firms. Such a view goes beyond conceptualisations of local investors in terms of their role in signalling value to foreign investors (Huang et al., 2015) and explores the local structuring of the entrepreneurial financing system and how it relates to global production and financial systems.

The empirical reality of globalisation, specifically in ICT, actually leads away from convergence. The reason is that the global system for the production of goods and services is a system characterised more by fragmentation, geographically and in production networks. Production is now divided into specific stages, and localities specialise in *different* stages resulting in *varied* development paths, that need not result in convergence. This development offers emerging economies more policy choices than they ever had before.

In this system of global fragmentation, the production of goods and services is no longer organised in vertically integrated hierarchical companies located in a single country. Even as corporations segment their activities into modules, they also are deciding what to source from which suppliers where (Arndt and Kierzkowski, 2001; Gourevitch, 2000; Sturgeon, 2002, 2003). This fragmentation has changed the international economic system, leading different locations to specialise in specific stages of production in particular industries (Breznitz, 2007a).

This division of labour permits the formation of innovation systems in both emerging and developed nations. It allows their respective entrepreneurs to specialise in specific sectors of the global ICT industry. For example, ICT has become the mainstay of economic growth in China, India, South Korea, Taiwan, Israel, and specific regions of the USA. However, each nation has specialised in particular segments of the ICT industry. Indeed, their respective ICT industries could not be more dissimilar. Consider the semiconductor industry: the USA (and, to a lesser degree, Israel) leads the world in designing chips with new functions; Taiwan leads the world in fabricating the these chips (as well as rapidly improving on them) and designing lower-functionality, lower-cost chips; South Korea focuses on developing market dominance in capital-intensive, mass-production niches (e.g., memory and liquid crystal display screens)); India has become a software programming powerhouse, while China produces an increasing number of usually lower-technology components, imports others, and assembles these components into a final product that is shipped to consumers around the world, but also has the world's second-largest internet industry, due to government control of the domestic market.

This global division of labour and thus divergence suggests that each local ICT industry not only employs different business models but should also experience different capital needs and develop institutions for providing the relevant forms ofcapital. It is one thing, in terms of financing needs, to develop a fabless chip design firm whose main revenues stream relies on designing and marketing speciality chips (Breznitz and Cowhey, 2012). It is a completely different endeavour to build a company whose main strength is designing and producing peripherals or new electronic gadgets or designing low-end semiconductors. Therefore, the national VC industries should differ, because the types of investment opportunities and the capital needs vary according to the position of the ICT firms it funds in the GPN.

With regard to the development of the VC industry, as the name Silicon Valley suggests, the semiconductor was the artefact and industry around which VC first coalesced. The ICT industry has been where the greatest VC market successes have been, and where venture capitalists still play a critical role in funding new firms (see Kenyon, 2012; Kortum and Lerner, 2000). The co-dependence of ICT and VC is evident in both of nations we study. In 2014, Israeli high-technology firms raised a record US$ 3.4 billion, with the internet and software sectors alone constituting half of all funds invested [IVC, (2014), p.2]. In Taiwan, the local VC market "made a substantial contribution to …

high-tech industry incubation" as over half of the ICT companies listed on the Taiwan Stock Exchange were VC-backed [Yeh, (2006), pp.3–22]. Further, ICT is also the main target industry for VC policy initiatives around the globe (Lerner, 2009; Sunley et al., 2005).

Concerning financial regulations, two crucial dimensions affect the development path of local VC industries:

1 the stance of policy-makers toward local or international sources of funds for the local VC industry

2 policy-makers' position vis-à-vis foreign financial exits [either initial public offering (IPO) or mergers & acquisitions (M&A)] of their portfolio firms.

These two dimensions influence not only the way in which VC policies are structured, but also the organisational models that local VCs employ, their sources of capital and expertise, and the kind of financial exits they offer their investors. On the first dimension of financial regulation, an illustrative example comes from the Israeli Yozma program, which required that each of its participating VC managers raise money from foreign institutional investors. This stance contributed to the significant volume of foreign sources of capital as LPs in Israeli VC funds. With respect to the second dimension, China serves as noteworthy example. In China, through 2005, regulations significantly restricted the ability for mainland firms to be publicly listed on foreign stock exchanges; this restricted the types of financial exits for Chinese venture capitalists to domestic IPOs and foreign trade sales.

Consequently, any theory seeking to explain the growth of a VC industry must take into account:

1 the types of entrepreneurial firms feasible and available in the local ecosystem

2 country-specific regulations regarding sources of financing and the types of financial exits available.

VC is a financial services industry whose performance depends on its ability to supply capital and other non-tangibles in ways that assist the recipient firms to grow sufficiently rapidly to enable lucrative financial exits (Gompers and Lerner, 1999). A VC business model that does not align with the industrial and financial market context within which it operates will fail.

Accordingly, we argue that VC creation policy initiatives must adapt the ideal-type 'Silicon Valley' model to the local context. And yet, it must also retain its core elements of supplying dedicated capital, providing monitoring and managerial assistance, and capturing capital gains.

3 VC policies and industry growth in Israel and Taiwan

To elaborate on our propositions we use the cases of Israel and Taiwan. Taiwan approximates the local financial exit ideal-type policy model, while Israel approximates the foreign financial exits ideal-type policy model. These patterns result from the

dynamic that we are investigating: the local ICT firms' characteristics and the orientation of local venture capitalists toward financial markets. Our two case studies elucidate the ways in which ICT entrepreneurship and VC investing in both nations co-evolved.

3.1 Israel

3.1.1 The origin and growth of the ICT industry

Starting in the late 1960s and with greater vigour in the 1970s, Israel's innovation agency, the Office of the Chief Scientist (OCS), opted for a national development strategy focused on novel product R&D. The mainstay of the policy focus was the view that private companies should be the main agents of industrial R&D. The unit of engagement was an R&D project meant to develop new exportable products. The project ideas came from private industry, and the OCS evaluated their feasibility and supplied financing to cover part of the R&D cost. The strategy encouraged a specific division of labour between local firms and multinational corporations (MNCs) in which Israeli firms conducted the R&D, while the MNCs were responsible for international sales and marketing (Teubal, 1983; Teubal et al., 1976). Since encouraging R&D was the policy goal, the ownership of the operation was not a central concern. Hence, MNCs that wanted to open R&D centres in Israel were treated as Israeli companies for the purposes of program support. By the late 1970s, in line with its international solicitation objective, a special program established with an endowment from the two governments – the Binational R&D Foundation USA-Israel (BIRD) – played a key role in convincing US MNCs to open R&D centres in Israel, while enhancing the model of Israeli firms developing novel products aiming at the US market [Breznitz, (2007a), p.59].

In conjunction with these policy initiatives, by the late 1960s local entrepreneurs and investors had already initiated relationships with a number of pioneers of the US VC industry (which was still in its early stages), such as Fredrick Adler in New York. These collaborations allowed an Israeli technology firm, Elscient, to list on the NASDAQ as early as 1972, less than a year after the NASDAQ was founded as an independent stock exchange. Later, in the early 1980s Yitzchak Yaakov, the then-chief scientist, created "a specific set of legal entities to use a US tax shelter to channel finance into Israeli ICT firms" [Breznitz, (2007a), p.65]. This 'special ad hoc LP program' operated between 1980 and 1986 as a means of channelling US investors to Israeli start-ups [Avnimelech et al., (2005), p.29]. By the 1980s, these strategies had created a small but thriving ICT industry.

Furthermore, by this period the Israeli ICT industry already specialised in a specific stage of the ICT GPNs, as a supplier of new-to-the-world R&D-based products. Because of the rapid growth of new ICT platforms [the move to minicomputers and then personal computers (PCs)], a market opened up for firms that could supply new products. Indeed, the customers for Israeli ICT companies were other ICT companies or developers, not end-consumers. There was a constant dribble of Israeli firms, many of which organisationally were difficult to distinguish from US firms, listing on markets in the USA. These exits proved that investment in Israeli companies could deliver substantial returns [Breznitz, (2007b), p.1474; Rock, 2001].

3.1.2 VC policy development and implementation

Consequently, by the late 1980s, when Israeli policy discussions on how to create a domestic VC industry began in earnest, it was in the context of existing integration of the local industry into the US GPN and a developing, but impressive, track record of IPOs on US stock exchanges. By then, Israel had the institutional preconditions (regulations and procedures), proven financial exits via the NASDAQ, and a thriving local ICT industry. However, since it was still difficult for local firms to secure financing for rapid scaling, policy makers decided that the formation of a domestic VC industry could address this problem[6].

The first initiative, the Inbal program, was launched in 1991 by the Ministry of Finance. The Inbal program was a domestically-oriented government insurance scheme that provided a 70% guarantee to four VC funds listed on the Tel Aviv Stock Exchange (TASE). This program was entirely Israeli-owned and -operated, raising capital on the TASE for fledgling VC companies (not limited partnership) managers, rather than raising capital from LPs, the preferred US organisational form. The establishment of the Inbal program in the TASE stemmed from its dual objectives: to promote Israel's VC industry and to strengthen the TASE. Ultimately, its reliance on the domestic stock market for liquidity resulted in the program failing to attract any new global investors to Israel [Avnimelech and Teubal, (2006), p.1489]. Largely due to its failure to fit into the local ICT focus on foreign financing and exits, Inbal's results were disappointing and the program was soon discontinued (Avnimelech et al., 2010).

In 1992, having learned from this experience, the OCS initiated the Yozma program. The OCS, led by Yigal Erlich, the then chief scientist, believed that an Israeli VC industry had to build strong relationships with foreign venture capitalists and continue the existing pattern of listing on foreign financial markets and not the TASE. Because of this overall goal, the Yozma program had four aims: increase the amount of VC available to Israeli firms; create a professional VC industry with the business skills that the ICT industry lacked; facilitate learning by fledgling Israeli high-technology firms about US markets in terms of both products and finance; and expand the number of venture capitalists operating in Israel.

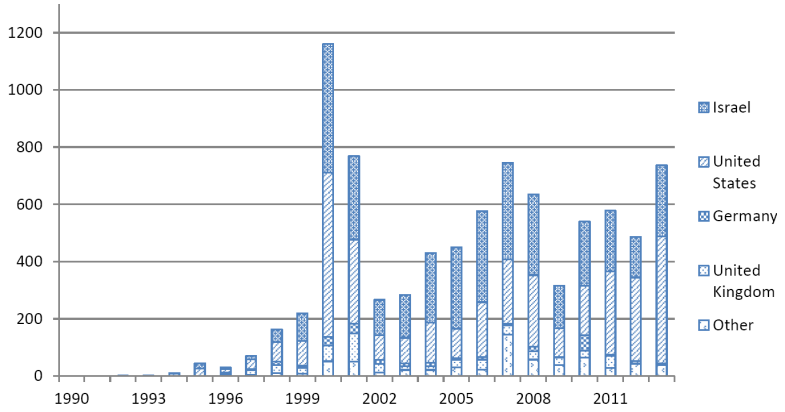
Acting in line with these aims, the OCS was given a $100 million fund which it used two ways (authors' interview, Tel Aviv, 6 October 2013). First a co-investment model in which the government would provide 40% of the capital of up to $20 million in total fund size for ten VC funds, all of which had to be organised in the US LP model, and at least one of the investing partners had to be an established foreign VC organisation. In addition a fully-owned fund of $20 million called Yozma was created and headed by Yigal Erlich who resigned from his role as Chief Scientist to lead it as a private entity (Breznitz, 2007a). Finally, the program included an option for the private investors to buy out the government share at cost plus 7% interest per year. All but one of the funds used that option and bought out the government share.

Unlike the demise of the domestic stock exchange-focused Inbal fund, the globally-linked Yozma program was very successful. The precise construction of the program, in particular the fact that it treated VC as a globally-linked industry with specific skills to be acquired and capabilities to be nurtured, led to a number of positive impacts (Avnimelech and Teubal, 2004). Importantly, Yozma professionalised or, more precisely, 'Americanised' Israeli venture capitalists. A number of the early Yozma Israeli venture capitalists were drawn from a growing pool of experienced technological

entrepreneurs who had already established firms. This, together with the demand that the VC firms include a professional foreign partner, created a VC industry in which the typical venture capitalist had experience in an R&D-based ICT firm and was oriented toward the US market. This mirrored the US-focused approach of Israeli ICT firms.

The first Yozma funds had multiple firms to invest in that already had products and sales. Hence they posed very little risk as they could quickly be exited. This, coupled with the fact that the NASDAQ composite experienced an enormous boom in valuations, led these funds to enjoy excellent returns. Early successes attracted yet more foreign capital to the Israeli VC industry (see Figure 1) so that by the late 1990s over 100 VC funds were active (Ber and Yafeh, 2003). The success of Yozma also led to the adoption of the American-style LP as the organisational form for Israeli VC funds. This decision further facilitated investment by US institutional investors in Israeli VC funds.

Figure 1 National source of VC investments in ISRAELI ICT firms, 1990–2013 (by US$ equity amount) (see online version for colours)



Source: Thomson Reuters Annual Foreign and Domestic Venture Capital Fund Deal data

The creation of an environment so conducive to US VC funds' investment in Israeli ICT firms and the fact that much of the capital raised by Israeli VC firms originated in the USA means that most of the financial gains have gone to the overseas investors. In this way, the Israeli economy did not capture most of the returns of its entrepreneurial activities.

Israeli ICT firms predominantly exited via US markets, namely either an IPO on the NASDAQ or an M&A by a US firm. In 2013, for example, 87% of Israeli high-tech firm exits – worth $7.6 billion – were acquisitions by US firms (Shamah, 2013). In 2014, Israeli ICT companies raised $2.3 billion through IPOs, primarily on the NASDAQ and, to a lesser extent, the New York Stock Exchange (Gilad and Orbach, 2015).

In summary, starting in the 1960s an ICT industry strongly focused on novel product technology development grew and flourished in Israel. As part of its co-evolutionary path, Israeli firms developed relationships with foreign (mainly American) MNCs. In this division of labour, Israeli firms (and the Israeli subsidiaries of these MNCs) focused almost exclusively on novel product R&D. In parallel with this business evolution, from early on the Israeli ICT industry developed an intimate relationship with US financial markets, which became the main source of both investment and financial exits.

Operating within this environment, and after a failed attempt by financial policy-makers to create a domestically-focused VC industry, Israeli policy-makers adopted an extremely international orientation. Not only was the LP organisational form adopted from the USA, but the investors, the knowledge, and the sought-after financial exits were all focused on US markets. The Yozma initiative both tailored the US VC model to fit well-established patterns in the Israel ICT industry, but also further integrated the Israeli ICT and VC industries into the US financial system.

3.2 Taiwan

3.2.1 The development and growth of the ICT industry

Like other industrial sectors in Taiwan, the ICT industry began with Taiwanese firms acting as contract manufacturers to MNCs (Noble, 1998; Chang et al., 1999; Amsden and Chu, 2003). As their quality improved, they began to deepen the Taiwanese ICT industry by building a supply-base to export assembled products containing a greater proportion of Taiwan-made components, rather than exporting assembled products that consisted almost entirely of imported parts (Berger and Lester, 2005). Initially, in consumer electronics, the Taiwanese strategy was to replace the more expensive American and Japanese products (Dedrick and Kraemer, 1998; Noble, 1998).

For its part, the Taiwanese government developed a variety of strategies for encouraging industrial upgrading. As in Israel, the government in Taiwan worked assiduously to attract electronics MNCs, though in Taiwan these were assembly operations. Taiwanese policy-makers cajoled MNCs to source components from local firms, many of which were newly formed, and encouraged them to learn while doing (see Lowe and Kenney, 1999). As the electronics industry became more sophisticated and diversified, the government established public research institutions to further industrial upgrading (Breznitz, 2005; Noble, 1998). The most effective was the Industrial Technology Research Institute (ITRI), which would become a central institution in the development of the Taiwanese semiconductor industry. ITRI also undertook applied research on an enormous variety of industrially relevant topics (Tsai and Cheng, 2006).

This model also institutionalised a division of labour in innovation between the government and the ICT industry, in which ITRI conducted ‘applied research’ and spread the results to industry, which focused on ‘product development’. This public-private division of labour allowed Taiwanese ICT firms that were most often in low-margin businesses to improve and build a formidable position in the ICT’s GPNs.

Working within this eco-system, Taiwanese firms focused on two types of innovation: first, developing innovative production processes, and, second, on second-generation innovation in a variety of components [particularly integrated circuits (IC) chips] with the aim of displacing the more expensive (and foreign) components[7]. Taiwanese IC design companies that focus on second-generation innovation were usually less risky than the Israeli novel product firms. Conversely, because they were developing products for existing markets and thus had a cost-saving business proposition, they had far less potential for rapid capital gains.

For geopolitical reasons, Taiwanese policy-makers considered control over the domestic economy essential. This led them to seek policies to promote *local* investment in Taiwan’s ICT sector. Taiwan’s ICT sector tax incentives were intended to increase *local* investment in high-technology small and medium-size enterprises (SMEs) [Wang,

(1995), p.2]. The statute for the encouragement of investment provided Taiwanese investors with a five-year corporate income tax holiday for capital allocated to "newly established capital or technology-intensive projects" [GIO, (1986), p.237]. Taiwanese policy-makers – in particular, the Council for Economic Planning and Development – restricted tax incentive eligibility to privately-held Taiwanese technology firms [Wang, (1995), p.2]. The Ministry of Finance offered tax credits of 20% for R&D investments in the high-technology sector in the 1970s as a means of supporting computer components production (Fuller, 2002).

Taiwanese policy-makers also sought to limit indebtedness to foreign entities in an effort to decrease foreign leverage over the local political economy, regarding them as potential threats to Taiwan's political independence. In line with this guiding principle, regulations such as those defining qualified foreign institutional investors were enacted to limit capital inflows [Desevedavy and Thien-Ah-Koon, (2008), p.2]. Furthermore, while deregulation has gradually allowed foreign investors greater access to public equity markets in Taiwan, foreign investors still must obtain an investment permit from the Ministry of Economic Affairs' Investment Commission or Hsinchu Science Park to invest in a private Taiwanese company.

Taiwanese regulations made it similarly difficult for local ICT companies to list on foreign exchanges and illegal for private companies to offer stock options (Breznitz, 2005). Additionally, Taiwan's regulatory environment makes it difficult, if not impossible, for companies that have not already listed in Taipei to list on foreign stock exchanges such as the NASDAQ. Only in November 2014 were the 'Regulations Governing the Offering and Issuance of Overseas Securities by Issuers' amended to allow already publicly-listed Taiwanese companies to trade their depository receipts on overseas markets (Chiu, 2014).

3.2.2 VC policy development and implementation

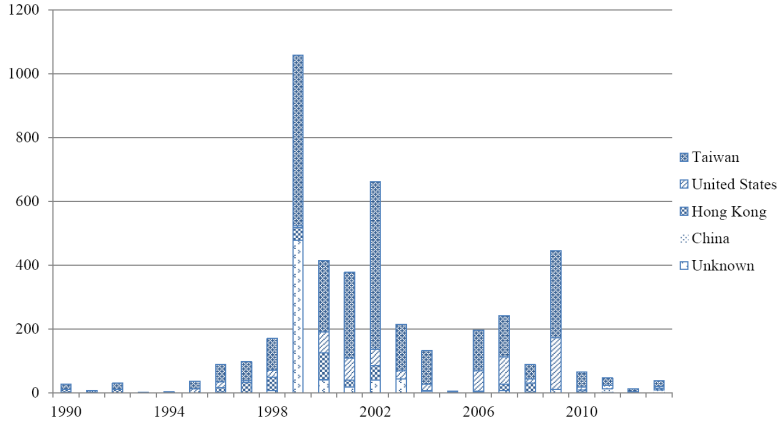
In light of the position of Taiwanese ICT firms in the GPN and policy-makers' desire for local, rather than foreign, capital in the early 1980s Taiwanese policy-makers, notably Kwoh-Ting Li (Li), adjusted the Silicon Valley VC investment model as they transferred it to Taiwan. Their goal was to support local firms (Klingler-Vidra, 2015, Wang, 2006). Li saw a Silicon Valley–like VC market as a solution to "Taiwanese SMEs' insufficient capital" [Kenney et al., (2002), p.36].

To entice investors, in 1983 Taiwan's Ministry of Finance issued the 'Regulations for the Administration of Venture Capital Enterprises', which provided a 20% tax deduction. This was the same tax incentive offered for technology R&D expenditures in the previous decade for investments in local high-technology firms (Koh and Wong, 2005; Wang, 1995). Recognising local investor preferences, Taiwanese policy-makers did not adopt the US LP structure but, instead, chose a 'paper company' structure, where the investors in the VC funds, not the VC manager, controls investment decisions [Yeh, (2006), p.4]. Taiwanese policy-makers decided to invert the LP structure to fit local preferences: "we learned about the LP structure from the USA, but changed the roles and responsibilities of LPs and GPs since Taiwanese investors like to be involved in investment decisions" (authors' interview, Taipei, 5 January 2012).

Taiwan's regulations succeeded in incentivising domestic VC activity that, by the mid-1990s, became an "integral force in promoting Taiwan's domestic high-technology (read ICT) industry" [Gulinello, (2005), p.848]. The domestic-centric regulations resulted

in a muted foreign, particularly American, investor presence. Initially, as illustrated in Figure 2, a few US VC firms that specialised in Asia invested in Taiwan, but their operations were quickly overshadowed by local firms. The domestically-oriented Taiwanese VC industry captured its capital gains by listing on the Taiwan Stock Exchange. Reliance upon local exits reinforced the dominant position of local VCs, as foreign investors were less attracted by the Taiwanese stock market.

Figure 2 National source of VC investments in TAIWANESE ICT firms, 1990–2013 (USD millions) (see online version for colours)



Notes: To ensure robustness, we also gathered VC investment data, by country origin, from Dow Jones Venture Source and the Taiwan Venture Capital Association (2006) (in their 2000–2011 data series and 2012 and 2014 yearbooks).

Source: Thomson Reuters Annual Foreign and Domestic Venture Capital Fund Deal data

The increase in investment volume after 2005 (see Figure 2), especially from American and Chinese VC firms, stems from two developments: first, regulatory changes allowed Chinese VCs to invest in Taiwanese technology start-ups, as long as they do not 'gain control' of the start-up (AVCJ, 2015). Second, the investment strategy of the 'Greater China' funds launched in the USA and China began considering Taiwan (Lin, 2013).

In summary, the Taiwanese VC industry co-evolved in not only a geo-political-economic, but also a technical, environment that was remarkably different from that of either Israel or Silicon Valley. By the time the Taiwanese government initiated a policy to adapt the Silicon Valley VC model to Taiwan, the domestic ICT industry was already experiencing success with business models that had significantly different financial needs than of the new-to-the-world technology commercialisation models of the USA or Israel. Drawing upon the previously effective policy models for encouraging ICT industry growth, the VC policy measures included some of the same instruments (e.g., tax incentives) employed earlier. Because the declared aim was to encourage local investors, the US LP model was rejected in favour of the paper company model. As a result, a vibrant domestically-financed and managed VC industry developed and co-evolved with the local ICT industry. VC managers employed investment models that could meet the financial needs of the Taiwanese ICT companies and reap the rewards that local financial exits offered. The domestic VC industry 'fit' the Taiwanese ICT industry's stage of

development. It also found investments that allowed the VC industry to succeed by securing exits, primarily on the domestic stock market.

4 Discussion and conclusions

Policy-makers and consultants invariably accept that 'smart' VC is the answer to creating a new Silicon Valley. This paper shows that it is the entrepreneurs and industrial opportunities that come first. They provide the fundable opportunities to the venture capitalists – money without 'good' entrepreneurs is soon lost and is, ipso facto, dumb. Looking at Israeli and Taiwanese entrepreneurs, we can quickly see that they were able to exploit and then excel in different stages and niches within the ICT's GPNs. As Feldman et al. (2005) pointed out, they created their firms, and also created the regional entrepreneurial ecosystems. These ecosystems developed quite different dynamics and developed particular insertions into the global ICT production networks.

In keeping with Westney's (1987) observations about Japanese importation of Western European models, our case studies demonstrate that the VC creation policies in Israel and Taiwan were conceptualised and implemented with an understanding of local conditions. The process was a combination of planning and organic evolution that allowed the implementations to fit the conditions of their local ICT industries and its position in the GPNs. Fortunately, for both nations, they were able to build upon an ecosystem that, though small, already existed; the addition of VC synergistically fed into the formation of a virtuous circle of co-evolution that developed between the local ICT and VC industries.

Table 1 summarises the differences in the VC policies pursued by Israel and Taiwan, which is followed by a summary of our argument about the importance of policy fit with local financing conditions and the position of firms in the global ICT production networks.

Table 1 Case studies' VC policies

	Israel	*Taiwan*
Funding	VC fund-of-fund (Yozma) required overseas investors for participating domestic VCs	Public VC fund co-invests in local start-ups with local VCs
Taxation	Tax transparent for international investors; capital gains tax on carry	20% tax credit for VC investments in local start-ups
Legal structure	LP structure attractive to international investors	Corporate structure to fit local investor preferences for control over investment decisions

Table 1 highlights the different local and foreign orientations whereby Israel is internationally-oriented and Taiwan locally-focused. The Israeli VC policy environment fits the 'born global' nature of its ICT firms, in their financing and business model characteristics.

For both of these nations, there were two critical factors for success. First, the particular position of the local ICT industry within the GPNs. The particular business models local entrepreneurs adopt and the opportunities they target, shape the investment opportunities for the local VCs. Israeli entrepreneurs employed business models closely

resembling those of the iconic Silicon Valley start-ups; while Taiwanese entrepreneurs, by contrast, employed quite different business models.

The second factor was the regulatory configuration of the financial sector. In particular, it was the stance and position of the ICT industry, the state, and the relationships with foreign or domestic financiers and capital markets. These factors shaped the sources of capital for the VC industry as well as the financial exits employed to realise their investment gains. After an initial misstep, Israel adopted a LP structure employing technology savvy general partners who sought foreign investment capital and foreign exits. In contrast, Taiwan developed the paper investment company structure that allowed its investors, not the fund managers, to become heavily involved in investment decisions, and financial exits were sought through the domestic market. The two cases suggest that a national VC industry can be structured in a variety of ways. By extension, it suggests that policy models must be shaped by an understanding of the available ICT entrepreneurial opportunities and financial mechanisms. The unique combination of these two can drive vibrant, albeit differently organised, VC industries fit for their local context.

Accordingly, this article suggests that researchers making cross-national comparisons of VC activity should consider not just general governance issues but also the structure and markets of the local ICT industries and the goals of policy-makers within which VC investment behaviour is embedded. Therefore, although the Silicon Valley archetype is a useful heuristic device, the creation of a VC industry is not simply a matter of changing the local environment to be like that in Silicon Valley but, rather, adapting a VC organisational model to fit the available local investment opportunities.

The establishment of VC industries in different nations will require accepting that different configurations can yield success, and therefore there is unlikely to be a convergence upon a single best model. Moreover, this suggests that cross-national studies based on aggregated data provide some general insights, but are less useful in explaining specifics on how national VC industries were created and organised and the types of firms funded in each nation. More importantly, our analysis also provides insight into possible reasons that most countries seeking to create a local VC industry have experienced little success. Most policies to encourage the creation of local VC industries do not consider either the opportunities or organisational contexts. Oddly, they fail to understand both the VC demand and supply side. In the demand side, questions that policy-makers should ask include: are there a sufficient number of investment opportunities present? And what financial exit channels exist? On the supply side, there needs to be answers to questions about the sources of capital for the VC industry and what kind of financial exist they can expect?

Most government policies have to date operated a ‘build-it-and-they-will-come’ principle. Often, the decision to create a VC industry is motivated by local self-interested parties or international organisations that advise a one-size-fits-them-all model. As a result, they fail to assess the local context and create a strategy tailored for the particular capabilities of the country. Our two successful cases, in a world of failures, show how important a careful fitting of VC policy to national realities is. The Israeli case is particularly instructive as it experienced a clear policy failure (Inbal) a year before an overwhelming success (Yozma), highlighting the importance of policy fit, in determining performance.

Two fruitful avenues can expand upon our findings: first, the examination of other cases would permit elaboration on our suggestive framework and allow better articulation

of various condition variables. While we have examined small states, it is also possible that it could be extended to regional innovation system policy initiatives, such as recent efforts to encourage university-based entrepreneurship, establish incubators, or invest in particular technologies. These two case studies demonstrate the importance of tailoring VC policies to local realities. Neglecting local reality has resulted in the repeated failure of VC promotion policies elsewhere, and likely most future promotions.

Acknowledgements

We thank Francis Santos, Casey Castaldi and Oi-Lai Lai for their research assistance. Our thanks also go to Don Patton for his helpful advice.

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Notes

1 We employ the European Venture Capital Association's definition of VC, which is "professional equity co-invested with the entrepreneur to fund an early stage (seed and start-up) or expansion venture".

2 For the quintessential statement of this perspective, see Saxenian (2007) or Kenney et al. (2013).

3 On the importance of context to entrepreneurship, see Autio et al. 2014.

4 Our aim is similar to Tikoria et al. (2009): developing a framework and system for policy-makers to evaluate national R&D organisations.

5 Our focus on VC allows a specific investigation of one policy sphere, as opposed to more broad research on policies driving structural change (see for example, Ylinenpää et al. 2014).

6 There were only four small-sized investment management companies, utilising different legal models, specialising in technology venture financing in Israel in 1991.

7 This is particularly obvious in the rapid replacement of Qualcomm chips by similar ones for the Taiwanese firm, MediaTek.