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VENTURE CAPITAL INDUSTRIES AND POLICIES:

Some Cross-Country Comparisons

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ABSTRACT: The paper summarizes the findings obtained during the first year of the Venture Fun project, carried out in an EU Network of Excellence PRIME and funded from the Sixth Framework Programme. The paper defines the central concepts of the project, identifies questions for further elaboration and study, and finally provides a rough idea of the different profiles that the studied countries (Finland, Israel, France, Italy, and the UK) evidence in the organization of their VC industries. One of the conclusions of the paper is that Israel, and to a lesser extent, Finland, has succeeded in developing a specialized, independent VC industry oriented to the early phase finance and support of ICT start-ups. By contrast, though the UK has a strong Private Equity industry, it is, however, not focusing on early-stage or high tech areas. Italy and France showed a significant presence of Venture Capital and Private Equity industries (public/private organisations), but in Italy an early phase VC industry has almost disappeared after 2001. The paper further summarises factors that have influenced the development of VC industries in the studied countries.

Keywords: Venture Capital, Industry Emergence, Start-ups, Venture Capital –directed Policy, Innovation Policy

JEL codes: O16, O38

Foreword

Venture Fun is a project funded by the Network of Excellence entitled PRIME (Policies for Research and Innovation in the Move Towards the European Research Area) and by the organizations participating in the project (as well as their national funding agencies). The Venture Fun project set out to study 1) the development of Venture Capital industry investing in early stage high tech enterprises and factors affecting the development or non-development in the participating countries, Finland, France, Israel, Italy, and the UK; 2) the co-evolution of the VC industry and high tech sectors, in particular, the ICT and Life Sciences; and 3) the various roles played by the VC industry in the governance and development of high tech enterprises. A central feature of the study was a view of VC not only as a pool of money but as a potentially important industry that could contribute - through its organization, strategies and capabilities - to the development of start-ups in the high tech industries studied.

This paper summarizes the findings obtained during the first year of the project and it is descriptive rather than analytical by nature. It is a very preliminary summary since this paper will only be able to deal with few of the factors that will be subject to study during the second and third year of the Venture Fun project. An important purpose of the paper is to define some of the central concepts of the project. Furthermore, this exercise is aimed to identify questions that need further elaboration and further data collection, since so far, we have gaps and unevenness in the information concerning the countries. Nevertheless, the paper can give a rough idea of the different profiles that the studied countries evidence in the organization of their VC industries.

1. MOTIVATION, BACKGROUND, SPECIFIC OBJECTIVES

Many countries have attempted to promote VC/PE¹ industries and/or markets, with varying degrees of success. On the one hand, we have the successful emergence in both the US (the innovator country, during the second half of the 1970s) and in Israel during the 1990s (a successful follower for whom venture capital was an infant industry) of an independent venture capital industry oriented to early stage finance and support of high tech start up companies (SU).² On the other hand, we have weak emergence of such venture capital industries up to and including the 1990s (e.g. in Germany, see Fiedler & Hellman, 2001) or emergence of industries not focusing in a dominant way on early stage finance/support and/or new technology based firms in high tech areas (the UK). The policies implemented also varied significantly in terms of their timing and context, their design and in their implementation³.

Inspired by the above observations, this paper sets out to compare VC industries and VC policies across countries with an eye to extract meaningful understandings concerning

- (i) emergence/non emergence of an industry;
- (ii) the structure and functioning of the industry or proto-industry that exists, and
- (iii) policies that have been influential in the emergence/non emergence process.

In this study, we will focus on the structure and functioning of VC industries and the policies directly relevant for the emergence process.

In our analysis of emergence, we will pay attention to framework conditions that influence this process. In this paper, our attention is devoted to the role played by innovation policies in the promotion of high tech entrepreneurship, but in a later phase, we will examine other salient features of the framework conditions, such as the regulatory framework or taxation issues.

¹ VC=Venture Capital; PE=Private Equity

² Gompers and Lerner 1999; Avnimelech and Teubal 2004a,b; Avnimelech, Kenney and Teubal 2005.

³ See OECD reports in the bibliography, Avnimelech & Teubal 2005a, 2005b and the document prepared by the Israeli team entitled "A Survey of the Venture Capital Policy Literature and some Implications".

2. BASIC CONCEPTS OF THE STUDY

2.1 Definition of Venture Capital and Venture Capital Industry

Venture Capital (VC) in our definition (which is a strict definition compared with Lerner's⁴) involves 'pools of money' oriented to the early phase finance and support of **high tech start ups (SU)**. In economies such as the UK, the US and Israel there are a variety of VC agents/organizations, e.g., independent organizations, organizations affiliated to financial institutions or to corporations, government owned organizations, and individuals (angels). Moreover, they constitute an *industry*, i.e. a higher level of organization, involving more than a pool of money and more than an individual organization or set of organizations. An *industry* is much more than a firm or even a collection of firms operating in a similar area.⁵ It represents a higher level of organization of the economic system, one that provides a greater measure of stability in the provision of a particular good or service than that provided by an individual firm (an individual firm may disappear tomorrow but that does not mean that an industry will disappear⁶). Thus the impact of innovations on growth through the process of division of labor will depend on whether or not the innovation catalysed the creation of a new industry and/or market.⁷ Beyond stability and continuity, new industries and/or new markets provide new organizational frameworks for continued incremental innovations; and when knowledge and capital markets are added to the system, for their endogenous metamorphosis.

Venture Capital and related financial institutions emerged in response to the requirements of the ICT Revolution. The ICT Revolution and the accompanying emergence and globalization of capital markets for technology companies, such as NASDAQ, called for a wide and varied trial and error/experimentation with the new technologies and for their articulation in terms of new business opportunities. This

⁴ Lerner's definition of VC is "independently managed dedicated pools of capital that focus on equity or equity linked investments in privately held, high growth companies"(Gompers and Lerner 1999, p. 349).

⁵ Similarly, a market transaction or set of market transactions is not in itself evidence of existence of a market viewed as a social institution promoting innovation, specialization and division of labor. See Marcus, Y. & M. Teubal "From unlinked transactions to the emergence of new markets: forms of intermediation with illustrations from venture capital", typescript, in process. This point, which is contrary to the implicit assumption in much of the economics profession, has implicitly been accepted by Coase (1988)

⁶ A well-structured industry or a cluster also provides greater survival opportunities and other advantages to its constituents firms.

⁷ In fact the diffusion itself and the continued possibility of using the new good or service will depend on these higher order effects of the innovation.

explains the new role played by SU (and indirectly, by VC) as specialized institutions focusing on invention and ‘exploration’ rather than ‘exploitation’ activities. While VC organisations in the USA predated the ICT Revolution their emergence as a new industry in the US during the 70s coincided with and is the result of this Revolution.

2.2 VC industry versus VC market

In both the US and in Israel, a VC industry developed in parallel with the emergence of a domestic VC market. This had to be the case almost by definition in the US since it was the inventor or innovator country. It need not have been the case in Israel, nor should it be the case in other countries which will develop early phase finance/support VC industries.

During the early emergence phase in Israel (1993-6/7) it was difficult to import VC services from the US, at least initially (they represented a non-traded good). Foreign VCs did not have a presence in the country and would not, at this stage, establish such a presence since there were no experienced local agents to partner with. The establishment of domestic offices of foreign VCs would materialize only after a measure of development of a domestic VC industry (in fact leading US VCs opened offices in Israel towards the end of the 1990s and after the bubble burst).

Globalization may change this: it is conceivable that a domestic VC market could emerge in a particular country with the supply of services originating in foreign VCs i.e. without a parallel emergence of a domestic industry. This is a major issue facing any country or region wanting to promote high tech SU through VC: should it develop a local VC industry or could it rely on the direct import of services (feasibility and its extent are important) or on foreign VCs setting up offices locally.

2.3 Industry Emergence

The concept of emergence as applied to a new industry/market refers both to an emergent structure (e.g. a new market or industry involves a higher level of complexity than that of its individual, component firms or agents) and to emergent properties (which are different from and the outcome of ‘collective behaviour of pre-existing interacting agents, elements or components’⁸).

⁸ This concept is central to the theory of complexity. See Odell 1998.

For our purposes at least, *and industry should be considered as coming into being as a result of a cumulative, auto-catalytic process with positive feedback-the emergence process.*⁹ What emerges is a new set of properties and a new organisational structure. The properties are not the properties of individual agents, of, for example, single firms but properties of the new, higher level organization, such as, new institutions and new mechanisms for the setting of product standards or for the contractual models and organisation of VCs that will be adopted in a particular context (country). These are the result of collective interaction among agents rather than from any one agent acting in isolation from the others.¹⁰ The recurrent interactions among the agents create new patterns of behaviour thus creating new institutions or institutionalised forms of behaviour (Goodin 1996; Lowndes, 2002)¹¹.

The concept of emergence has been applied to the Industry Life-Cycle analysis of Venture Capital in Israel, one of the participating countries in this project to characterize how a new industry, which should not be identified with one firm nor with a simple aggregation of firms, will come into being. The emergence of an industry is an evolutionary process, an essential part of which is organisational and institutional experimentation, and in the case of Israel's VC industry, a result of policy experimentation and learning (Avnimelech and Teubal 2005b). The Avnimelech and Teubal model suggests five specific phases, two of which precede the phase of industry's emergence.

This paper concentrates on the phase of emergence of a new venture capital industry, the nature and conditions favouring this process, and the role of policy. The cross country research programme will allow for different institutional and organizational variants for the intermediation function which venture capital is understood to.

⁹ In Israel's VC industry case, the cumulative process which took place during 1993-2000 was fed by a number of sub-processes such as new entrants and expansion of existing VC organizations, reputation effects, collective learning, virtuous VC-SU co-evolution and cluster effects (see Avnimelech and Teubal, 2005c). The process of emergence led to the *acceleration of VC activity*; and to the emergence of a new high tech cluster with large numbers of SU.

¹⁰ Another clear example of an emerging property relates to a new market (which may include a new industry as one of its components). When a new market emerges out of a precursor unrelated set of transactions-an *emergence property* is the *market price*.

¹¹ Goodin (1996); Lowndes (2002).

2.4 Intermediation

The project draws on the notion of *intermediation* to highlight its basic view of the VC industry, not just as a pool of money, but also as providing value-adding (non-monetary) services to start-ups at the firm-level (Bertoni and Colombo, 2005). Furthermore, VC may be an important macro-level player in the intermediation task of the promotion of the development of new, high-tech intensive industries (such as the ICT and Life Sciences). The latter need effective, new financial institutions to support their trial and error/experimentation in the commercialisation of new technologies. Public Policy is interested in promoting effective forms of intermediation, not necessarily one particular organizational form; and it will tend to support those institutions which best ‘fit’ the local context and institutional framework. However, we cannot assume that the best ‘fit’ is necessarily the most effective under the circumstances. Moreover, even when the strategic priority eventually articulated for the country concerned would be the development of an independent, specialized VC/PE industry such as that prevailing in the US and in Israel, Governments may opt to promote other forms of intermediation as well, either as part of the broad experimentation process that must necessarily precede the effective targeting of a new industry, and because of indirect effects. Thus some of the VC/PE* institutions, as defined below, have a double role as being part of the expanded notion of the VC/PE* industry, while at the same time, being institutions that promote, at least indirectly, the development of the VC/PE industry by strengthening deal flow.

2.5 Challenges for research in VC

A major obstacle blocking meaningful cross-country research on venture capital concerns the nature, definition and structure of VC. A Venture Fun hypothesis is that this type of institution should be adapted both to the technology (broadly speaking ICT vs. Life Sciences, LS) and to the institutional context under which it will operate. Therefore, we are interested in an analysis of the alternative organizational forms to be taken, only one of which is the US and Israeli model¹². The cross-country comparison of 2006-2007 in the Venture Fun project will involve not only the formal, independent venture capital industry (like those in the US and in Israel) but also other institutional

¹² Despite the similarities there are differences, particularly as far as success in financing biotech companies is concerned, our presumption is that the US has been successful while Israel has not.

variants, such as banks in Italy and the Caisse de Depots et Consignations (CDC) in France.

In our project we have distinguished between the VC/PE industry on the one hand (which involves independent, specialized organizations oriented, but not exclusively devoted to, early finance of SU—see below) and the VC/PE* industry on the other. The latter includes *affiliated VCs*, which in our context means affiliated to corporations or financial institutions; *Government owned VCs*; *banks*; *angels and other institutions*. It is needless to say that the greater the institutional variety, the greater the complexity of the comparative and cross-country analysis. This process is further complicated by the absence of comparable, cross country data.¹³

Another clear obstacle to undertaking comparative research is that it is not enough to compare the structure of existing industries or proto-industries; an incursion into the dynamics of the processes of emergence of the new industries or markets is unavoidable, being the only approach which might lead to meaningful analytical (rather than simply descriptive) conclusions and policy implications.

Despite these difficulties it is clear to us that our approach is probably the most effective one both to clearly differentiate this type of research from others and to increase the likelihood of influencing policies in Europe.

3. COMPARING THE VC INDUSTRIES OF ISRAEL, FINLAND, ITALY, FRANCE AND THE UK

In this section we will first present the overall development of VC industries in the studied countries. We will review VC-directed or VC-related policies in these countries and lastly pay attention to innovation policies as a promoter of high tech industries. In our view, VC- and innovation policies are part of the framework conditions influencing the evolution and co-evolution of VC and high tech industries.

This comparison draws on country reports that Venture Fun participants have produced during the first year of the project.

¹³ Conceptually the project is of greater complexity since the institutional variety underlying our approach points out to the existence of alternative *modes of intermediation* in the area of finance and support of SU. Eventually we will be linking a) the alternative modes of intermediation and b) their underlying technology and country contexts and c) VC directed and VC-related policies on the one hand with d) VC or VC* outcomes and e) economic impacts on the other.

The work of Venture Fun during its first year (2005) enables us to describe and compare salient features of the VC industries and of VC and innovation policies. In the next phase of the Venture Fun project, other characteristics of the framework conditions of the countries will be described. Aside from innovation and VC-directed or VC-related policies, these framework conditions include other public sector (intermediation) initiatives to promote deal flow for VCs (e.g., incubators and other transfer organisations). Additionally, characteristics related to entrepreneurship in general and conditions that are conducive or negative to entrepreneurship, such as taxation, social security questions, bankruptcy laws etc, are pertinent. Furthermore, training policies, regulatory characteristics, potentially also Intellectual Property Rights matters will be considered because of their potential impact on entrepreneurship, that is, demand for VCs. Framework conditions of importance for the supply of VCs include factors such as taxation and regulatory characteristics.

This list of framework conditions needs to be formulated in a more systematic frame, and overall, it cannot be thoroughly studied within this project. We, nevertheless, wish to acknowledge the importance of the framework conditions for the shaping of VC emergence.

3.1 Emergence, Size, Structure and Recovery after 2001

The summary information is found in Box 1 below where EM stands for Emergence in the sense that the industry has been created. In Box 2's first row the word emergence refers to the *process* leading to the creation of the industry (if that took place). Box 2 also summarizes the policy emphasis of the country as far as VC-directed policies are concerned (more details below). FoF stands for Fund of Funds. Because of the difficulties in obtaining comparable data, VC investments refer to all stages, and not exclusively to the early stage.

Box 1: Comparing VC/PE Industries: Summary 1

	Israel	Finland	Italy	France	UK
ICT EM or not	Yes (93-00)	Yes (90's)	No	Yes (90s)	Yes (pre-exists 90s)
Structure	Large, VC dominated	Dual structure*	Proto VC industry	A mixed VC*/VC structure	Mixed VC*
Growth & Size	App. 100 M\$ (92) ---10B\$ (2000)	100/200 M€ (90s) --- 3000M€ (2002)	540 M€ (2000)	From 40-60 M€at the start of the 1990s up to 1155 M€by 2000	Approx. £4B (2004)
Relative Size	Above Average	Below average	Below average	Below average	Above average
Recovery after 2001	Strong 2004-	Strong 2002 -	Collapse? 23 M€(04)	Smooth recovery	Strong

Figures in this box refer to the total VC/PE, not exclusively to VC. PE involves 'pools of money' devoted to investments in privately held companies, not only in 'high growth' companies (Lerner's definition of VC) and not only early phase investments in 'high tech SU' (our strict definition of VC). Thus PE as a pool of money is a broader category than VC although we may think of PE in the strict sense as investments in private *equity which are not VC* investments in a strict sense. There are no statistics of 'pools of VC' as distinct from 'pools of PE'. What statistics there are refer to capital raised and capital invested by VC/PE organizations some of which may in a dominant fashion be oriented to VC in a strict sense while others would be oriented to PE in a strict sense. Moreover the figures do not inform us about the share of early phase investments in high tech SU in total investments by VC/PE organizations. We know this to be around 50% in the Israeli case (Avnimelech and Teubal, 2005c) and much lower in the UK case.

*In Finland there is a dual structure: one part consisting of the three public VCs, partly having FoF functions, two of them also making direct investments; and the other part consisting of mostly independent VCs. In Israel a distinction is made between private VCs (mostly Limited Partnerships), publicly quoted VCs, PE funds which are limited partnerships; and Investment/Holding companies. See Avnimelech and Teubal, 2005b, and Israel's year 1 country report.

Box 2: Comparing VC Industries: Summary 2

Other features	Israel	Finland	Italy	France	UK
Emergence	Evidence of strong, cumulative sustainable process; VC-SU co-evolution	Presumption of a cumulative process underlies the accelerated growth of the 1990s	Not sustainable; Collapse after 2000 & 'low level of equilibrium trap'	Sustainable mixed effort (public and private); pro-active policy (compensating effort from public to overcome the burst and to avoid collapsing)	Sustainable; not much interaction between private and public sector, though current activity is underway in that direction
Main VC-directed policies	Targeting VC (FoF) sparked the cumulative process	Government owned VC funds; three with FoF function* Succession of ad hoc measures to provide more funds to the early stage.*	Few VC-directed policies; co-financing after 2000 (not FoF)	Co-financing (mixed VC funds) FOF mechanisms	Several tax incentives for investors; schemes to attract broad-based capital to VC sector

*Also a series of measures to stimulate early phase finance. The objectives are SME creation, regional development and innovation rather than VC creation *per se*.

Israel, and to lesser extent Finland, has succeeded in developing a specialized, independent VC industry oriented to the early phase finance and support of ICT SU. In both countries, emergence took place during the 1990s, and the crisis in 2000-2001 did not lead to the collapse of the industry, but led to a reshuffle in Israel, and some structural changes, that is, changes in capital sources and some retrenchment in early-stage investments in Finland. Overall, Israel's VC industry seems to be larger than the Finnish industry and has obtained substantial funds from abroad quite unlike the Finnish VC industry.

In these two countries, policies were important but their nature and impact were substantially different. In Finland, the VC industry is dual in its structure with public sector VC organisations playing an important role, while in Israel, it is dominated by independent VCs.

The UK has a strong VC/PE industry, but has less emphasis on the early stage. The UK industry makes significant investments into Continental Europe and other markets such as the Middle East and Africa. The crisis in 2000-2001 led to a relatively reduced level of transactions in the UK, however, without a major shake-out of the industry.

Italy and France showed a significant presence of a VC/PE*, in France probably side by side with a significant specialized VC industry. The growth of an early phase VC industry in Italy during the 1990s was followed by a strong decline and almost disappearance towards 2004. This raises questions about whether VC (in our definition) really emerged as an industry in that country.

3.2 VC policies

VC policies are summarized in Box 3. Israel's successful VC directed policies were the result of an explicit national priority of developing a domestic, independent Venture Capital industry. Yozma, the successful programme, came after a failed precursor (Inbal) with a completely different configuration and intermediation pattern.¹⁴ The objective of both VC-directed programmes was not simply to *close the early phase funding gap* for SU (a favourite EC buzz word); it was to promote SU more generally including the stimulation of SU foundations and their international expansion. The programme was very successful and it led to the emergence of the industry and to the

¹⁴ Prior to Yozma numerous business and policy experiments took place in order to identify a new intermediation configuration which would be adapted to the local context and its needs.

transformation of the country's high tech cluster (into a Silicon Valley model of high tech). It is worth mentioning that, like in other countries, the Government of Israel contributed a venture capital component. However, 80% of the 100 M\$ contribution was articulated through a Fund of Fund mechanism rather than through a Government owned Venture Capital company.

In Finland, a possible hypothesis is that venture capital-directed policy, largely implemented through Government owned VC organisations, was viewed as another mechanism to close the above mentioned early phase finance and support gap of SU. Creating a Venture Capital industry was not a priority in itself; rather closing such a gap as well as promoting SMEs, regional development, and other socio-economic targets was the priority. Some of the independent VC funds and managing firms have their origins in the public VC organisations, which have also made early experimentation in VC activities through VC funds. In Finland VC-directed policies have separated the value-adding functions of finance on the one hand, and business development advice on the other hand. Public VC/PE organisations have not perceived the latter as their function, and policies have been targeted to channelling business advice through other schemes, such as schemes to help start-ups in the formulation of their business models, and finally aiming to promote deal flow. The recent policy initiative to promote early-stage VC investments (AISP) follows this separation, though for the first time, it acknowledges the importance of the non-monetary value-adding function of VC. Adequate deal flow and sufficiency of early-stage funding are regarded as persistent problems.

In Italy there were few VC-directed policies; rather there were co-financing schemes involving governments and since the year 2000 (Law 338) involving financial institutions. This seems to be a poor substitute for a bona fide VC-directed policy oriented to the creation of an independent, professional and specialized domestic industry. The intermediation configuration implied by the above law seems to be poorly adapted to the present context and requirements of the country. A proof of this is the almost insignificant uptake of the program as of late (3,3 M EU out of a total budget of 202 MEU).

In France, the structuring of the VC industry results from a double concern. On the one hand, voices from business associations call for reducing the funding gap for High Tech entrepreneurial businesses. This is particularly sensitive in the biotech industry, where industry representatives have been complaining about a lack of interest

by financial partners. On the other hand, public (national) concern for innovation and growth has targeted a series of initiatives in order to deal with higher competitiveness on the global markets, including the emergence of High Tech SMEs and provision of incentives to develop science-industry relationship and technological transfer. An important event was the Innovation Law 1999 which included four main Innovation Policy components, one of which included seed funding to SU through Government owned sector-related and regional funds (Mustar 2005). Till the end of 2000 only 80 investments were made by these funds, which neither absolutely nor relatively seems to be a significant number (they represent only 10% of all companies hosted in the incubators stimulated by the 1999 Law; see Mustar 2005). Another axis of French VC-directed or VC-related Government Policy is the activity of the state-owned Caisse de Dépôts et Consignations (CDC) - an idiosyncratic French government institution which performs public-interest missions on behalf of the French central, regional and local authorities. All of CDC's private equity activities have been grouped under a new division, CDC Enterprises (a 100% owned holding company). CDC Enterprises is involved in all segments of the private equity market, including regional high tech venture capital and private equity. Its portfolio of investments is 3.8 Billion euros of which 1.8 Billion comes from outside investors (Mustar 2005).

In the late 1990's, the UK government changed its earlier focus from regulatory and tax policies to more targeted initiatives and announced the creation of funds to increase access to venture capital for SMEs: 2000 saw the launch of a fund-of-funds (The UK High Technology Fund) to provide seed funding for early-stage high technology businesses in order to leverage additional private investment and of the Regional Venture Capital Funds, a network of venture capital funds in the country's nine regions. These initiatives were followed by other public funds, a fund to strengthen public/private partnerships and in 2000 a fund to provide venture capital to the deprived districts in England. In 2003, The Early Growth Fund, another small business scheme was launched to encourage risk funding of start-ups. The extent to which these schemes have been effective is yet to be seen. Nevertheless, they seem to have had the effect of broadening the capital base available to the VC industry.

Box 3: VC Policy

Israel	Finland	Italy	France	UK
<p>-Successful Yozma Program 1993-97/8. FoF scheme with <u>pro-active search of high quality domestic VC mgt teams</u>; strong foreign participation required; critical mass achieved; collective learning; ICT orient.</p> <p><u>-Precursor events:</u> Intermediation configuration tested late 80s, early 90s; Failed Inbal Program(92); 300 SU early '90s</p>	<p>-Creation of Government-owned VC companies Direct Invest. & FoF function catalysed creation of private, independent VCs (e.g. spin-offs from SITRA). -Taxation* of Foreign Investors->few investments -2005 AISP initiative - a new VC policy? Create a new Fund to provide seed/early; link experienced angels/businessmen w/SU</p>	<p>Few VC-directed policies.</p> <p>Most serious- Law 338 of 2000 which is a co-financing scheme rather than a FoF scheme</p> <p>Total budget 202ME; program uptake: only 3.3 ME (weak impact)</p>	<p>Grants Programmes as a dominant but declining design</p> <p>A substitution process of policy support to (HT) SMEs</p> <p>The Law on Innovation as an important device to support HT SMEs</p>	<p>Schemes to attract broad-based investment into the VC sector; several regional development assistance grants and small business support progs; no specific benefits for angel investors</p>

*The taxation problem has ceased since the beginning of 2006.

3.3 Innovation Policy

Innovation policies of the five countries are summarized in Box 4.¹⁵ We think that innovation policies play an important role in the emergence of VC because these policies influence the demand for VC funds by promoting the creation of SUs and strengthen the deal flow. Without demand for VC funds, VC policy initiatives, no matter how well designed, can fail. Even though VC and innovation policies are analytically distinct, in practice in many countries, they are often merged: schemes may have combined VC and innovation policy objectives and apply tools attempting to promote both objectives.

The distinctive characteristic of Israel's Innovation Policy was a *direct Business Sector R&D support* scheme which started and continued for a period of 25 years before the implementation of VC directed policies (it also continued after Yozma). The support scheme was open to the BS as a whole (*Horizontal Programme*) and, till the 1990s, was

¹⁵ BS stands for Business Sector, TT for technology transfer, RI for Research Institute and MOD for Ministry of Defence.

largely *Neutral* (50% or recognized R&D costs independent of sector, technology or product class)¹⁶ This backbone programme - which is still the dominant Government innovation incentives' programme - was complemented by other programmes during the early 90s - one directed to technological entrepreneurs and SU (Technological Incubator Programme) and another directed to University-Industry collaboration in pre-competitive, generic R&D (Magnet Programme)¹⁷. Till the early 2000's Israel's support was consistent and increasing through time.

In Finland, policies supporting innovation have been both *direct and indirect*. Finland started the promotion of technology development through direct support to companies since the 1960s. Direct support was over the years partly channelled through technology-specific programmes, partly as a general, non-specific support to the R&D of companies, and SMEs have over the years generally been a prioritized target. Direct support has been given as grants (particularly to SMEs), or loans, loan guarantees or capital loans. An important feature of the R&D support system in Finland, especially in the late 1990s, was the promotion of collaboration and networking among companies, large and small, and universities or other public-sector research organizations. Direct support represented about 5% in 2003 against Israel's estimated 30% during the 1990s and towards 20% after the year 2000. However, the Finnish percentage was somewhat larger, and even above the OECD average, namely 9,9%, if the giant Nokia and electronics was excluded (since public R&D support was only 0,3% of Nokia's R&D costs in 2000) (OECD; 2003e).

An example of indirect measures is the support to technology parks, incubators, and programmes to support commercialisation of scientific research originating from Universities and Public Research Institutes. An important part of the overall transfer mechanisms is the big public RI, the Technical Research Centre of Finland, VTT, which carries out applied research, largely in collaboration with or commissioned by industry.

¹⁶ Obs. that the EU has strict regulations concerning subsidies to companies and has issued, e.g., restrictions concerning grants to large companies. Each country has to notify the EU Commission on its support programmes. Furthermore, a country may opt to use lower limits of maximum support percentages, e.g., Finland has done so thinking that providing support in itself offers sufficient incentives for companies to invest in R&D. However, it is to be noted that during the relevant pre-emergence period in Israel, most of the support went to small companies rather than large corporations (given the fact that there were practically no such corporations in Israel's civilian industry). A full analysis of the desirability of direct support to business sector innovation should be explicit about the pros and the cons of such a policy (a major impact of the Israeli programme was 'entrepreneurial learning' and the fostering of innovative entrepreneurship-a major problem in Europe). See below

¹⁷ Some selectivity in favor of biotech emerged during the last years especially in the technological incubator programme & collaborative, generic R&D programmes.

As compared with the Israeli case, in Finland, there seems to have been *more selectivity* in terms of technological/science areas supported (direct components). Another feature is the fact that the National Technology Agency, Tekes, has been quick to respond to the emerging needs of the rapidly growing ICT industry.

Italy does not seem to have had a consistent innovation or R&D promotion policy and the few programmes that have existed have, to a large extent, been subservient to a major national priority: development of the South. Disbursements declined considerably during the last three years - we also note a shift to loans and a corresponding enhanced role of banks in the promotion programmes - and the overall impact of the programme on SU was small (Bertoni, Colombo, and Piva, 2005).

During the Post WWII period, France inherited an innovation policy centred on a national champion philosophy. An important and unique feature on the international scene was the encouragement of a mix between public and private funding in the long run toward targeted large-scale research projects (the Grands Programmes). This has weakened since the mid-1980s, due to its inadequacy in an open and global market. It has been complemented by a series of more decentralized incentives targeting SMEs to deal with innovation and technological improvement. VC structuring in France is part and/or a by-product of that shift. The innovation Law 1999 involves three main axes of support of SU particularly of research based spin-offs (Mustar 2005): I) authorizing Academics to participate in the creation of SU (temporary leave, assistance from the University Lab); ii) offering subsidies to validate projects and to create companies (700 companies till 2004; 30 Million euros for 2005); (iii) allowing Universities and Government Research Institutes to create incubators, 28 of which were created till 2004 (612 new firms were created in such incubators). All in all, these policies and the other efforts were effective although quantitatively much more seems necessary to further develop a strong SU early phase finance and support oriented VC/PE industry in France.¹⁸

The UK has a decentralised regional development model with Regional Development Agencies within England and Wales, and further complexity is added with different degrees of decentralised powers resting with Scotland with the Scottish Enterprise being the representative body. In addition, the Department of Trade and

¹⁸ Also, in 2002 'innovative start-ups' were provided with a new legal status offering distinctive fiscal advantages. An increase in the volume of the 'crédit d'impôt recherche' and a public effort to establish academic incubators are among the most recent significant efforts to promote a favourable environment for the emergence of high-tech SMEs.

Industry encourages and supports several small business schemes within the limitations set by EU directives. The UK government has also made special infrastructural allocations for development of ‘bio-cities’ and science parks.

Box 4: Innovation Policy

Israel	Finland	Italy	France	UK
<ul style="list-style-type: none"> -Strong, direct support to BS R&D since 1969; -Horizontal, market friendly, stimulation capabilities & entrepreneurship; -BIRD (link with the US) -(3) other programmes '90s: Incub. & Ind-Univ col.; & VC (2 programmes) -MOD tech. development 	<ul style="list-style-type: none"> -Strong, high impact policies (TEKES) -Direct R&D support to BS R&D since the 1960s -tech parks and TT -Public RI -1990s: BS-PRI collaboration; cluster programmes (framework conditions) -Partially Selective support to BS and to PRI 	<ul style="list-style-type: none"> Some promotion of R&D/ innovation but focused on South (60% of funds in 02); increasing use of loans rather than grants; involvement of Banks 	<ul style="list-style-type: none"> - Strong direct support to BS (large firms) through ‘Grands Programmes’ - Broadening incentives toward SMEs (among which VC efforts) - Fiscal advantages to R&D support (Crédit Impôt-Recherche, CIFRE) - Establishing incubators and developing HT SMEs (law on innovation by 1999) 	<ul style="list-style-type: none"> - Well-defined science policy with a 10-year horizon to 2014; outlines financial and other incentives to promote science and technology based innovation as well as collaboration. The Govt. mediated some cross-national university collaboration programmes such as the Cambridge-MIT Institute for TT activities; these have spawned a range of similar collaborations mainly with US academic institutions. Infrastructure in the form of ‘bio-cities’ and science parks. Overall a strong focus on regional policy and small and emerging businesses.
<ul style="list-style-type: none"> -Disbursements peaked at about 2000;200M\$/yr approx. for 2005 	<ul style="list-style-type: none"> -5% of total BS R&D supported (<OECD<Israel); yet to be taken into account that Nokia distorts the picture 	<ul style="list-style-type: none"> Reduced disbursements last 3 years (664ME in 04) Overall weak impact on SU 		<ul style="list-style-type: none"> Variable disbursements through regional development programmes

As noted, innovation policies may play an important, although probably indirect role in the creation of VC industries. Our description of the innovation policies of the countries under study is not able to draw definite conclusions on the effectiveness of these policies. Our thesis is, first, that such policies are needed. Secondly, the design of the policies matters. Understanding the features of policies that contribute to their effectiveness under specific circumstances is, however, insufficient, and calls for more systematic efforts in research to illuminate this important question. Such a study, however, falls outside the scope of our present research project.

4. SUMMARY AND EMERGING POLICY ISSUES

4.1 Summary

1) Israel, and to lesser extent Finland, have succeeded in developing a specialized, independent VC industry oriented to the early phase finance and support of ICT SU. In both countries emergence took place during the 1990s. Israel's VC industry seems to be larger than the Finnish industry. In Israel and Finland, policies were important but their nature and impact were substantially different. In the Finnish context, it has to be noted that the vast effect of Nokia on the growth of, not only the ICT sector, but the whole economy, has greatly influenced demand for and supply of VC funds.

2) The UK, Italy and France showed a significant presence of a VC/PE or VC/PE* industry. The growth of an early phase VC industry in Italy during the 1990s was followed by a strong decline and almost disappearance towards 2004. This raises questions about whether VC (in our definition) really emerged as an industry in that country.

3) No country provided evidence of the emergence of a Life Sciences oriented VC industry segment. In the UK, investment trend over the last 5 years shows a move away from early-stage LS investment. An issue is whether the new segment should be a new industry or part of the existing ICT-focused industry. This should be further studied and policy implications analyzed.

4) Israel's Innovation and VC policy were unique among the set of countries considered (also emphasized in OECD reports and in the literature). Innovation policy emphasized massive, horizontal support of business sector R&D starting in 1969, 25 years before Yozma and emergence of a VC industry.¹⁹ This policy created the conditions for the eventual successful application of a targeted VC policy during the 1990s (Yozma). It was a necessary condition, given the Israeli context during the 1970s and 1980s. Additionally, many other policies were important for facilitating the transition to VC as the main source of finance of R&D in the business sector - and more specifically, of SU.

¹⁹ Massive support here and the numbers of section 3.3 above refer to the high share of Government support of civilian R&D. During the early 1980s, military R&D (mostly performed in Government owned companies) represented about 50 or more percent of total country's R&D (this share has declined dramatically during the 1990s).

5) In Finland VC-directed policy was largely implemented through Government- owned VC organisations and was viewed as another mechanism to close the early phase finance and support gap. Creating a VC industry was not a priority in itself; rather closing such a gap as well as promoting SMEs, regional development, and other socio-economic targets was a priority.

Finland implemented programmes of direct support of BS R&D/innovation but they seemed to have been less massive, and more focused on specific technologies (less neutral and Horizontal than in the Israeli case, where the dominant form of support *for civilian oriented R&D* was and is neutral). In Finland horizontal support represented about 50% of total direct support of company R&D/Innovation. The ‘indirect’ support of BS R&D/Innovation (Higher Education, Public Research Institutes, technology parks) relative to the direct support—was presumably higher in Finland relative to Israel (this statement excludes Defence R&D which was strong in Israel). As noted in Finland, the highly dynamic development in the 1990s cannot be solely attributed to successful policies but to also to the extraordinary growth of Nokia and its effect on the economy. Policies, nevertheless, matter and have helped create the conditions conducive to the observed developments.

6) In Italy there were few VC-directed policies; rather there were co-financing schemes involving governments, and since 2000, financial institutions. This seems to be a poor substitute for a bona fide VC-directed policy oriented to the creation of an independent, professional and specialised domestic industry. Furthermore, Italy did not have a strong direct support of BS R&D policy component - at least one which was sufficiently massive and consistent through time to succeed in generating a critical mass of SU prior to the attempts at creating a VC industry.

7) In France, the structuring of the VC industry results from a double concern. On the one hand, there are calls for reducing the funding gap for High Tech entrepreneurial businesses. This is particularly sensitive in the biotech sectors. On the other hand, public (national) concern for innovation and growth has targeted a series of initiatives to deal with French competitiveness on global markets, including the emergence of High Tech SMEs and providing incentives to develop science-industry relationship and technological transfer. The 1999 Innovation Law seemed to have a positive, albeit limited effect both on SU creation and on Venture Capital. On the other hand, the CDC

seems to have had quantitatively stronger effect compared to the 1999 Law, but its share of investments is not clear.

8) The UK has a decentralised regional development model and a special focus on SMEs in its VC promotion. To some extent, the VC and innovation policies seem mixed. The Department of Trade and Industry encourages and supports several small business schemes, and the Treasury has schemes, such as the Enterprise Investment Scheme (EIS) and Venture Capital Trust (VCTs), which have had the effect of broadening the capital base available to the VC industry. The UK government has also made special infrastructural allocations for development of 'bio-cities' and science parks. Furthermore, within its science policy with a 10-year horizon to 2014, there are financial and other incentives to promote science and technology based innovation as well as collaboration.

9) The variety of country and sector conditions for the emergence and structuring of a VC* industry is extremely significant in the EU context. Part of this variety can be explained by differences in the stage of development of the VC industry, e.g., differences in the positioning of countries in terms of VC industry emergence. However, part of this variety can also be explained by the differences in the structure of VC* industry among the different countries²⁰. As a consequence, the need to design policies aimed at dealing with the specific intermediation function of VC* industry is somewhat central to be considered in the further stages of the project.

4.2 Emerging Policy Issues

Policy Issue 1: Ascertaining the impacts of VC directed and VC-related policies

(alternatively, of the VC oriented policy profile) **in each country**

There is no clear policy evaluation methodology either in the literature or (apparently) within the actual practices of Governments, on which we could draw. Instead, we will accumulate elements of judgement and techniques along the way in order to conduct an exercise towards the end of year three of the project. This fact should not be surprising given that the systems-evolutionary perspective followed in our research is not yet a

²⁰ Petit, Pascal and Michel Quéré, French Country Report on the Venture Capital Industry, Contribution to the Venture fun project, manuscript, 2005

clear and widely accepted perspective in innovation and innovation policy. We can, nevertheless, be assured that prior to a specific evaluation of the above categories of policies it is necessary to *frame* this policy issue. Given that our work contributes significantly to such a framing we can reasonably expect to provide an evaluation of VC policies towards the end of the third year.

Policy Issue 2: Nature and design of VC policies: Could the Targeting of VC be successful?

Additional reasons for the relative success of Israel in VC compared to Italy relate to the nature of the VC-relevant policies themselves. The objective of Yozma was not only to contribute to close the ‘early phase gap’, but to create a high impact domestic VC industry to drive high tech growth. The approach followed was adoption of proactive Fund of Fund perspective, which became the central axis through which the economic impact materialized.

The policy involved an important Government VC contribution (100M\$). This was used to “seed” private funds (the FoF function) that fulfilled a set of monetary *and non-monetary* criteria - rather than being articulated through a Government owned VC company.

Yozma was not exclusively an incentive programme – although its ‘incentives to the upside’ were an important and original design feature. It was based on a proactive attempt to involve high profile/quality foreign agents active in the PE area, to achieve a critical mass of both capabilities and ‘pool of money’ (to trigger the cumulative process of VC emergence), and on other factors.

This example highlights the importance of policy design for success when taking policy initiatives. This issue is highly important for policy-making and presumably has not attracted enough attention from European policy-makers.

Policy issue 3: Could the same model of independent VCs be applied to technology sectors other than the ICT?

As noted, a Life Sciences oriented VC industry segment did not emerge in any of the studied countries. The question is whether the model of independent VCs is even in principle applicable to the Life Sciences area given the much longer R&D processes and exceedingly high technology and commercial risks in the area, implying that some of

the basic assumptions under which independent VCs function – expectations of high returns within a short period of time – are no longer applicable. Related issues are whether Life Sciences Venture Capital activities should be a separate segment of existing VC industry, focused on the ICT, or whether the answer would be something different, such as a public VC organisation with somewhat different conditions under which to function.

Policy Issue 4: The Role of Direct Support of BS R&D

Market-friendly, direct, Government support of BS R&D (when such programmes are implemented according to a ‘learning or evolutionary perspective’ see Teubal 2002) could promote innovation capabilities and high tech entrepreneurship. They, however, require an adequate absorptive capacity in firms which need not be the prevailing situation in many contexts. For example Ireland’s attempt to promote technological level of Irish firms through horizontal R&D programmes has apparently encountered difficulties because most of the indigenous firms cannot use R&D because of their low absorptive capacity and low-level/traditional technology (Evaltec, 2004).²¹ There are other requirements as well e.g. the training level and capabilities of the population which in Finland received strong support through long-term training policies. Moreover, BS R&D subsidies could lead to corruption or to a rent-seeking culture among enterprises without fostering a true innovative spirit among enterprises

It is clear that direct Government support to BS R&D need not be effective in all contexts. The Israeli experience suggests, however, that in some contexts it may be a very powerful tool, whose success not only depends on context but also on the way the policies are configured and implemented.²² Moreover a crucial benefit of a successful direct support of BS innovation could be, through its stimulation of SUs, the creation of VC ‘demand’-possibly a major VC pre emergence condition.²³

²¹ Evaltec, Evaluation of Agency Supports for R&D Performed in the Business Sector, 27 September, 2004.

²² In Teubal 2002 and elsewhere it was suggested that a horizontal BS R&D support programme should be implemented according to a ‘learning approach’, one impact of which would be the promotion of innovative entrepreneurship. This implementation strategy differs considerably from the strategy of venture capitalists that focus on identifying and selecting ‘good entrepreneurs’. Rather, its objective is creation of new entrepreneurs – probably the most important externality during the early phase of diffusion of R&D/Innovation throughout a country’s business sector.

²³ Absence of the implied phased approach to innovation and technology policy (significant direct support of BS R&D first and then support of VC) may also contribute to explain the relative failure of Italy to create an early phase oriented VC industry. It is a component of the failure of Germany in the early 1980s and of Chile in the early 2000s.

Policy Issue 5: Defining VC-relevant Framework Conditions

Aside from VC-related or oriented policies, many other factors, directly related to VCs, influence the emergence and development of VC industry in a country. Thus the legal framework concerning, e.g., ownership by foreign investors in venture capital funds, limitations of pension funds and insurance companies to invest in venture capital funds, taxation levels in general, tax incentives for individuals to invest in new ventures, and taxation of stock options are among the factors that are of importance not only in shaping the conditions under which VCs develop and are able to attract investments but also in influencing their functional purpose.

The project will devote attention to framework conditions and to the critical role they play in the countries under examination for VC industry emergence. Moreover, framework conditions play an essential explanatory role to deal with the various patterns of intermediation fulfilled by VC industries in European and non European contexts. The articulation between intermediation characteristics and policy-making design is considered to be central in order to make VC industry sustainable over time.

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