

Benchmarking **UK** *Venture Capital* to the **US** and **Israel**: What *lessons* can be *learned*?

Report prepared for the British Private Equity
and Venture Capital Association (BVCA)

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May 2009

Research study undertaken by *Think, Play, Do Group*

think, play, do



Contents

Foreword Sir Ronald Cohen	4
Introduction Jeremy Hand	5
Executive summary	6
1 Introduction	8
1.2 Venture capital impact on job creation and company growth	8
1.3 Access to Finance	8
2 Venture capital activity in the UK, US and Israel	9
2.1 USA	9
2.2 Israel	9
2.3 UK	10
2.4 Comparisons between USA, Israel and UK	11
2.4.1 Venture capital activity	11
2.4.2 Early stage venture capital activity	11
2.4.3 Size of investments	12
2.4.4 Venture capital performance	13
2.4.5 Venture capital stakeholders	13
3 Financial ecosystems and their impact on VC	14
3.1 Supply side conditions	14
3.1.1 Exit conditions: stock markets and trade sales	14
3.1.2 Regulations concerning pension funds	14
3.2 Demand side conditions	15
3.2.1 Entrepreneurial activity	15
3.2.2 R&D Expenditure	15
3.2.3 Capital gains tax	16
3.2.4 Employee share ownership schemes	16
3.3 Drivers of venture capital activity and panel regression results	17
4 Government intervention	18
4.1 US government intervention	18
4.2 Israeli government intervention	20
4.3 UK government intervention	21
5 Conclusions and recommendations	24
Endnotes	26
Appendix	28

Foreword

The current economic downturn has put increased pressure on government to find policy solutions to drive growth in sectors of potential global advantage.

Developing high tech industries is a key consideration for the UK. This depends on a critical alignment of factors including available scientific and research skills, interaction between universities and business, government policies supporting enterprise and the availability of capital.

In 2007 Lord Sainsbury produced a report for HM Treasury “The Race to the Top: A Review of Government’s Science and Innovation Policies” addressing the competitiveness of the UK in science and innovation. His report focused on topics such as education, government procurement and high tech clustering. Reflecting its date of publication, Lord Sainsbury’s report was generally sanguine about the availability of early stage venture capital in the UK and the prospects for AIM given the growth in institutional investment at that time.

However, more recent data suggests that investment in high tech early stage companies since then has been far more robust in Silicon Valley and Silicon Wadi than in Silicon Fen. The number of companies listed on AIM has declined very significantly since 2007 and there is concern that, unless something is done, the UK will lose its competitive advantage in this strategically important sector.

It is timely, therefore, that this report looks at the lessons to be learnt from the US and Israel about what has worked in those countries.

Government policies have made a critical contribution to the success of both countries’ high tech industries – whether through intervention to remedy market weakness (Israel) or public procurement policies (US).

The first two conclusions of the report are critical for the UK and more generally for the EU:

1. Government investment in a fund-of-funds initiative to boost innovative companies.

The quantum of capital invested in early stage companies in the US is significantly higher than in the UK. This fund-of-funds would help attract significantly more private capital from institutional investors into venture capital funds.

2. Reviewing the feasibility of a pan-European stock exchange to finance high-growth companies.

Exiting a venture capital investment via public markets continues to be challenging for EU high tech companies relative to US and Israeli ones. EU stock markets remain fragmented and lack the scale to deliver the depth and liquidity of US public markets – particularly NASDAQ. Governments across the EU need to address the infrastructure required to enable growth companies to raise capital to fund their expansion. A number of European countries are taking initiatives to promote investment in venture capital, so now would be a good time to focus attention on this project. It is vital to the development of European high tech venture capital and entrepreneurship.

We need to create an environment in the UK in which innovation can thrive and ambitious entrepreneurial endeavour is encouraged and rewarded. High-growth businesses, backed by experienced venture capital firms, can help Britain achieve the scientific and technological innovation that is crucial to our position in the global economy.

Sir Ronald Cohen



Introduction

The importance of venture capital firms and the support they provide to early stage, high growth and innovative businesses cannot be underestimated. But when commissioning research last year, none of us had any idea how prescient the decision would be to focus on the challenges this sector now faces. Survival prospects for many early-stage businesses and investments are extremely uncertain so it is vital that effective solutions and policy responses are identified and implemented quickly.

The BVCA has helped raise Governmental awareness of these problems and has been instrumental in presenting the case for measures to support the venture capital sector. These efforts are ongoing and following the budget announcement of a £750 million Strategic Investment Fund we look forward to hearing how it is to be targeted and managed. Decisions here will help determine Britain's role as a future hub for world-class innovation.

As the report identifies, the venture capital market in the UK, in contrast to the US, has not achieved the critical mass necessary to fund an appropriate proportion of the most promising and innovative companies through all stages of their development. In Europe we are facing a challenge to our primacy from countries such as Ireland, Denmark and France, all of which are investing heavily in new technologies and positioning themselves to take advantage of a new economy, based on greater innovation, which will emerge from the recession. We cannot afford to miss these opportunities and without policy initiatives which stimulate investment we risk falling behind. This research makes it clear that a government sponsored fund-of-funds to boost investment is only part of the solution. Reform of public procurement policy and an improved partnership between business and university technology transfer offices is also required to help optimise the environment for high-growth companies. There is also a need to look again at how successful businesses can tap into the public markets for further growth capital. At the current time the Alternative Investment Market (AIM) is not providing liquidity or working effectively in this regard.

This research poses challenging questions regarding the structure of the UK venture capital industry. While it does not suggest we should strive to replicate the US model in all respects, there are important lessons to be learnt. The US experience shows that appropriate government intervention, including a targeted public procurement program for innovative SME's, delivers measureable benefits. NASDAQ has been instrumental in the development of many world-leading technology companies and illustrates that a public market tailored to the requirements of high-growth companies can help propel companies to the next phase of their growth while providing a valuable exit option for early stage investors.

The recommendations arising from this research are not a cure-all for the challenges facing innovative early-stage companies, but we hope they will inform policy makers and other influential stakeholders. The UK is alive with opportunity and we have the people, technology and innovative track-record to develop what we have into a world-class success story. But to realise this potential will require changes to current policy and bold action. Private sector investment, from institutional investors into venture capital funds and from funds into companies, will remain the most important element of the process, but policy changes which encourage such investment are now more critical than ever.

Jeremy Hand

Chairman (2008/2009)

BVCA – The British Private Equity and Venture Capital Association

May 2009



Executive Summary

The UK represents the largest venture capital market in Europe, investing over £1 billion in 2008. However, whilst amounts invested since the late 1990's have increased significantly, there are persistent structural problems that need addressing to ease the flow of equity capital into early-stage innovation intensive companies. Supporting innovative companies has positive spill-over effects for the wider economy, in turn leading to the emergence of new industries and playing a vital role in economic growth and job creation. It is for this reason that venture capital has become a key economic priority in several countries and concerns regarding access to finance for innovative companies have prompted government intervention of many varieties.

The US laid the groundwork for the creation of the modern day venture capital industry through the provision of billions of dollars of aid, state subsidies and tax relief measures over several decades. Israel successfully implemented a venture capital industry over a very short period of time with the help of government intervention whilst also relying heavily on capital from the US to address a new set of national priorities. By contrast, the UK is still trying to identify the most suitable interventions to increase and organise the flow of capital to innovative companies. This report seeks to benchmark the VC industry in the UK to the US and Israel in order to shed light on the similarities and differences in each of the three countries and specifically answer the following questions:

- What supply and demand factors affect VC activity and what barriers currently prohibit investors from raising and investing capital?
- What are the key factors that drive VC investing?
- How have governments intervened and at what stages?

The final recommendations based on this research conclude:

1. **Establish a government sponsored fund-of-funds to be managed by the private sector to boost the supply of capital to innovation intensive companies**

Amounts invested per early stage company are significantly larger in the US than in the UK. The sizes of public funds in the UK have not enabled the industry to reach a sufficient critical mass and the limited availability of follow-on financing has resulted in a “second equity gap”. To address this, the government could cornerstone an investment into a fund-of-funds that would attract private capital from institutional investors which would invest in venture capital funds able to demonstrate a track record of strong performance.

2. **Improve the exit environment for innovative high growth firms**

EU stock markets have been and remain too small and fragmented to provide the necessary liquidity to venture capital-backed companies looking to raise significant sums of capital to fund their expansion. The creation of a European small to mid-cap exchange is critical to serve the strong supply of VC backed companies across Europe. This could be achieved through reform of an existing exchange (AIM) or the creation of a new exchange. The success of a Pan-European market is dependent upon a confluence of variables so a review should be conducted to assess current structures and the feasibility of a Pan-European exchange,

3. **Reform public procurement policy towards innovative SMEs**

The success of the US venture capital industry is in large part a result of public procurement policy stimulating demand for innovative SMEs. Public procurement ranges from the reservation of R&D grants for SMEs to the use of tax credits to stimulate large companies to buy innovative services or products from local SMEs. Finding customers is an important step in the growth trajectory of SMEs and demand procurement is more effective than straight grants which do not guarantee customers or users.

4. **Allow non-executive directors and academics to participate in the enterprise management incentive scheme (EMI)**

This would allow high growth companies to attract highly skilled employees and retain academic founders in the firm. It would also reduce the risk of the company failing by securing employees with expertise in managing extremely high growth firms.

5. **Increase R&D expenditures to meet the minimum criteria in the EU or match the US**

There is a clear and important link between investments in R&D as a percentage of GDP and the availability of innovative ideas. The UK still lags significantly behind the US and Israel when it comes to investment in R&D. This investment is often the best guarantor of long term success for innovation intensive companies.

6. **Strengthen links between the academic and commercial worlds**

Stronger links need to be generated between academics and people with business experience. A sufficient critical mass is needed at technology transfer offices (TTOs) within universities which have been successful in building networks with VCs and the business community. TTOs should not position themselves as semi-professional VCs or IP boutiques and instead have a low profile to decrease the entry barrier to academics

1. Introduction

While the US has pioneered a new technological revolution based on large numbers of new small enterprises, the European Union still lags behind in the growth of 'new economy' high-tech activity. Compared to the US, innovative small and medium sized enterprises appear to find it more difficult to get started and grow in Europe. The dominant view is that this is due to the nature of capital markets,² the problems of raising finance for small risky businesses and the high correlation between company and personal bankruptcies.

1.2 Venture capital impact on job creation and company growth

Empirical research in the US comparing VC-backed firms to those that do not receive venture capital backing shows that the former are more innovative and produce more patents,³ are faster in developing their products and introducing them to the market,⁴ and have a higher rate of executive turnover which reflects faster managerial professionalization.⁵ Thus, a wide consensus exists that a vibrant venture capital industry is *the* cornerstone of a healthy economy. VC-funded firms contribute \$1.1 trillion annually to the US economy, representing 11% of the country's GDP.⁶ VC-backed companies employed over 10.4 million American workers in highly skilled jobs and generated \$2.3 trillion in revenue in 2006. VC-backed companies outperform non-VC-backed ones in employment generation (3.6% annually vs. 1.4%) and sales growth (11.8% vs. 6.5%).⁷

Similar observations have been made in the UK on the contribution of venture capital to the economy. Between 2002 and 2007, the growth in number of people employed in VC-backed companies was 6% annually, compared to a national average of 1%. Private equity-backed companies in the UK employed 1.1 million people in 2007, equivalent to 6% of the private sector workforce. VC-backed firms also increased sales growth over the five years at 12% a year and the value of exports at 14% a year.⁸

1.3 Access to finance

There are still concerns that early stage companies in the UK have difficulties accessing capital to fund their growth compared to their counterparts in the US and Israel. Whilst this is not a study of the so called 'equity gap' (see defining the equity gap), many entrepreneurs and venture capital firms claim that there is a shortage of sufficiently high amounts of VC in the UK and that there may be a second equity gap for follow-on funding. These firms face many issues, not least technology uncertainties and inexperienced management teams. The high fixed costs which a VC faces and the perception of potentially low returns associated with investing in early stage companies have encouraged VCs to move towards larger, downstream deals in lower tech industries.

In order to understand the drivers that have resulted in these large discrepancies between the VC industries and their value added across countries, this study analyzes the emergence of three VC industries: the US, Israel and the UK, three diverse countries in terms of economic output, number of employees and amount invested every year. This study specifically aims to provide an understanding of why the VC industry in the UK has developed into a later stage industry and will provide recommendations for developing more early stage and high tech oriented activity, based on the experiences in other countries. In order to do so, we first study the investment patterns in the UK, US and Israel. In the second part, we elaborate on the supply and demand conditions in these countries and present a model for explaining VC investment. In the final part, we elaborate on the government initiatives that have been taken in the three countries to boost venture capital activity.

We use the BVCA definition of Venture Capital in the report. Institutional or formal venture capital, hereafter referred to as venture capital or VC, is a financial intermediary investing primarily institutional capital in privately owned early stage companies, often technology related, with large growth potential.

Defining the equity gap

According to HM Treasury, an equity gap arises where viable businesses are unable to attract investment from either informal investors or venture capitalists. Investors have access to limited financial resources and therefore generally invest relatively small amounts of equity.

An equity gap therefore affects businesses seeking a sum of money that is beyond the financial means of most informal investors, but below the level at which it is viable for venture capitalists to invest. According to the 2004 Bridging the Finance Gap report, the equity gap affects businesses seeking to raise between approximately £250,000 and £2 million of equity finance, and that this gap is most severe for sub-£1 million investments and for innovative businesses at an early stage of their development.

This is consistent with the view of respondents to the Bridging the Finance Gap consultation, of whom 97 per cent agreed that SMEs continue to face a significant equity gap. Many also argued that the severity of the gap varies according to the size, sector and stage of development of the business. However, it is difficult to measure the equity gap with certainty, because it requires an assessment of which businesses would have attracted investment if there had been no equity gap.

2. Venture capital activity in the UK, US and Israel

2.1 USA

A formal VC fund first came into existence in the US with the creation of the American Research and Development Corporation (ARDC) in Boston in 1946. ARDC was a publicly traded company investing in high-risk, small firms that commercialised technologies developed for World War II.⁹ In 1958, the Small Business Administration licensed and helped fund the first Small Business Investment Companies (SBICs), which are still in existence today and are private equity funds that invest into small businesses. The growth and maturation of the US VC industry was not an entirely smooth process and took a number of decades until it reached a critical mass with seasoned investors and an attractive deal flow. Until the 1980s, the vast majority of VC firms in the US were publicly funded SBICs. Whilst they trained many VCs and helped the industry to reach a critical mass by channelling large sums to early stage companies, their ability to perform was limited by bureaucratic constraints, lack of professional expertise and a faulty design of capital structure and incentives.¹⁰

US VC activity has traditionally been centred in a few key regions which hosted pools of skilled human resources and where prestigious academic institutions were available that had the infrastructure to incubate high tech start-ups. Over the period 1980 to 2000, California and Massachusetts were the top two states in venture investments in high-tech sectors in the US. In the late 1990s, VC investments started to spread geographically as new hot spots emerged in places such as Texas, Maryland and North Carolina – also places known for having top academic institutions and highly skilled labour.

The US VC industry has grown from \$568 million invested in 1980 to \$30 billion in 2007. \$25 billion or 85% of investment in the US is dedicated to high tech investments with software, medical devices and equipment and biotechnology representing 50% of all investment. As a general caveat, each country has massive spikes in the amount invested over the period 1999 to 2001 during what became known as the dot com bubble.

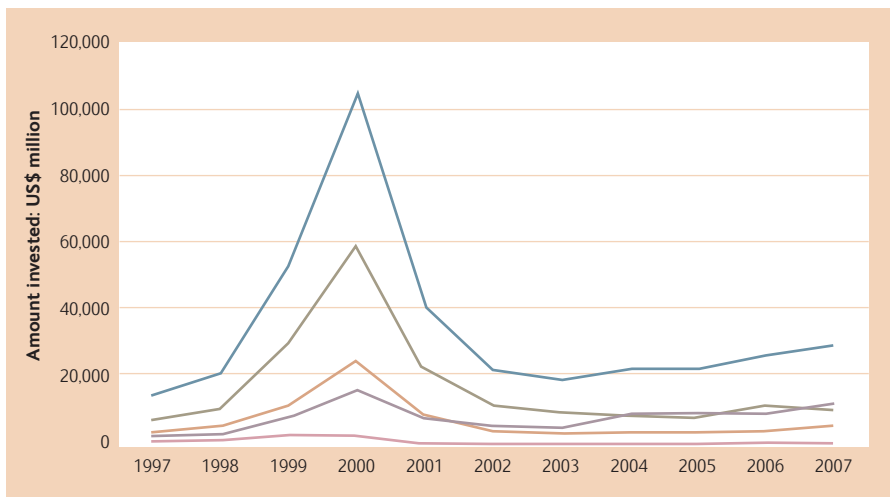


Figure 1: Overview of VC investments in the US

Source: NVCA Yearbook 2008

- Start-up/Seed
- Early stage
- Explanation
- Later
- Total investment

2.2 Israel

At first glance, Israel does not look like the most obvious home for one of the leading knowledge-based economies in the world.¹¹ It has however, been a remarkable case study in the transfer of technology from the research base to commercial exploitation internationally, despite its many disadvantages, notably a small population, geographical isolation, limited natural resources and high defence expenditures.

The creation of the Israeli VC industry as we know it today took place over the period 1993-2000.¹² The government intervention known as Yozma (see section 4.2) allowed limited partnership VC fundraising to grow at an average annual rate of 85% over this period. The Yozma programme was a set of new national priorities that emerged in the wake of changes in the internal and external environments of Israel; including the mass immigration during the early 1990s from the former Soviet-Union (of which many were scientists and engineers), ineffective R&D grants and the lack of management and commercial capabilities. The government identified VC and support of start-ups as the new innovation and technology national priorities over this period of time.

The industry has grown from \$440m invested in 1997 to \$1,759 billion invested in 2007 and close to 100% of the investment in Israel is dedicated to high-tech investments including ICT and biotech (data is only available from 1997 from the IVC).

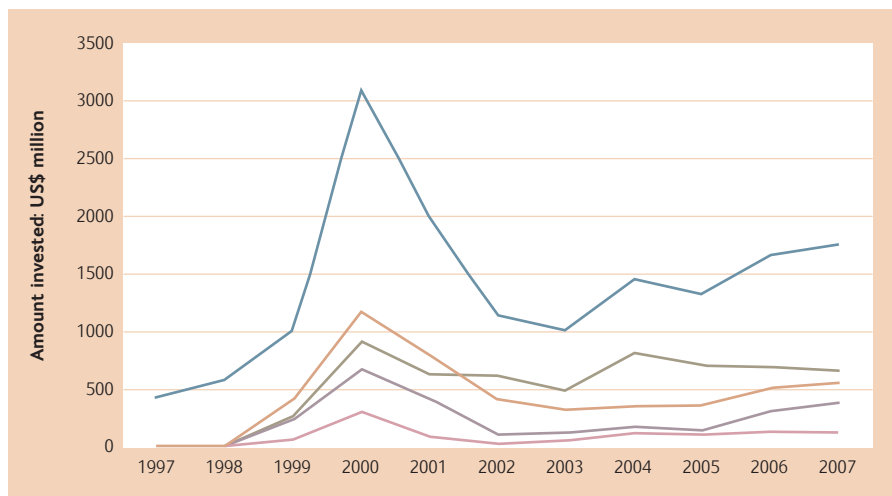


Figure 2:
Overview of VC investments in Israel

Source: IVC (Note: Only total amounts available for 1997-1998)

— Start-up/Seed
— Early stage R & D
— Mid-stage
— Late stage
— Total investment

2.3 UK

The UK VC industry today is the most advanced and developed in Europe. Its roots go back to 1945, with the creation of the Industrial and Commercial Financial Corporation (ICFC), which later became 3i. However, VC in the UK only really started to take-off in the 1970s with the arrival of experienced VC managers who had been operating in the industry in the US and who drew heavily on US capital.¹³ The availability of experienced VC managers seems therefore to be one of the key elements in creating a successful VC industry. The early stage VC firms migrated to leveraged buyouts and expansion type deals as start-up opportunities were scarce.¹⁴ In 1982, total amounts invested in the UK amounted to £250 million which was all private equity buyouts and de-listings. The historic focus on leveraged buyouts and expansion type deals still determines today's focus. More recent research clearly indicated that VCs in the UK are still oriented towards more established companies.¹⁵

The mid to late 1990s saw the formation of some of the UK's premier technology VC funds being established in London, Cambridge and Scotland by a mix of ex-entrepreneurs, scientists and financiers. In addition, US VC firms opened offices in London to invest the large sums of capital that they had raised in pan-European early stage companies. Today, an increasing amount of VC activity in London and Cambridge is targeted toward high-tech sectors including biotechnology, software/IT and a fast growing clean technology sector.

The VC industry has grown from £26m invested in 1983 to £1,048 invested in 2008. Well over 50% of all investments are made in high-technology companies.

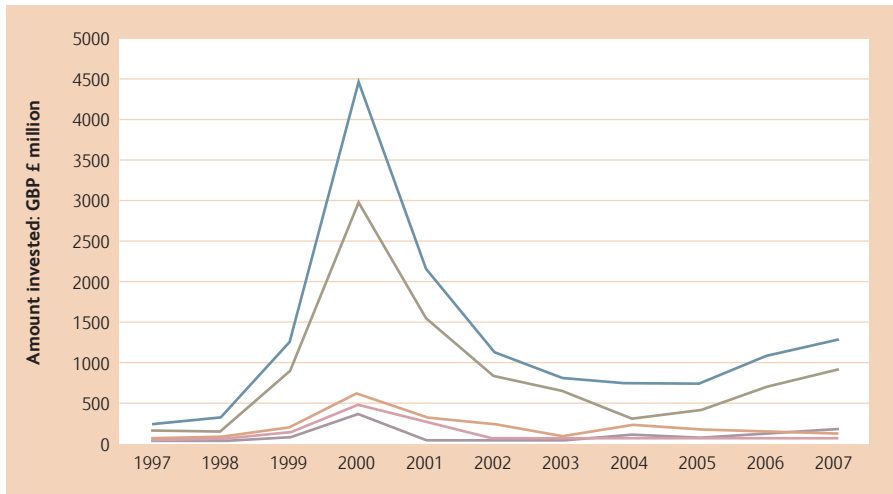


Figure 3:
Overview of VC investments in the UK

Source: Thomson One

- Start-up/Seed
- Early stage
- Expansion
- Late stage
- Total VC

2.4 Comparisons between UK, USA and Israel

In what follows, we focus on the relative importance of venture capital as a share of GDP, the importance of early stage investments, amounts of funds raised and their sources, size of investments and return on investment.

2.4.1 Venture capital activity

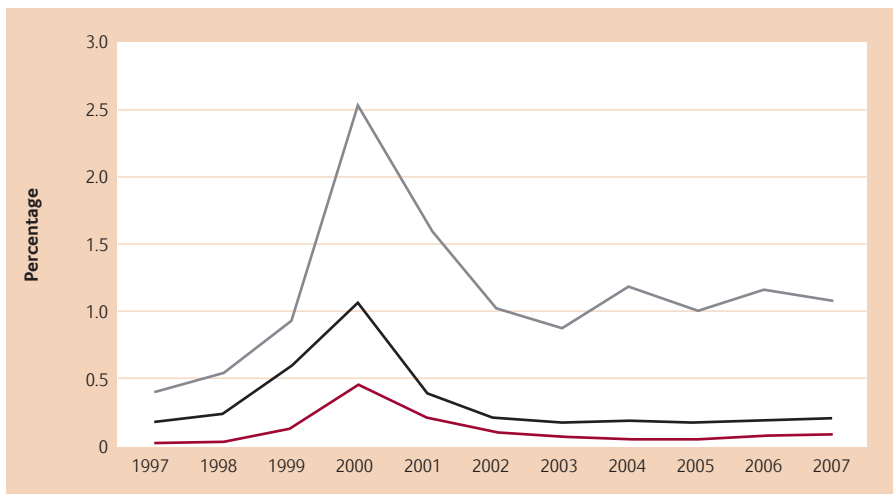


Figure 4:
VC investment as a % of GDP

Source: IVC, NVCA and Thomson One for VC data. Worldbank for GDP data (GDP in current \$)

- US
- UK
- Israel

The figure above shows that both Israel and the US invest more VC as a percentage of GDP than the UK. This is not surprising given the long lead time that the US has had in investing in high risk early stage ventures. This also highlights Israel's dependence on economic growth from investing in start-up ventures. After the dotcom bubble, VC investment has come back to normal levels again. However, the UK continues to lag behind the US and Israel. So, structural underinvestment in VC as a percentage of GDP remains to be resolved.

2.4.2 Early stage venture capital

Israel is an exceptional case of an industry that is primarily dedicated to early stage VC. A lot of Israeli VC-backed firms go on to receive later stage funding from non-Israeli VCs, which helps explain the high level of early stage investment. The large US involvement in Israel and the strong links of many US incumbents in Israel help to explain the high interest of US VC in Israel. Most of the early stage investments in Israel will not be sold to Israeli companies but to US companies, or will trade

on US stock exchanges. The US seem to have reached a static level of early stage investment at around 20% of all VC investment since the dotcom boom. The UK market, which has been sporadic over its history, maintains a level of early stage investment at a rate between 20-30% of total VC investment. Early stage investment is volatile and erratic in the UK and the public sector has become more important as an investor in both absolute and relative terms and co-investments are now the dominant form of public sector venture capital investment.¹⁶ Business angels have also become more significant, and this highlights the maturity of the UK VC market.

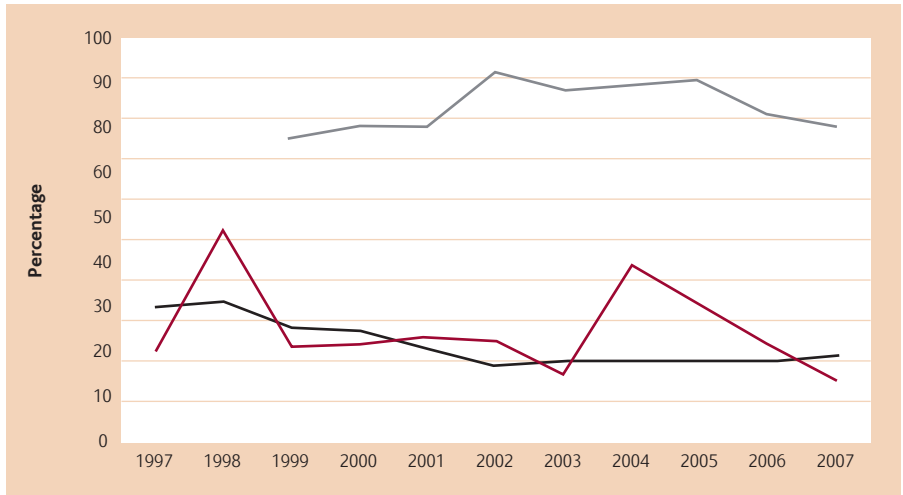


Figure 5:
Early stage investment as a % of total VC investment

Source: BVCA, IVC, NVCA

— US
— UK
— Israel

2.4.3 Size of Investments

On average the amounts invested per early stage company are significantly larger in the US than in the UK, and Israel is somewhere in between. While Europe invests much less in VC than does the US, it supports nearly twice as many companies.¹⁷ This means that money is spread more thinly across companies in Europe. US VCs typically invest more per early stage company than UK VCs which can be a problem knowing that later stage investments require larger amounts per deal than early stage ones. This observation has many consequences since academics have shown that VC backed firms which receive too little money perform much worse than innovative companies that follow a bootstrapping strategy and try to develop their business model without VC involvement.¹⁸

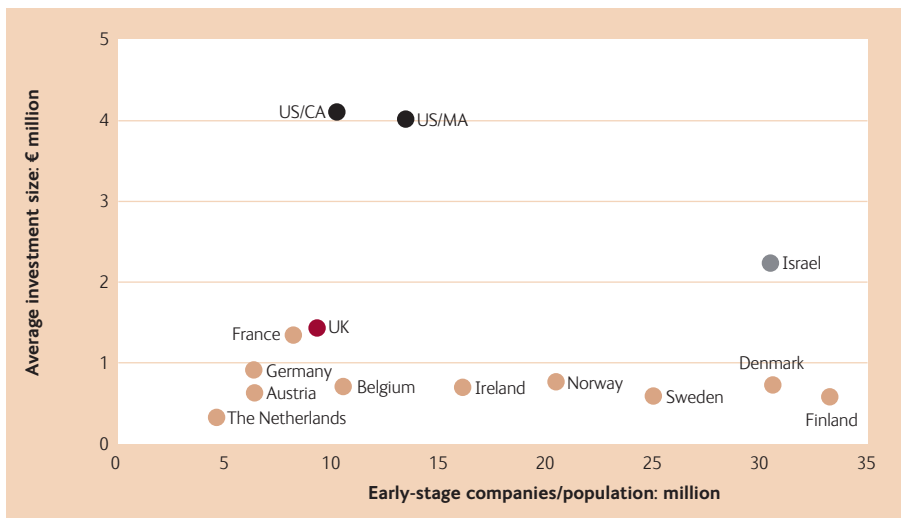


Figure 6:
Investments per early-stage company

Source: Maula et al. (2007)¹⁹

2.4.4 Venture capital performance

According to Thomson Financial, the returns on investment for venture capital in Europe have been below the returns realised in the US. However, care is needed as we cannot make a straight comparison between returns by UK VCs and US VCs, as the BVCA reports returns by vintage year and NVCA by calendar year. If we reconstruct these figures to make the numbers comparable, we find that, over the period 1991-2007, VC returns were on average 6.9% in Europe (average of 5-year rolling IRRs), and 18.9% in the US.

Figure 7 also helps to paint a picture of VC performance in the UK since 1980. It is clear that performance is dominated by the nearly £3.3 billion that was invested during the dotcom bubble and which has a pooled IRR of -6%. This accounts for over 60% of the total VC that has ever been invested into the UK by independent funds. But it appears as though VC is starting to break through the J-curve on 2002/2003 vintages with a pooled return of 0.3% on these still immature funds.

	Pre-Bubble 1980-1997	Bubble 1998-2001	Post Bubble 2002-2003	Total
Number of Funds	36	38	22	96
Drawn Down (GBP million)	1,096	3,272	831	5,199
% of Total Drawn Down	21%	63%	16%	100%
Pooled IRR	13.3%	-6.6%	0.3%	0.1%
Multiple	1.73x	0.76x	1.01x	1.00x
Upper Quartile	15.0%	0.5%	0.5%	7.6%

Figure 7:
UK VC fund performance 1980-2003

Source: BVCA

2.4.5 Venture capital stakeholders

The US has relied very heavily on investments from pension funds over the last 30 years. The alleviation of the prudent man rule for pension fund managers enabled more money to flow into venture capital from 1979 onwards.

More than 90% of funds raised by Israeli VCs come from foreign sources, and negligible investments are made by domestic pension funds (only 0.2% of the Israeli pension fund and insurance company assets are investments in VCs, compared to between 3 and 5% in the US and Europe). Israel has relied heavily in recent years on the US for investment. This is the case for investment in Israeli-based research companies and venture funds as well as export markets for its products and services and for NASDAQ-listings. Some 70% of investment in venture funds at the end of the 1990s came from the US.

The most important source of funds for UK VCs are pension funds, which represent about 24% of the funds raised in 2007 (for total private equity and venture capital). US pension funds have been the largest investor in UK venture capital,²⁰ while domestic pension funds have declined in importance.^{21,22} In 2007, about 70% of the funds raised by UK VCs came from overseas. An analysis by the BVCA²³ has indicated that domestic funds only started to invest in the early nineties, and were confronted with the dotcom bubble in their earlier years of investment, which may have led to a loss of interest in VC investing. However, since these pension funds may also supply financing through fund of funds, their importance is probably higher than the figure shows. Other important sources of VC funds in 2007 were banks, fund of funds, insurance companies and government agencies.

3. Financial ecosystems and their impact on VC

We now turn to the supply and demand determinants of VC within each country. Supply of VC is determined by the willingness and ability of investors to provide funds to venture firms whilst the demand concerns the quantity and quality of innovative companies looking for VC and that are expected to deliver a particular rate of return.

3.1 Supply side conditions

There are many factors to take into account as determinants of supply in VC. These encompass the state of development of exit markets, pension fund regulations, fiscal and regulatory environments and wider economic indicators. We concentrate here on the two which have been described in the literature as the most important determinants, namely exit conditions and regulations concerning pension funds which are the biggest investors in VCs.

3.1.1 Exit conditions: stock markets and trade sales

VC tends to flourish in countries with deep and liquid stock markets and favourable conditions to realize trade sales.²⁴ Bringing a company to IPO signals the quality of the VC²⁵ and is recognised during subsequent funding rounds by the VC investor,²⁶ even though IPOs only account for less than 5% of total exits.²⁷ In the US, NASDAQ was created in 1971 followed by the introduction of the NASDAQ SmallCap Market in 1992. NASDAQ is by far the most successful secondary market in domestic and international stock exchanges. The popularity of NASDAQ affected both the domestic VC market by providing an increasingly successful exit route, and the European and Israeli VC markets were positively affected by the liquidity that NASDAQ provided. The vast majority of IPOs by Israeli companies was through flotation on the NASDAQ over the period 1991-2005 (43 IPOs were made in Europe and 120 through NASDAQ). In the 90s, Israeli companies raised \$10.75 billion on NASDAQ.²⁸

In an attempt to imitate the success of NASDAQ in Europe, most European countries have launched a secondary market. The UK is unique in Europe in regards to the size and liquidity of its own stock markets. The UK's secondary market, AIM (Alternative Investment Market) was founded in 1995, and has grown significantly, from having a capitalisation of £82.2 million in 1995 to nearly £40 billion at the time of writing this report. Furthermore, the London Stock Exchange launched techMARK to help promote existing quoted technology stocks and attract new ones to the exchange.

However, although several technology stock markets do exist in Europe, they have not emerged as serious alternatives to America's NASDAQ.²⁹ There is a problem of fragmentation in European second-tier markets as several second-tier markets were launched in Europe, resulting in limited capitalisation and liquidity of individual markets. Capital market regulation in the EU may need reform to allow the creation of a single stock market for growth companies (including the UK markets) to promote more economies of scale. Such a market would have two crucial benefits; first, it would greatly improve the ability VC-backed companies to raise large sums of capital required for global expansion and secondly, it would help to increase the average valuations of M&A transactions.³⁰ Further research should be conducted to fill the gaps and update the existing literature on the feasibility of a Pan-European stock exchange.

3.1.2 Regulations concerning pension funds

Pension funds are large potential providers of funds to the VC industry. Pension funds in the US would not have been able to invest if US regulations over the past 20 years had not enabled and encouraged them to do so. In 1979, changes were made in the "prudent man" rule applying to pension funds and allowing them to invest up to 15% of their assets in riskier investments. Further changes were made in 1980 (safe harbour rule) and resulted in pension funds becoming the largest source of VC funding in the US.³¹ The Financial Modernisation Act (also known as the Gramm-Leach-Bliley Act) allowed banks, insurance companies and securities firms to affiliate and sell each other's investment products, thus increasing the liquidity of VC investments.³²

In Israel, strict restrictions on VC investments by local institutions, including pension fund and insurance funds apply. Compared to North America and some European countries, where insurance companies and pension funds invest 3 to 5% of their assets in venture funds, Israeli insurance companies and pension funds only invested 0.2% of their assets in VC.³³

In the UK, pension funds have also been the major players, supplying a third or more of new funds for investment.³⁴ UK regulations and accounting standards have influenced the perspectives of institutional investors. The 1986 Financial Services Act excluded the majority of UK pension funds from investing directly in PE funds. In addition, a minimum funding requirement (MFR) was introduced in 1995 in the UK and came in force in April 1997. This required that assets must closely match liabilities if a fund was liquidated immediately. The protections were designed to limit risks for pensioners and further depressed VC investment at a time when significant amounts of money were being invested into VC in the US and Europe. The Myners Report (2001) was responsible for focusing pension funds on the benefits of private equity. The Myners Review proposed changes to the 1986 Financial Services Act to liberalize conditions for pension fund investments into private equity funds, thus making it easier to invest. A report by EVCA and KPMG (2008), benchmarking European tax and legal environments, subsequently found that the UK has been in the top 5 of best performing countries, providing a favourable environment for PE and VC.

3.2 Demand side conditions

A number of factors affect the demand for venture capital. In what follows, we highlight the roles of entrepreneurial activity, R&D intensity, capital gains tax and employee share ownership schemes in each country.

3.2.1 Entrepreneurial activity

Data collected by the Global Entrepreneurship Monitor (GEM) provide an insight into entrepreneurial activity, as well as other factors that may affect entrepreneurial activity (see Figure 9 in the appendix).

The GEM data show that UK citizens on average believe they have the necessary skills to establish a business and they indicate that there are enough opportunities to establish a business. The main difference between the UK and the US is that 38% of UK potential entrepreneurs are afraid of starting a business (because they fear failure), while the corresponding figure for the US is only 28%. One explanation for this fear may be that bankruptcy laws are more entrepreneur-friendly in the US compared to the UK, where company and personal bankruptcies tend to be correlated.³⁵

It is also important to distinguish high-growth from general forms of entrepreneurship. It is mainly high-growth oriented, early-stage entrepreneurial activity (HEA for short) that drives VC demand. GEM has assessed HEA as the percentage of new and nascent entrepreneurs who expect their business to employ at least 20 people in five years' time. GEM data indicate that for 2007, about 14% of nascent and new entrepreneurs in the US expected that their business would employ at least 20 people within five years, compared with 12% for the UK and 26% for Israel. This results in large differences, especially when we take into account the lower entrepreneurial activity in the UK compared to the US.³⁶

3.2.2 R&D expenditure

Figure 8 shows R&D expenditures as a percentage of GDP in each of the three countries. [GERD (Gross Domestic Expenditure on Research and Development), based on OECD and World Bank data].

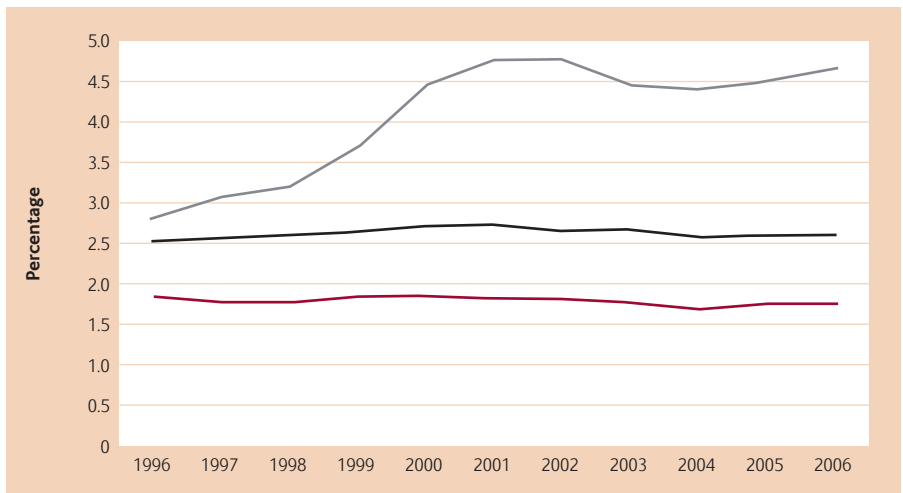


Figure 8:
GERD as percentage of GDP for US, UK and Israel

Source: OECD and Worldbank

— US
— UK
— Israel

The figures show that Israel spends around twice as much on R&D in terms of its GDP as the US, which itself exceeds the UK by more than half a percentage point. A strong R&D culture, especially in universities or national laboratories, is important to nurture a growing VC industry.³⁷ In addition to a strong research culture, the US higher education system through its unique tenure system also provides strong incentives to focus on academic research with local economic and social benefits.³⁸ As a result, spin-outs from US universities have been major vehicles of economic prosperity. There are also many spin-outs in the UK, but the attitude towards academics that are involved in entrepreneurial activities tends to be negative, both in the investment community and the academic community.³⁹

3.2.3 Capital Gains Tax (CGT)

It has long been acknowledged that low capital gains taxes have a direct effect on the demand for VC as it makes more people inclined to start their own company or perform a spin-out from an existing company. The US re-thought their tax regime after a toughening up of their CGT regime was followed by plummeting venture capital in high tech companies. Between 1979 and 1982 the CGT rate was cut from 35% to 20%, with an effective rate of 14% for taxpayers selling shares in companies with assets of \$50 million or under held for five years. After 1981, stock options were taxable only when the relevant shares were sold, rather than exercised.

In the UK, CGT rate has been reduced since 1988 from 40% to 10% for higher-rate tax payers for long-term investments, although the personal threshold is only £7,100. The CGT rate increased again from 10% to 18% in 2008.

Israel has few direct tax incentives for VC investments, and in general, business taxes are quite high with marginal tax rates reaching 52%. In 2000, some targeted changes were allowed, including tax incentives for foreign investors in local venture capital, which was extended to a permanent exemption to foreign investors in 2002. The local tax structure has led to many Israeli start-ups being incorporated in the US or elsewhere.

3.2.4 Employee Share Ownership Schemes

Stock options have been argued to be critical mechanisms through which technology-intensive and highly risky start-ups are able to attract, compensate, incentivise, monitor, and retain the right employees.⁴⁰ Governments have created stock option schemes to make it more attractive for people to create their own company and to make it easier to attract highly skilled employees to their company. Since granting employee stock options involves no outlay of cash by the firm, the more its employees' total compensation is tilted toward stock options, the lower are the cash demands put on the firm. Therefore, the more cash constrained VC firms are, the more likely they are to grant extensive options to their employees in order to conserve cash. Israel, the US and the UK each have their own schemes which vary slightly.

US VC-backed firms are renowned for the inclusiveness and intensity of their employee stock option grants. Employees working in technical areas such as engineering, IT and R&D will have a greater ability to affect equity value than will other employees, leading them to be better incentivized and more likely to be retained through stock options.⁴¹ ISOs (Incentive Stock Options) may only be granted to employees of the company, its parent or subsidiary (grants to non-executive directors or independent contractors are not permitted). A number of restrictions apply, including that ISOs can only be granted to employees who own less than 10% of the company. Furthermore, the value (determined at the time of grant) of the stock that can be exercised for the first time during any year by an employee cannot exceed \$100,000.⁴²

In Israel, Employee Stock Ownership Plans (ESOPs) have been established and every employee on the pay-roll is eligible to receive shares in the company. The first option of the scheme foresees that options are kept by a trustee, who can release the options after 12 months (in which case the options will be taxed as salary income for the employee, and costs will be deductible to the company) or 24 months (in which case the options will be taxed at a lower rate as capital income, and costs will not be deductible to the company). The scheme can be applied for all employees and non-executive directors on condition that they own less than 10% of the company and vendors, service providers and suppliers may also receive stock options, but will be taxed on the day of granting.

In the UK, the EMI (Enterprise Management Incentive) Scheme was introduced in 2000, and applies to companies with less than £30 million of gross assets. Only companies that are deemed independent qualify, and therefore, unfortunately companies controlled by a VC fund cannot qualify to take advantage of the scheme. The scheme only holds for employees who spend the majority of their time working for the company (25 hours a week or 75% of their working time). No employee can obtain shares with a value of more than £120,000 and the total value of all employee options cannot exceed £3 million. The condition that employees can only receive stock options under the scheme if they work more than 75% of their time at the company may put a burden on high tech start-ups, which often rely on externally developed technology (for instance in the case of academic spin-outs). Under this condition, it would be impossible to motivate the academic inventor to join the company on a part time basis using stock options, since these would not fall under the scheme. The current regulations may therefore be pushing people to either become entrepreneurs or stay on at universities as academics, and may therefore be detrimental to high tech entrepreneurship.

3.3 Drivers of VC Activity and Panel Regression Results

In order to understand which supply and demand drivers are the most important factors in explaining VC activity we conducted a detailed statistical analysis (See appendix). We found that the amounts of early stage and total VC invested in the three countries is determined by three main factors:

1. Total entrepreneurial activity
2. Market capitalization of listed companies
3. R&D expenditure

It should be borne in mind that important factors such as trade sale values are not included in this analysis as no consistent data were available for the US and Israel. However, the determinants that are included tell a clear story: higher levels of entrepreneurial activity, R&D expenditures as a percentage of GDP and visible success stories on the stock market affect early stage and total venture capital activity. The analysis suggests that the supply side is attracted by success stories, while opportunities for entrepreneurs arise from technological exploration (reflected in the R&D measure). In-depth analysis shows that entrepreneurial activity in the UK is the most important of the three factors. We would expect that if entrepreneurial activity (in terms of creating high growth oriented ventures) was increased it would have a significantly higher impact on VC activity in the UK compared to the US and Israel. Therefore, one of the first areas of attention for policy makers is to increase entrepreneurial activity.

4. Government intervention

The previous section provided an insight into supply and demand side conditions in the three countries. These conditions have been recognized by governments, who have implemented policy measures to attempt to address market failures. There is no consensus about the need for government intervention to increase the supply of early stage venture capital, and at this moment, academic studies have failed to differentiate between those companies that cannot raise capital due to market failures and those that were unable to raise capital because they failed to meet appropriate investment criteria. There is a clear need for further academic analysis on this topic.

There is much debate about the extent to which governments should engage in VC activity themselves. There is a continuing debate about whether public funds really play a sufficient role in attracting good projects at below market rates before the VC invests. Often, the management of public funds is done by private fund managers, who typically compete with rather than complement the private VCs. If they compete, they can of course offer better rates but do not really play the role they are set up for. The problem is that once a public fund is created very little control exists over how these funds invest and which deals they attract. The returns required by public funds should be lower than their private counterparts, a phenomenon which can be attributed to the multiple goals that public funds target, such as job creation and urban renewal.⁴³ Ideally, the best projects should be able to raise public fund money before they have to go to the private VCs. In the US this hypothesis is confirmed. SBIR awardees in the US grow significantly faster than a matched set of companies in terms of employment and sales. This finding is mainly attributed to the certification of firm quality through the SBIR award.⁴⁴ Also in Israel, government intervention has often been described as extremely important for the establishment of the flourishing VC industry.⁴⁵

Some programmes, such as the US Central Intelligence Agency's In-Q-Tel fund have funded niche technologies that are not of interest to traditional VCs, instead of financing companies in sectors where venture capital was already available (such as the Advanced Technology Programme).⁴⁶ The most successful approach would be to address the gaps in the venture funding process as an increase in venture fund raisings which are driven by factors such as shifts in capital gains tax rates, appear more likely to lead to more intense competition for transactions within an existing set of technologies than to greater diversity in the types of companies funded. The greatest assistance to venture capital may be provided by government programmes that seek to enhance the demand for these funds rather than the supply of capital. Examples of these specific demand side programmes include efforts to facilitate the commercialisation of early-stage technology, such as the Bayh-Dole Act of 1980 and the Federal Technology Transfer Act of 1986, both of which eased entrepreneurs' ability to access early-stage research in the US. Efforts to make entrepreneurship more attractive through tax policy (for instance by lowering tax rates on capital gains) may have a substantial impact on the amount of VC provided.⁴⁷ This vision is shared by other academics⁴⁸ who argue that through the legal and tax environment, loss guarantees and direct expenditure, the government can play an important role in nurturing local VC markets.

Although the US and Israel serve as good points of reference for analysing the UK VC industry, the urge to simply reverse engineer government interventions in those countries and then transpose the formula to the UK must be resisted. In what follows, we discuss the various supply and demand side interventions that have been utilised in each country.

4.1 US government intervention

The government has played a very significant role in the growth of the modern day venture capital industry in the US. Whilst there have been numerous interventions for early stage entrepreneurial firms dating back to the 1950's, according to various academics and practitioners only a couple of these schemes have had a significant impact on the transformation of the industry. These include Small Business Investment Companies (SBICs) and amendments to the prudent man

and safe harbour rules on the supply side, and Small Business Innovation Research (SBIR), the Advanced Technology Program (ATP) and the Small Business Technology Transfer Act (STTTA) on the demand side.

SBICs are licensed and regulated by the SBA (Small Business Administration), but are managed by private sector management teams whose qualifications and business plans are approved in advance in a rigorous licensing process. The \$5 million minimum capital required to form an SBIC must come from qualified private investors. Additional capital, as much as three times the private capital, is then potentially available to each SBIC through the SBA by sale of SBA-guaranteed securities on an "as needed" basis to support fund investments and expenses. The private capital is at risk in its entirety before any taxpayer money is at risk. The SBA examines SBICs regularly to ensure their financial soundness and regulatory compliance. The SBICs were perceived as a success until 2003, when poor performance data began to emerge. Over the vintage years 1994-2000, the composite IRRs were 20.4% for the private investors and -12.3% for the SBA. The report indicates that the SBA's estimated total value to capital was 0.78 as of September 2004, compared to 1.3 for the private partners, indicating a positive return for the private partners.⁴⁹

At the end of 2005, the SBA had invested over \$6.3 billion in 418 funds, plus another \$5.1 billion in outstanding commitments. Together with private capital topping \$12 billion, the programme totalled over \$23 billion in capital resources.⁵⁰ But it has been found that SBIC investments are not addressing gaps in the private funding process, such as industrial segments or firms neglected by financiers and may be contributing to over-funding of particular sectors and crowding out purely private funds.⁵¹

Probably the most significant government intervention that has driven the demand for venture capital in the US has been the formation of the SBIR programme. The SBIR was created in 1982 and federal departments and agencies who evaluate proposals based on a set of criteria including small business qualification, degree of innovation, technical merit, and future market potential are able to award SBIR grants. Lerner (1999) analyzed the long term impact of the SBIR program, by composing a dataset of SBIR awardees and matching them to companies that did not receive SBIR financing. He found that, while the awardees and matching firms did not differ significantly in the likelihood of receiving VC in the years prior to the awards, in subsequent years the awardees were significantly more likely to receive such financing. Awardees also enjoyed substantially greater employment and sales growth. The results were however not uniform, with superior growth of awardees to be confined to firms in zip codes with substantial VC activity. The study suggests that the Federal SBIR programme has played an important catalytic role in high-technology sectors, reducing some of the information gaps faced by investors and helping the certified firms to obtain venture funding, as well as directing over \$2 billion per year of public venture funds.

The ATP was created in 1988 by the NIST (National Institute of Standards and Technology) to foster collaborative technology development of high-tech industrial products with the potential to foster significant future economic growth and funds high-risk R&D performed in partnerships. Both ATP and SBIR are cost-shared R&D programmes aiming at commercial exploitation of the R&D performed. Small businesses that receive grants began a three phase programme, during which they may receive financing for exploration of the technical feasibility and commercialization potential. Over the period 1990-2007 \$4.6 billion was granted under the programme, with close to \$3 billion granted to proposals led by SMEs.

In 1992, the STTTA established the Small Business Technology Transfer (STTR) programme, aiming at public/private research partnerships. Five federal agencies reserve a portion of their R&D funds with awards to small firms up to \$100,000 for technology feasibility studies and up to \$500,000 for subsequent research.⁵²

Other policy measures in the US include reducing the capital gain taxes (see previously), the Bayh-Dole Act 1980, transferring ownership of IP to universities undertaking government-funded research and the National Innovation Act, identifying three primary areas of importance for the US' innovation: (1) research investment, (2) increasing science and technology talent and (3) developing an innovation infrastructure.

4.2 Israeli government intervention

Israel had something of a false start in terms of government interventions to create a VC industry. The Inbal programme was established in 1992 and was aimed at stimulating VC activity by guaranteeing the downside of investments. Inbal was a government insurance company that guaranteed up to 70% of the initial capital assets of approved VC funds in the Tel Aviv Stock Exchange. Four funds were established without great success. The Israeli government learned that the main problem with Inbal was that it didn't attract venture capital firms into the programme and it didn't generate the skills the VCs need such as value adding capabilities. In that way, Inbal had a large social impact and resulted in a more qualitative selection of VCs to include in the Yozma programme. Two fund of funds were created in 2000, mainly to attract large institutional investors from abroad, but were discontinued due to unfavourable market conditions.

Yozma was established in 1992-1993, providing matched funding for a range of VC companies typically providing some 40% of their capital. This amount was limited to \$8 million per fund with private partners contributing \$12 million. \$80m of government money was invested in 10 hybrid funds and an additional \$20 million was directly managed by the Yozma venture fund. Government contributions leveraged an additional \$150 million from domestic and foreign investors. In total, about 200 start-ups were funded over the life of these funds. Thanks to a number of successful exits by Yozma funds in 1996-1998, the VC industry networks in Israel were extended, multinational companies entered the Israeli market and collective learning by the Israeli VC industry emerged. Yozma was privatised in 2000, when the sector was considered to be established. Yozma led to more than 30 foreign-based VC funds operating in Israel. The leverage of Yozma increased from the initial \$100 to \$250 million by 1996, and by 2001 to \$2.9 billion under management.

The Israeli case demonstrates that targeted government intervention is able to remedy market weaknesses, to work with the grain of the market and to be withdrawn once its objectives have been accomplished.⁵³ The Israeli government took a supply side initiative via the creation of Yozma in 1993 at the moment that many demand side factors, including a high level of R&D, immigration and an educated labour force were in place. According to Avnimelech and Teubal (2006), Yozma was the driver in the creation of the Israel VC industry.

Whilst it is widely recognised that it was the formation of a supply side measure that jump started the Israeli VC industry, the government has gone much further to stimulate the demand for VC. Several initiatives have been taken as well to stimulate the demand side. One of these initiatives is Tnufa. This is a pre-seed investment grant which provides up to 85% of costs with a maximum of \$50,000 per project. In addition, a number of technology incubators were created, which provide similar pre-funding grants as Tnufa. Finally, The Hezrek Government Seed Fund takes an equity position in start-ups (\$900,000) that will fund up to 60% of approved expenses. The government gives an upside incentive for private investors to buy out the government stake within 5 years at the initial price plus interest. These schemes are designed to stimulate the supply of high quality start-up businesses (and, subsequently, the demand for venture capital).

Israel has a considerable number of schemes covering the promotion of R&D and technology transfer on an international basis, such as the BIRD programme which provides funding for projects in which Israeli start-up companies commercialize their technology with US companies.

In 2005, an amendment to the law on R&D allows overseas transfer of know-how resulting from publicly funded research, the establishment of several new programmes for SMEs and traditional industries, as well as the creation of a €21 million fund for nanotechnology and a €25 million fund for biotechnology.⁵⁴

Other initiatives include the Law for the Encouragement of Industrial R&D, which was passed in 1985, and has been amended a number of times over the previous years. At the heart of the programme are financial incentives for companies which meet certain eligibility criteria for the development of innovative, export-targeted products.

The MAGNET programme supports R&D of generic pre-competitive technologies. Goktepe⁵⁵ made an evaluation of the programme, which supports research carried out in consortia. Goktepe found that the results obtained by a consortium of partners were better than what could have been achieved by all individual partners, and identifies the programme as a best practice of innovation networks. The MAGNETON programme grew out of MAGNET, and provides financing for cooperation between an industrial company and an academic group, with a view to transferring technology to industry.

4.3 UK government intervention

The government has played a very active role in recent years trying to stimulate the VC industry in the UK. To date, policy intervention has mainly been focused on the supply of VC to early stage companies starting with the launch of what is now known as 3i and extending to funds that invest into SMEs through providing tax reliefs to individuals that invest into those funds (VCT and EIS), as well as hybrid VC funds such as RVCFs and ECFs. There have been very few successful or even significant demand side policy measures attempting to increase the number of companies seeking VC or funding R&D through grants or government procurement which will be touched on below.

3i laid the foundation for the modern day UK VC industry. 3i has its roots in ICFC, which was set up to invest in long-term funds in the MacMillan gap, with identified limits between £5,000 and £200,000. In the early 1980s, ICFC became Investors in Industry, or as it is better known today, 3i. At its zenith in 1988, 3i had a portfolio of 4,789 investments with an aggregate value of £1.6 billion and accounted for over 38.5% of investments made by BVCA members. At that time it had a network of 23 regional offices and employed nearly 800 staff. Towards the end of the 1980s, an increasing amount of 3i's venture capital investment went towards MBOs and MBIs.⁵⁶

In the UK, the government has been instrumental, through the Small Business Service (SBS) and BERR (Department for Business Enterprise and Regulatory Reform), and the Regional Development Agencies (RDAs) in setting up a network of small venture capital funds investing to promote growth in small firms. The Enterprise Fund was established by the Labour party in 1999 and includes a loan guarantee scheme, as well as the UK High Technology Fund and Regional Venture Capital Funds. Before the Enterprise Fund was created, tax reliefs were already implemented for high net worth individuals to invest into those companies seeking early stage capital. Hence, the majority of measures to date were aimed at increasing the supply of equity for SMEs.

The Business Start-up Scheme (BSS), later renamed the Business Expansion Scheme (BES), was set up in 1982 and offered attractive personal tax relief for investment in start-up and early stage businesses. This scheme, refined and renamed as the Enterprise Investment Scheme (EIS) in 1994, continues to operate today. Investment under the EIS increased from £53 million in 1995-96 to over £1 billion in 2000-01, although activity has subsequently declined. By 2008, however, EIS had raised over £6.1 billion and been invested in over 14,000 small, high-risk companies.⁵⁷

In 1995, relief for investment in collective venture capital schemes was enabled through VCTs (Venture Capital Trusts). VCTs are quoted limited companies that invest shareholders' funds in smaller unquoted trading companies and AIM-listed stocks. A VCT must invest at least 70% of its fund in 'qualifying holdings', which must be unquoted companies that will carry on qualifying trade wholly or mainly in the UK. Private individuals investing up to £200,000 in a VCT are entitled to income tax relief at 30% on the investment provided that is held for at least five years. Income distributed by the VCT is free of tax in the hands of the investing individual, and capital gains realised by an individual on the sale of VCT shares are free of capital gains tax. By 2008, the amount invested by VCTs had totalled £3.2 billion in over 1,500 companies.⁵⁸

The University Challenge Funds (UCFs) were established in 1998, aiming at investing in the commercialisation of science originating in universities and government research bodies in a seed stage. The UCFs were established by cooperation between the government and a number of large charities providing financing under the form of grants. The government provided £40 million, the Wellcome Trust £18 million and the Gatsby Foundation £2 million. The applicants have to provide at least 25% of the financing requested from the government and foundations. Each fund has a size of £1 to 5 million and may invest up to £250,000 per project. In total, 57 universities and research institutes have access to UC-financing. The initiative resulted in 105 new spin-offs during the first two years of operation and additionally, £26.8 million was raised on top of the £16.8 million that was brought in by the UCFs.

In late 1999/2000, the government attempted its first measure which aimed to get the VC industry to a critical mass. A government sponsored fund of funds was set up to invest in early stage technology, known as the High Tech Fund of Funds. It was a DTI initiative with the purpose of:

1. Providing returns to investors of 15%+ (which were the government and LPs)
2. Stimulating interest for institutional investors to invest in UK and overseas venture capital
3. Initiating relationships that would encourage direct investment in venture capital

The impetus came from one of the conclusions in the Myners report which stated that UK pension funds should invest more into the private equity asset class. It was deemed that to give funds enough critical mass to employ teams and get returns, the government would cornerstone £20m with one fund of funds with the expertise to select direct VC fund managers. A further £106m was raised from 23 institutional investors, mainly from the UK, which increased the total size of the fund to £126m. To date, the vast majority of the capital has been invested but there hasn't been any data published on its performance.

Since 2000, over £120 million has been committed by the SBS and the EIF (European Investment Fund) in creating a network of nine RVCFs (Regional Venture Capital Funds). Each of these funds has between £20 and £50 million under management and provides up to £500,000 per investment in SMEs.

In 2005, the UK Government launched Enterprise Capital Funds (ECFs). The scheme encourages an increased flow of private capital into early stage deals by adjusting the risk-reward profile for private investors making investments in SMEs. It lowers the barriers to entry for entrepreneurial risk capital managers by reducing the amount of private capital needed to establish a viable venture fund. The model is based on the US SBIC model and it entails a government loan to a fund at a 10-year government bond rate (about 5%). A profit share is set to ensure that the programme is cost neutral in the medium term. The ECFs have between £10 and 37.5 million under management. The small size of the funds raises questions, given that it has been shown that VC funds need a minimal critical size. Murray and Marriott (1998) for instance indicate that funds with fewer than £15 million under management are of increasing economic vulnerability. A BERR (2008) report indicates that £141 million of public money was committed to the ECFs with a further £150 million earmarked for further rounds.

The UK does not provide a specific fiscal incentive scheme to support young and innovative companies in their early development phase; the average company tax rate (28%) is still above the European average of 24%.⁵⁹ The UK however does provide a reduced rate of 20% for SMEs. The UK has several fiscal incentives for business R&D expenditure, available advantageously to SMEs, and allowing them a 175% tax deduction for qualifying R&D expenditure. Since their introduction in 2000, the R&D tax credits have delivered more than £2.3 billion of support to innovative UK companies, through almost 30,000 claims. Besides, support for individuals and SMEs who research and develop technologically innovative products and processes is also provided by the Grant for R&D scheme. The scheme started in 2003 and over 1,600 businesses have claimed support totalling more than £130 million.⁶⁰ But, on the negative side, there are no fiscal incentives for the creation of innovative firms in the UK.

Other policy initiatives have spanned increased entrepreneurship education to both students at schools and universities; support for social entrepreneurship in disadvantaged communities; fiscal incentives for informal investors and retail investment funds focusing on young businesses.⁶¹ Examples are the Science Enterprise Challenge established in 1999 to affect cultural attitudes and to support a network of centres in the UK universities, specializing in teaching and practice of commercialization and entrepreneurship in the field of science and technology and the Higher Education Innovation Fund (HEIF), established in 2000 and aiming at knowledge exchange and interactions between business, public sector organizations and the wider community.⁶²

The government has set up an advisory committee in order to provide advice on necessary public action to reduce the barriers to SMEs competing for public sector contracts and to advice on the practicality of setting a goal for SMEs to win 30% of all public sector business in the next five years. First steps have been taken by launching www.supply2.gov.uk. As part of this report we assessed whether setting up a programme similar to the one existing in the US on public procurement would be feasible. We provide our insights on the next page.

Increased public procurement for SMEs*

David Connell (University of Cambridge) introduces his analysis of the US SBIR programme with the observation that most high tech start-ups do not start in a garage funded by fools and later on by investors such as business angels and venture capital funds. According to him, the reality is that most of these companies are spin-offs from publicly funded research projects or research commissioned by government. This observation is in line with most studies on high tech start-ups, which show that two out of three high tech companies is based upon research developed within a university or R&D lab of a company.⁶³

To stimulate the creation of high tech start-ups, it is strongly believed that in the US, public procurement has had a major impact on boosting the emergence and growth of small businesses in the economy. In its broadest sense, procurement means that a “percentage” of the budget which is subcontracted is set aside for SMEs. The statutory target of federal procurement in the US going to small businesses is 23%. One can say that all companies that have a public link receive strong incentives to work with locally embedded SMEs.

In addition, one particular form of R&D procurement is embedded in the philosophy of the SBIR programme which several US government departments such as the Department of Defence, the National Institute for Health and the Department for Energy have underwritten. This SBIR programme is a mixture of R&D grants and contracts oriented towards SMEs. Under the SBIR programme, the departments commit themselves to grant at least 2.5% of their needs for external R&D towards SMEs, which in turn receive 100% funding plus a profit margin. However, in contrast with the normal procurement where government related companies are fulfilling the contract of a customer, some of these contracts have very broad requirements and certain ministries even do open calls for proposals so that content wise they resemble the R&D grants known in Europe, albeit with less funding involved for any particular company. The companies that benefit most from SBIR employ less than 25 people.

Although no formal evaluation exists, studies show that procurement policy in the US has an extremely positive impact on the economy. Despite the wide recognition that procurement has played an extremely positive role in the US, the policy has not been implemented in Europe and certainly not the UK. In its broadest sense, procurement is against the agreements between countries made by the WTO and the US has long received an exemption in this respect. It is unlikely that the EU will succeed in negotiating exemptions for a European procurement policy towards SMEs. It is even more unlikely that a single country like the UK would succeed in arriving at these agreements on its own.

In the absence of a real public procurement policy implemented by a set aside compulsory target, UK lobbyists suggest to make it easier for SMEs to win R&D contracts. The BVCA for instance recommends the following:

- **More effective monitoring and reporting of procurement contracts awarded.** All public sector bodies, including central government should report on who their contracts are being awarded to. This transparency will allow SMEs to judge more effectively whether a public body is realistically going to consider their bid.
- **More to ensure awareness of available opportunities.** Making better online national and regional opportunity portals that are accessible free of charge. In particular a more comprehensive use of Supply2gov so that it advertises all publicly funded contracts and that these are kept up-to-date.
- **Reducing the level of bureaucracy which burdens SMEs disproportionately.**
- **Making the procurement process more transparent.** In addition, many tenders are still too prescriptive and do not allow for the unique and innovative solutions which SMEs are well placed to provide.
- **An introduction of performance bonds and contract banding to combat the risk associated with SMEs.**

However, it is unlikely that these kinds of soft advice could have the same impact as a real procurement policy initiative. More realistic might be a stronger emphasis in the UK on the use of R&D grants towards SMEs. This is in line with the SBIR programme and takes place in a European version in many countries within the EU. It implies that R&D granting institutes reserve part of their budget for specific SME programmes and make use of subsidy and deferred loan components to achieve at least the 80% level of funding through the grant. The EU state aid rules allow that with respect to SMEs both technological developments and innovation efforts can be subsidized with these grants. In addition, the de minimis rules give guidance on the maximum amount of grant a company can achieve. The granting system also offers the option to stimulate collaboration with ministries and public/private companies.

* The authors would like to thank Tom Wils-Sandford, Ernie Richardson and David Connell for sharing their views during the interviews.

5. Conclusions and recommendations

The VC industries in the UK, US and Israel are clearly different and have developed in different directions. Whereas the US VC industry is the oldest and is quite early stage focused, the Israeli VC industry is relatively new and predominantly focused on early stage and high tech. The Israeli VC industry profits mostly from its US orientation and from the investments of US companies in Israeli high tech. Therefore, the growth path of this industry cannot be imitated in Europe. The UK VC industry is one of the oldest in Europe, but it is less high tech and early stage oriented than the US and Israeli VC industries. One of the most remarkable observations is that the deal size in the US and Israel is still much higher than in the UK, despite the number of government measures taken to increase the amount of capital available for SMEs. This is a potential pitfall as academic research has indicated that undercapitalisation is a major determinant of failure in VC backed ventures. In short, VC backed ventures should be able to raise £2 million on average at start-up. UK government initiatives have fallen short in strengthening the capital bases of individual funds and have focused too much on spreading small amounts of capital too thinly over too many funds.

In this report, we identified a number of factors that could explain drivers of venture capital activity and early stage venture capital activity. On the demand side, we emphasized the need for more high growth oriented entrepreneurial activity and more opportunities that arise from technology development as reflected in the ratio of R&D expenditure to GDP. High growth oriented entrepreneurial activity is determined by exogenous opportunities that exist in an economic ecosystem (e.g., opportunities that are created by discontinuities in technologies which give rise to new industries). In addition, opportunities are also created endogenously by entrepreneurs that enter into the economic space and create opportunities. While exogenous opportunities are determined by the availability of a strong science and technology base in an ecosystem, endogenous opportunities are determined by attracting highly skilled people in the entrepreneurial space. This can be done by changing the risk-reward profile of being an entrepreneur. Fear of bankruptcy creates a high barrier of entry for skilled people into venture activity.

On the supply side, stock market activity and the availability of trade sale opportunities were found to be important elements. VCs think in milestones but dream of exits. Visible exits such as stock market introductions are important for VCs to raise funds. It does not really matter whether these companies are introduced on local or international public markets as long as the stock market is liquid. An opportunity was missed for European countries to come together and introduce a Pan-European stock exchange in the late 90's with each country introducing their own national exchanges. The vast majority are illiquid and do not cater to high growth innovative firms. Further research should assess IPO markets in Europe, specifically looking at the first attempt of establishing such a market (EASDAQ) and its failure. The UK, which has an economic system largely dominated by middle sized rather than multinational companies, might provide too few opportunities for domestic trade sales. Therefore, it might also be necessary to analyse how foreign direct investment in the UK can be increased and how trade sale activity can be facilitated.

It is clear that government initiatives focusing on both demand and supply side have been taken in the three countries under study. Even though assessing the direct impact of these initiatives on VC activity is difficult, it is clear that some initiatives have been instrumental for the establishment of an R&D oriented and entrepreneurial culture and the flourishing of the venture capital industry in the US and Israel. In the US, the SBIR programme has been extremely important in explaining the success of high tech ventures. The SBIR program includes a high proportion of different forms of procurement towards innovative SMEs in the US. The fact that government related companies are forced to outsource part of their investments towards SMEs, is important in creating a customer base from which SMEs can learn and which provides them with the necessary revenues to be able to attract VC money.

In the UK, investments in R&D have historically been relatively low compared to the US and Israel and by extension to the EU target of 3% of the GDP. Therefore, we believe that policy measures in the UK should be directed at improving demand side conditions, and creating an entrepreneurship and R&D oriented culture. This could be achieved through education, or through incentives that are targeted directly to those who could potentially commercialize technology. Public policy could also look at how the experience of serial entrepreneurs could be used to assist new start-ups. The UK government could take initiatives particularly focused on young and innovative companies, for instance by granting R&D subsidies specifically to SMEs. Even though we believe that initiatives should mainly be targeted at improving demand side conditions, supply side initiatives could improve the effectiveness of public policy, on the condition that the initiatives have sufficient critical mass. The UCFs and ECFs are initiatives that increase the supply of venture capital, but their small scale may result in a second equity gap, with companies finding it relatively easy to gain access to start-up funding, but experiencing difficulties in finding follow-on financing. Further supply side interventions may include the removal of the fragmentation of EU stock markets and ensuring that investments made in early stage are of sufficient size. Concerning the latter, it is clear that UK VC is spread thinly across a much larger number of companies, which may be negatively affecting the competitive position of UK VC-backed companies.

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Appendix

	United States 2008	United Kingdom 2008	Israel 2008
% of respondents indicating to dispose of the necessary skills and knowledge to establish a business	48%	45%	35%
% of respondents indicating that opportunities exist in their country to found a new business	44%	41%	39%
% of respondents indicating that fear of failure is preventing to establish a business	28%	38%	43%
Early stage Entrepreneurial Activity (% of population indicating that they have recently established a business or are in the process of establishing one)	10.8%	5.9%	6.4%

Figure 9:
Entrepreneurial activity and its drivers in the US, UK and Israel

Source: *Global Entrepreneurship Monitor*

In order to understand what drivers have the largest impact on VC activity, we composed an overview of potential venture capital drivers and used a panel analysis technique with time series to identify the most important factors in explaining VC activity in the countries under research.

For each of these indicators, we collected data for the UK over the period 1985-2006, for Israel over the period 1999-2007 and for the US over the period 1980-2007, and ran panel regression analyses on the data. Some indicators were left out of the final analysis. For instance, including the total country population generated multicollinearity issues. For capital gains tax, we were faced with the problem that these regulations in Israel differ largely for foreign and domestic investors. We used the tax regulation for foreign investors.

The following table provides an insight in the variables collected and the sources of the data.

Figure 10:
Overview of indicators and sources of information used

Variables	Indicator used	Source of data		
		UK	Israel	US
Dependent variables				
Venture capital invested	Venture capital invested	BVCA	IVC	NVCA
Early stage venture capital invested	Early stage venture capital invested	BVCA	IVC	NVCA
Independent variables				
Demand side conditions				
Capital gains tax regulation	Capital gains tax rate	Literature and diverse sources		
Number of entrepreneurial firms / entrepreneurial activity or culture	Total Entrepreneurial Activity	Global Entrepreneurship Monitor		
Unemployment	Unemployment rate	IMF		
GDP growth	GDP growth	Worldbank		
R&D expenditure	Gross Domestic Expenditure on Research and Development (GERD) as % of GDP	Eurostat	OECD	Eurostat
Size of the home market	Total country population	Worldbank		
Supply side conditions				
Pension fund regulations	Pension fund regulation for VC in place? (0/1)	Literature and diverse sources		
Interest rates	Interest rates on a 3month treasury bill	Bank of England	Bank of Israel	Federal Treasury
Stock market returns	Market capitalization of listed companies as % of GDP	Worldbank		
Past performance of funds	Not used due to unharmonizable data for US and UK, and non-availability for Israel			

The table below presents the results of the panel regression analysis.

	Venture Capital Invested per year (standardized coefficients)	Early Stage Venture Capital Invested per year (standardized coefficients)
Demand side conditions		
Capital gains tax regulations	.14	.20
Total Entrepreneurial Activity	.66****	.69****
Unemployment rate	.01	.01
GDP growth	-.06	-.02
Gross Domestic Expenditure on Research and Development (GERD) as % of GDP	.50****	.58****
Supply side conditions		
Interest rates on a 3month treasury bill	.19*	.10
Market capitalization of listed companies as % of GDP	.91****	.88****
Model		
F-statistic	17.5****	16.15****
Adjusted R-Square	.65	.66
N (number of observations)	57	57

Figure 11:
Panel regression results on drivers of venture
capital activity

Note: Levels of significance:
* $p < .10$; ** $p < .05$; *** $p < .01$; **** $p < .001$

Disclaimer

The data provided has been collected from different sources. BVCA has taken steps to ensure the reliability of the information presented. However, BVCA cannot guarantee the ultimate accuracy of the data and therefore BVCA does not accept responsibility for any decision made or action taken based on the information provided.

Think Play Do Group (TPDG)

Think Play Do Group (TPDG) was set up in 2005 with the mission of assisting both private corporations and public sector organisations to enhance their ability to innovate successfully. TPDG is the commercial arm of the Innovation and Entrepreneurship Groups at the Imperial College Business School in London and the University of Queensland in Brisbane.

The company was founded by Professors David Gann (Imperial College) and Mark Dodgson (University of Queensland). Headed by Professor David Gann, the I&EG at Imperial College now boasts the largest academic group focused on innovation and entrepreneurship management in Europe and is closely linked to top academics across the world.

TPDG's key team members have longstanding experience in all aspects of corporate strategy and organisational development as well as years of practice in address innovation-related issues. We are therefore particularly well positioned to combine the ideas and insights from the world-leading research conducted in the university sphere with our understanding of business practices and priorities to ensure that our solutions are feasible, cost effective and designed to deliver real-world business value

The British Private Equity and Venture Capital Association (BVCA)

The BVCA is the industry body and public policy advocate for the private equity and venture capital industry in the UK. Our members come from venture capital, through mid-market, to private equity/large buy-out houses from all over Britain.

Our voice is one of authority when speaking for, or negotiating on behalf of, the UK industry. Our aim is to aid understanding, clarity and transparency around the activities of our members, promoting our industry to entrepreneurs and investors—as well as Government, trade unions, the media and the general public.

We provide a growing list of services and best practice standards for our members across a spectrum of activities covering a network of interconnected committees, which focus on segment-led, legal, technical, regulatory, investor-led and service-led needs. We also provide networking opportunities, training courses, research, publications, public affairs and communications on behalf of the industry.

With a membership of over 450 firms, we represent the vast majority of all UK-based private equity and venture capital firms and their advisors. The benefits of becoming a member—whether full or associate—are wide-ranging and only briefly described above.

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