INCREASING INNOVATION-DRIVEN ENTREPRENEURSHIP IN SCOTLAND THROUGH COLLECTIVE IMPACT

CONTENTS

MIT REAP
REGIONAL ENTREPRENEURSHIP ACCELERATION PROGRAM

FOREWORD

In Scotland we have an opportunity to redefine ourselves as a nation of dynamic and high achieving entrepreneurs, targeting global market opportunities, using innovation as a key driver of sales growth, making a significant contribution to the creation of employment and wealth

Scotland already has strong foundations in place to achieve this, but, in key areas the environment in which our talented entrepreneurs and innovators operate is not optimal and this constrains progress. In addressing these constraints through specific and targeted actions we can stimulate a new era of innovation-driven entrepreneurship in Scotland. A relentless focus on customers and markets, combined with high levels of market orientated innovation and access to a variety of funds for business growth, will deliver increased numbers of ambitious companies growing rapidly with both a determined and disciplined approach.

In this document we describe the Scottish entrepreneurial ecosystem and what should be done to improve it. By working collectively Scotland can accelerate the performance of innovation-driven entrepreneurial businesses for the benefit of both society and the Scottish economy. We have developed these proposals through intensive consultation with our stakeholders, including entrepreneurs, investors, corporate organisations, academia and agencies of government. Throughout this document we have taken into account the Scottish Government's CAN DO framework.

We ask our stakeholders to work collectively to deliver this stakeholder initiative for acceleration of innovation-driven entrepreneurship across Scotland.

REAP SCOTLAND TEAM

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EXECUTIVE SUMMARY

Scotland's Innovation-driven entrepreneurship opportunity

- Scotland is a prosperous nation with world leading capabilities for scientific research and invention.
- However, over the past 30 years Scotland has not delivered economic growth on a par with the world's best performing innovation-driven economies.
- Entrepreneurship, particularly when combined with market orientated innovation, is known to create companies capable of capturing substantial value and delivering significant economic benefit.
- Promoting innovation-driven entrepreneurship and creating the conditions for young companies to grow is a key focus of Scotland's economic strategy.

Scotland's participation in MIT REAP

- In order to investigate how Scotland's performance in entrepreneurship can be enhanced, a team from Scotland participated in the Massachusetts Institute of Technology inaugural Regional Entrepreneurship Acceleration Programme.
- During this Programme the REAP Scotland team participated in four multinational residential workshops alongside teams from Finland, New Zealand, and regions of China, Spain and Mexico.
- The workshops provided a framework for analysis of Scotland's innovation-based entrepreneurial ecosystem and development of a strategic action plan for improvement.
- Between the workshops the team carried out an investigation of the entrepreneurial ecosystem in Scotland using both academic research and stakeholder consultation.
- The result is this document.

An initiative for realising Scotland's potential

Participation in REAP and the associated stakeholder consultation has identified five areas which currently constrain the ecosystem. These five areas require attention and action, if Scotland's performance in building innovation-driven enterprises is to be enhanced:

1. Actions to **improve networking linkages** between innovation capacity and entrepreneurial capacity to improve the rate of creation or transformation of growth businesses.
2. Actions to **improve skills for growth** through provision of internationally excellent education in entrepreneurship and management.
3. Actions to **improve access to growth finance** through private initiatives in the finance sector and enhancement of management capability in companies.
4. Actions to **leverage the role of our universities** to improve entrepreneurship and management education and build links with alumni to foster mentoring, support and development of Scotland's ambitious entrepreneurs.
5. Actions to **promote innovation-driven entrepreneurship** to individuals of all ages as a worthy and rewarding career choice through a positive communication strategy and extensive use of role models.

Delivery of the plan

For each of the five action areas, the REAP Scotland team gathered input from expert groups to identify specific actions which are presented within the main text of this report, and summarised within the conclusion. Furthermore, the team concludes this is best delivered using a **collective impact approach** which involves all players in Scotland's entrepreneurial ecosystem. This includes individual entrepreneurs through to Scotland's largest businesses, government and business support organisations, universities and the finance and investment community. To maximise effectiveness, this collective approach will require coordination by an independent organisation which will provide a 'backbone'. This backbone organisation will work across all stakeholders to ensure ongoing alignment of vision, delivery of mutually re-enforcing actions, continuous communications and an agreed monitoring framework.

The REAP Scotland team recommends that the backbone should be a non-profit stakeholder-led organisation, potentially a new or existing foundation, which is funded by a mix of public and private funds. This organisation should have a small core team and should help to coordinate stakeholder-led collective actions to achieve impact. The REAP team proposes to continue with early implementation of the strategy actions on an interim basis over the next 9-12 months as the backbone model is established.

CALL TO ACTION

REAP Scotland team invites, and calls to action, all those with an interest in improving the performance of Scotland in the field of innovation-driven entrepreneurship to engage with and support the actions of this stakeholder led initiative. We ask for your endorsement, participation and support in working collectively to deliver a world class ecosystem which stimulates and supports the growth of innovation-driven enterprises.

OUR VISION FOR SCOTLAND

A vibrant, dynamic society which inspires, resources and rewards innovators and entrepreneurs.

A forward looking business culture which celebrates success and acknowledges failure, recognising the value in both. Where inspirational role models are well known and accessible, showcasing Scotland's entrepreneurs and their contribution to society.

An efficient and joined up entrepreneurial ecosystem where innovators, entrepreneurs, financiers, educators, government and established corporations all play their part to enable Scotland to realise its potential for creating and growing significant innovation-based enterprises.

An open, globalised economy characterised by opportunity and resource, attracting top talent from around the world who see Scotland as a centre for vigorous, successful and sustainable business growth.

SECTION 1

Setting the scene

1.1 INTRODUCTION TO MIT REAP

For over two years between 2012 and 2014 a team from Scotland participated in the Massachusetts Institute of Technology (MIT) inaugural Regional Entrepreneurship Acceleration Program (REAP). Delivered by the world leading MIT Sloan School of Management, REAP is designed to help regions and nations to accelerate economic development and job creation through effectively enhancing innovation-driven entrepreneurial ecosystems.

Scotland's participation in the programme was through an independent team of key stakeholders, the REAP Scotland Team, brought together by Highlands and Islands Enterprise (HIE) and Scottish Enterprise (SE). The team worked alongside groups from Finland, New Zealand, and regions of China, Spain and Mexico. Scotland's team consisted of entrepreneurs with experience of building enterprises of various scales (SMEs and large companies), representatives from academia, the finance and investment community, and the economic development agencies. Members are identified in Annex A and were brought together to ensure a balanced view across critical areas of the Scottish entrepreneurial ecosystem. Annex B provides a short overview of the MIT REAP programme.

Over the two years the team participated in four MIT led workshops, two onsite at the MIT Sloan School in Boston USA, one in Edinburgh and one in Auckland, New Zealand. Between the workshops the team completed MIT assignments, held monthly team meetings and carried out significant consultation with wider stakeholders through a number of forums. Leading entrepreneurs in Scotland were also consulted for their views and comments.

1.2 SCOTLAND'S LATENT OPPORTUNITY

Scotland is a nation of well educated, inventive and industrious people. Scots are known the globe over for tenacity and fortitude having played a leading role in establishing trade around the world. Scots have been leading advanced scientific research and inventive discovery for over 200 years. Today Scottish scientists are at the forefront of advanced research including, for example, in fundamental physics, energy, engineering and life sciences.

Scots also have a strong commercial record: during the 19th century, Scots traders built Glasgow to become the "Second City of the British Empire" whilst today both Aberdeen and Edinburgh feature in the top four of the UK's most competitive cities outside London (2013)[1] . Edinburgh has the highest percentage of professionals in the UK, with 43% of the population holding a degree-level or professional qualification[2].

[1] http://www.cforic.org/pages/ukci2013.php

[2] http://www.edinburgh-inspiringcapital.com/live/working_in_edinburgh.aspx

"In terms of the wider ecosystem, we do a good job talking about this and what needs to change - we just need to make it happen. And to come to the table as equal partners. It needs us all involved - from SMEs to corporates to academia to government to investors. SMEs should not be daunted by academics or large corporates, we all have just as much to bring. We need to get the best team together and make this happen"

COLIN STEWART, CITI

Despite this track record of outstanding success and highly educated people, Scotland produces few home grown enterprises of global scale. There is latent potential to create significant wealth from Scotland's innovative capacity, but opportunities are not being realised at present.

This document sets out to define what is constraining our ability to scale-up the businesses entrepreneurs create, and aims to identify action areas to overcome these constraints.

1.3 SCOTLAND'S MIT REAP GOALS

The Scottish team set out on the REAP programme with the objective of producing three specific outputs:

- Recommendations on ways to improve the entrepreneurial ecosystem to accelerate business growth.
- Specific project/programme ideas which are capable of implementation within the wider context of Scotland's entrepreneurial ecosystem.
- Recommendations to Government, and its agencies, on public sector interventions to improve the performance of Scotland's entrepreneurial ecosystem.

During the programme these objectives were sharpened to focus on the conditions for creation and acceleration of innovation-driven enterprises (IDEs). Over the two years of the REAP Programme the Scotland team gained significant knowledge and understanding in relation to the Scottish entrepreneurial ecosystem itself, the wider economic issues, and leading international academic thinking around entrepreneurial business growth. In particular the team identified that the creation and growth of IDEs represents an important opportunity for Scotland.

Accordingly, the original objectives of the REAP Scotland team were re-focused to concentrate on how we might improve the entrepreneurial ecosystem specifically to enable the creation and scale up of IDEs to maximise the growth opportunity for Scotland.

SECTION 2

Learning through **MIT REAP**

The REAP Scotland team was guided by the insights and experience of the MIT faculty, their advice on stakeholder strategy development and through the sharing of experiences between participating nations and regions. This took place during the international workshops. In addition, the team commissioned academic research, carried out intensive stakeholder consultations and set up a number of working groups – all designed to define specific actions which will strengthen Scotland's IDE ecosystem. The key concepts and learning included:

- The importance of innovation-driven enterprises in an entrepreneurial ecosystem;
- The importance of linking innovation capacity with entrepreneurial capacity;
- The value of Collective Impact to solve complex social challenges;
- The importance of visibility, investment and mentoring by successful entrepreneurs at every level;
- The value of learning from other regions of the world, tailored to suit local circumstances;
- Throughout, it was recognised that a joined up approach to action across the whole ecosystem by the full range of stakeholders is vital as is the requirement for patience to allow actions to take effect.

Each of these learning points is described in the next section.

2.1 THE IMPORTANCE OF INNOVATION-DRIVEN ENTERPRISES

Innovation-driven enterprises or 'IDEs' are enterprises which lead the competition and secure business growth by creating new products or services that excite customers and can be rolled out quickly and effectively. They often compete in new ways, using new business models to respond rapidly to evolving trends in a highly connected marketplace. They turn the dynamic of ever-shorter product lifecycles to their advantage. To do this they focus on innovation as a key driver of growth.

According to the Organisation for Economic Co-operation and Development (OECD) more than half the productivity growth in developed nations now

[3]OECD (2012) OECD Compendium of productivity indicators 2012

comes from innovation[3]. It is also identified as the engine of long term economic development and has underpinned much of the UK's productivity growth. As NESTA said in its report in 2009[4] "Innovation may be responsible for two-thirds of UK private sector productivity growth between 2000 and 2007".

While all IDEs are innovation-driven, this is not limited to technology based businesses. IDEs operate across most industry sectors. Aggreko, Global Energy Group, Wolfson Microelectronics and Skyscanner are impressive examples of Scottish IDEs successfully delivering across global markets.

In the United States, IDEs are highly valued as a source of wealth creation and employment. In contrast, Europe in general has been less successful in cultivating IDEs[5] . The process of creating IDEs, 'IDE entrepreneurship', has specific challenges and is distinct from the creation of small local businesses. Several elements of the entrepreneurial ecosystem must be functioning well and working together, to create the optimum conditions for IDEs to flourish.

MIT faculty at the Martin Trust Center for MIT Entrepreneurship set out the difference between IDEs and SMEs as follows in Table 1[6]:

The REAP Scotland team has focused attention on the stimulation of more IDEs, either through the creation of new businesses, or transformation of existing companies, for example through family succession. New IDEs in Scotland are likely to start as SMEs *'with a difference'* as Table 1 demonstrates. Existing SMEs can transform themselves into IDEs by adopting a disciplined approach to structuring their business model for scalable accelerated growth, and by selling innovative products or services to larger, higher value markets.

2.2 IMPORTANCE OF LINKING E-CAP WITH I-CAP

A key theme highlighted by the MIT faculty is the importance of linking the innovation capacity (I-cap) with the entrepreneurial capacity (E-cap) of a region. Often innovators have great ideas (I-cap) but lack the entrepreneurial skills (E-cap) to develop them. Similarly there are many talented entrepreneurs whose talents are wasted on low quality ideas.

MIT faculty believe that the key to success in the Boston entrepreneurial ecosystem has been the linking of I-cap with E-cap, thus enabling talented entrepreneurs and innovators to meet, facilitated through well developed networks, leading to the formation of many IDEs.

Table 1: Difference between SME entrepreneurship and IDE entrepreneurship (Source: MIT Sloan School of Management)

SME Entrepreneurship	IDE Entrepreneurship
Local and regional markets	National and global markets
Innovation not necessary nor a competitive advantage; replicable businesses	Based on innovation (tech, process, business model) and potential competitive advantage
Jobs generally performed locally	Tradable jobs—can be performed locally or elsewhere
Modest capital; often bank financing; often family business	External equity capital often required; diverse ownership
Linear growth	Initial losses followed by rapid growth...or failure; requires investment

[4]http://www.nesta.org.uk/publications/innovation-index-2009

[5]Coad et al., 2014, UK Innovation Survey Innovative Firms and Growth, BIS, March

[6]http://entrepreneurship.mit.edu/sites/default/files/AuletMurray_IDEvSME.pdf

MIT REAP IDE Ecosystem Framework

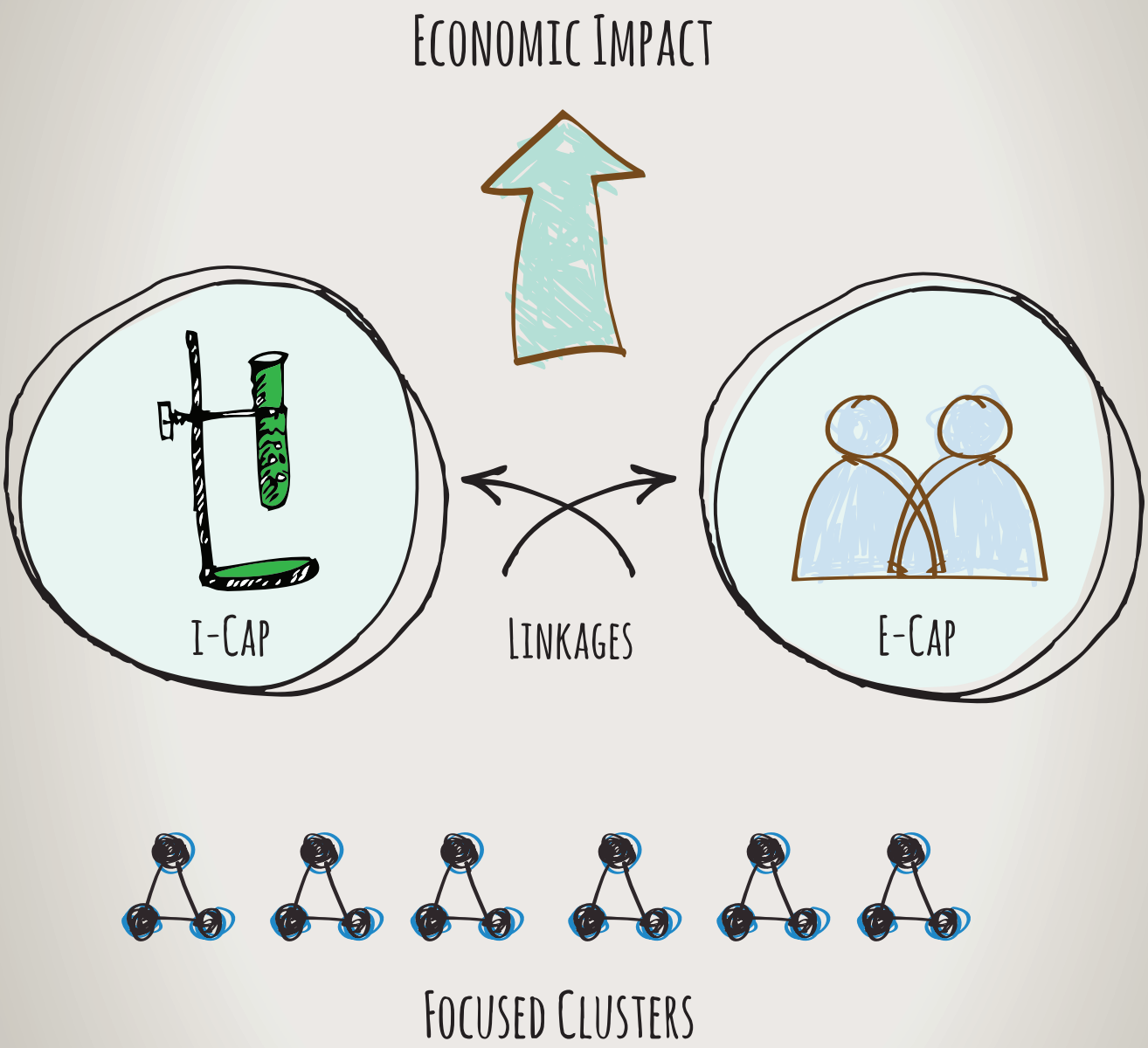


Figure 1 – the MIT view of strong links between innovation and entrepreneurship flourishing in clusters to generate economic impact (Source: MIT Sloan School of Management)

2.3 VALUE OF COLLECTIVE IMPACT

In order to create lasting solutions to large scale issues, organisations - including those in government, civil society, and the business sector - need to coordinate their efforts and work together around a clearly defined goal.

The Collective Impact approach is the commitment of a group of actors from different stakeholder groups to a common agenda for solving complex economic and social problems. Collective Impact is a significant shift from the social sector's current paradigm of 'isolated impact', because the underlying premise of Collective Impact is that no single organisation can create large-scale lasting change.

There is no "silver bullet" solution to systemic problems, and these cannot be solved by simply scaling or replicating one organisation or programme. Strong organisations are necessary, but not sufficient for large-scale change.

Not all societal problems are suitable for Collective Impact solutions. Collective Impact is best employed for problems that are complex and systematic rather than technical in nature.

Collective Impact initiatives are currently being employed around the world in education, healthcare, homelessness, the environment, and community development. Many of the initiatives underway are already showing concrete results, reinforcing the promise of Collective Impact in solving complex issues[7]. The REAP team believe this approach can be applied to the Scottish entrepreneurial ecosystem.

The Collective Impact approach is an important and distinctive element of this REAP initiative. It is what sets this initiative apart because it does not rely heavily on delivery and success from just one or two lead bodies. The Collective Impact approach – as the name suggests – relies on the collective input and delivery of key players or stakeholders who all share a common interest in the success of this initiative.

2.3.1 *The five conditions of collective impact success*

Collective Impact is more rigorous and specific than collaboration among organisations. There are five conditions that, together, lead to meaningful results. These are:

- **Common Agenda:** All participants have a shared vision for change including a common understanding of the problem and a joint approach to solving it through agreed actions.
- **Continuous Communication:** Consistent and open communication is needed across the many players to build trust, assure mutual objectives, and appreciate common motivation.
- **Mutually Reinforcing Activities:** Participant activities must be differentiated while still being coordinated through a mutually reinforcing plan of action.
- **Shared Measurement:** Collecting data and measuring results consistently across all participants ensures efforts remain aligned and participants hold each other accountable.
- **Backbone Organisation:** Creating and managing collective impact requires a separate organisation(s) with staff and a specific set of skills to serve as the backbone for the entire initiative and coordinate participating organisations and agencies.

By tracking contributions and progress towards agreed goals, collectively Scotland can change and develop our entrepreneurial ecosystem, increasing our pool of successful entrepreneurs and rapidly growing IDEs.

2.4 IMPORTANCE OF INVESTMENT AND MENTORING BY SUCCESSFUL ENTREPRENEURS WITHIN SPECIALIST INCUBATORS AND ACCELERATORS

The REAP Scotland team was impressed by the prevalence of highly successful entrepreneurs, many

[7] http://www.ssireview.org/articles/entry/collective_impact

"The Collective Impact approach is the commitment of a group of actors from different sectors to a common agenda for solving complex economic and social problems. Collective Impact is a significant shift from the social sector's current paradigm of 'isolated impact', because the underlying premise of Collective Impact is that no single organisation can create large-scale lasting change"

of whom are now multi-millionaires, both within the teaching staff at MIT and engaged in supporting growing companies through investment and mentoring across the Greater Boston area.

Initiatives the team found particularly exciting were accelerators sponsored by corporations, venture capitalists and successful entrepreneurs. Examples include Bolt (hardware), Greentown Labs (energy) and Healthbox (healthcare). These centres appeared to blend access to facilities, specialist knowledge and capital in a way that is likely to be highly successful in producing IDE scale-up. The REAP team believes this specialist innovation-driven approach could be replicated in Scotland with good effect.

2.5 VALUE OF LEARNING FROM OTHER REGIONS

The REAP Scotland team noted how other regions and nations approached participation in the programme. In particular:

- The team from Andalucia used an impressive public-private partnership with Telefonica and others to sponsor acceleration of entrepreneurship activities very publicly;
- The team from Mexico hired a dedicated project manager with excellent business and communication skills to drive their progress;
- The team from China was entirely privately funded, very ambitious, and extremely self-reliant;
- The team from New Zealand was heavily government-led and had to work hard to rebuild momentum when departmental re-organisation disrupted their progress;
- The team from Finland highlighted the issues with an economy which becomes too reliant on a single 'mega-player' such as Nokia, and the importance of universities such as Aalto was evident in the wider ecosystem.

These observations all contributed to the Scottish team's view that the backbone organisation established to lead and facilitate this initiative must involve all stakeholders, should not be government led, and must have access to sufficient professional resources to really drive change.

One of the key points of learning from REAP was that what works well in one region or nation will not necessarily work in another. Each region has a unique set of economic circumstances, resources, opportunities and constraints. Hence adaptation of successful approaches and initiatives, rather than replication, is needed. We must learn from elsewhere and Scotland should continue to draw on knowledge and best practice from innovation-based economies to achieve the REAP Vision.

SECTION 3

Scotland - Investigating the Issues

In order to investigate the issues in the Scottish entrepreneurial ecosystem, the REAP team adopted the following methodology

- Firstly the team quantified the ecosystem as it currently exists in terms of its entrepreneurs, capital, corporations, government and universities. This analysis is detailed further in this section.
- Secondly the team commissioned research to investigate the performance of the ecosystem in using data from the Global Entrepreneurship Monitor (GEM) and other sources. This work is described in detail in Chapter 4 of the GEM Scotland Report 2012 and summarised in section 3.4 of this document.
- Thirdly having identified potential issues within the ecosystem, the team arranged a series of stakeholder meetings to further investigate key areas and gather opinion regarding potential courses of action.
- Finally having considered the research and validated this against stakeholder opinion, the team established a series of task groups with the intention of identifying specific actions which would lead to an improvement in Scotland's IDE entrepreneurship ecosystem.

The first two steps in this methodology are described in the remainder of this section, while the third and fourth steps are described in section 4 "Developing solutions and actions".

3.1 KEY ECONOMIC FACTS ABOUT SCOTLAND

Table 2 provides an overview of Scottish economic performance.

Table 2: Scotland key economic facts (Sources: Business Population Estimates for the UK and Regions 2013, BIS; Business Demography Births, Deaths and Survival, ONS; Fiscal Commission Working Group, First Report – Macro-economic Framework, Scottish Government 2013; Global Entrepreneurship Monitor.)

Population in millions (% of UK population), 2011	**5.26 (8.3%)** (UK - 63.2 (100%))
GDP per capita, US$, (% of UK) 2010	**34,184 (96%)** (UK- 35,715 (100%))
Unemployment rate (%), Nov-Jan 2014	**6.9** (UK - 7.2)
No. of businesses with UK HQ in Scotland (% of UK), 2013	**325,570 (6.6%) (UK - 4.9 million (100%)**
No. of businesses with UK HQ in Scotland per 10,000 population (% of UK), 2013	**740 (78%) (UK - 947 (100%)**
Registered businesses with UK HQ in Scotland (% of UK), 2013	**149,635 (6.8%) (UK -2.2 million (100%)**
SME percentage (based on location of HQ), 2013	**99.7%** of registered businesses (UK – 99.7%)
Medium sized registered businesses with UK HQ in Scotland (% of UK total), 2013	**2,270** (7.4%) accounting for **15%** of jobs in registered businesses (UK: 30,685, 14% of jobs)
Large businesses with UK HQ in Scotland (% of UK total), 2013	**465** (7.1%) accounting for **45%** of jobs (UK: 6,595, 46%)

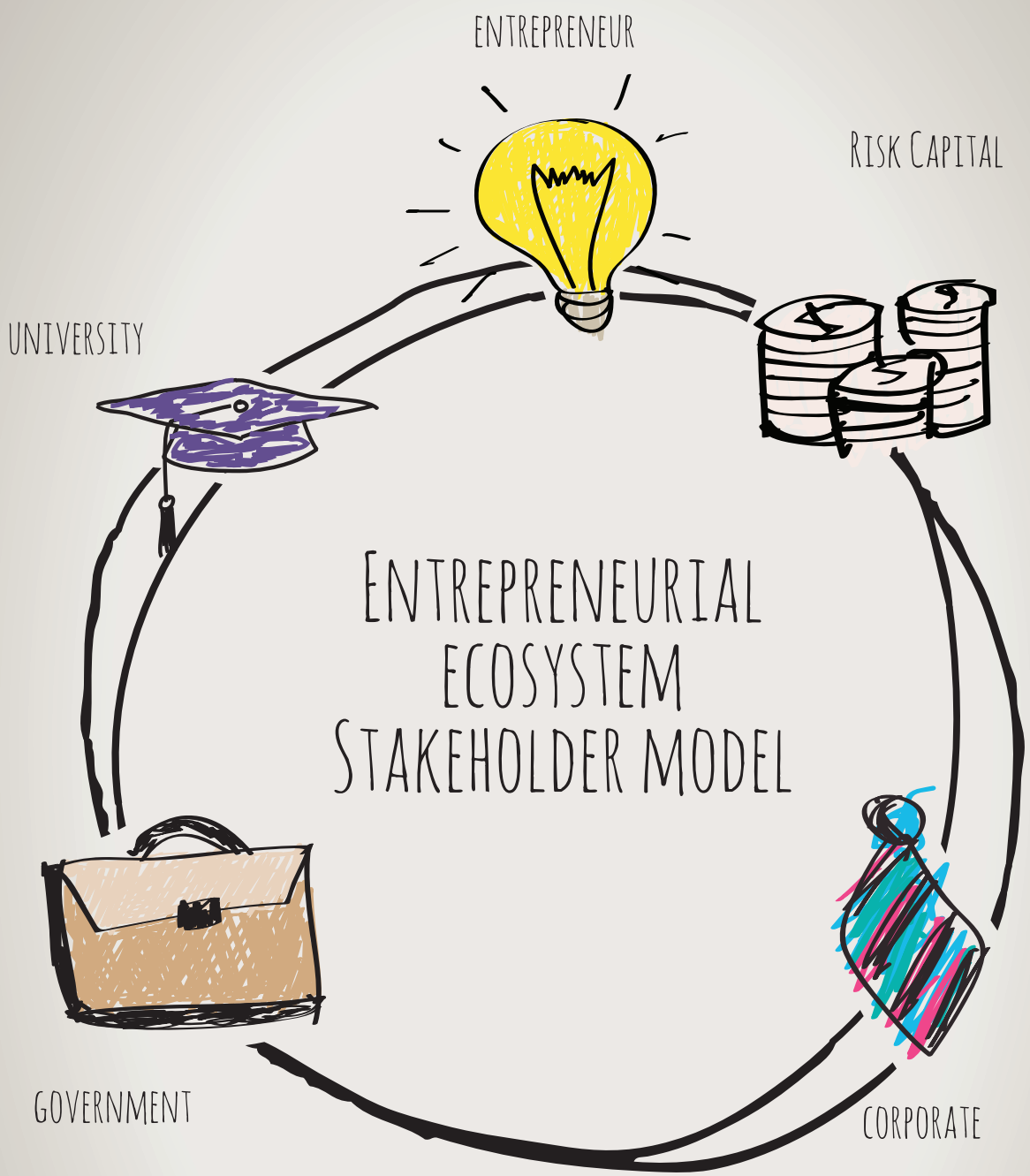


Figure 2 – Key stakeholders in the entrepreneurial ecosystem (source: MIT Sloan School of Management)

"I feel that the challenge in Scotland for small companies lies more around the area of making enterprises 'investor ready' rather than there necessarily being a challenge around levels of risk capital in the market"

PETER ESTIBEIRO, I2EYE DIAGNOSTICS

3.2 THE SCOTTISH IDE ECOSYSTEM

The MIT faculty advised that highly effective IDE ecosystems require strong collaboration and interactions between five key stakeholder groups. These are entrepreneurs, risk capital, universities, government and corporate organisations as shown in Figure 2. These key groups were represented throughout the consultation exercise, and the REAP Scotland team was formed from the outset to ensure these stakeholder interests were represented within the team. Linking these actors is a further set of organisations, corporations, physical infrastructure, resources and information, for example networking groups, professional advisers, websites, etc.

Below the five key stakeholder groups are summarised as they currently operate within the Scottish IDE ecosystem.

3.2.1 *Entrepreneurs*

Despite its heritage and innovation capabilities, and notwithstanding some notable success stories, Scotland lacks a substantial body of experienced, talented, and well networked entrepreneurs.

Scotland has almost 150,000 SMEs, the majority of which are run by owner managers or small management teams. Whilst some might assume that this indicates healthy entrepreneurial activity, the majority of these managers are not actively seeking to grow their businesses and create significant wealth – instead many are content with running a sustainable enterprise which meets their needs and those of their dependants.

An indication of active, ambitious entrepreneurs is found by studying the membership of organisations such as the Entrepreneurial Exchange and other networking organisations, by considering entrepreneurs engaging in professional development (such as that supported by HIE and SE) and reviewing deal-flow for risk financing. These indicators paint a different picture with the number of ambitious entrepreneurs active in Scotland being limited to a few hundred at the most.

At the 'top of the tree' we see some high profile entrepreneurs who have built global businesses, however these are truly the exception rather than the norm. Examples of globally successful high-technology businesses built in Scotland are

particularly rare. GEM indicates around 20% of existing owner-managers are serial entrepreneurs, compared to 26% in the United States, so Scotland is performing reasonably well in this area. Scotland's economy would benefit from many more experienced, successful entrepreneurs following the example set by Sir Tom Hunter and Lord Haughey in investing money and time in young, dynamic businesses.

3.2.2 *Risk Capital*

Scotland has a highly sophisticated angel community which invests across a broad portfolio of early stage companies. Investments at £250k-£500k are typical, often matched by public funds invested under commercial terms by the Scottish Investment Bank (SIB). In addition, there are approximately 40 venture capitalists active in Scotland (i.e. currently investing in companies and/or actively exploring opportunities). While the risk capital market has known weaknesses in Scotland, which will be addressed later in this document, there are clear strengths from which to develop stronger solutions and increase deal flow.

3.2.3 *Universities*

Scotland has 19 universities and institutes of higher education which together win approximately £2 billion of public funds from UK research councils, industry, charities and the Scottish Funding Council (SFC). The sector has a strong international reputation for research and teaching with particular recognised strengths in informatics, engineering, physics and life sciences. The sector in Scotland outperforms the overall UK figure for research publications per capita by approximately x1.3. Scotland is perceived as delivering a strong supply of new inventions. While there are hot spots of entrepreneurial activity, the sector is generally characterised as providing a discipline intensive education rather than a strongly entrepreneurial experience.

3.2.4 *Corporate Organisations*

Some 2270 large businesses (with 250 or more employees) and 3705 medium-sized businesses (with between 50 and 249 employees) operated in Scotland in 2013. However, only 18% of large and 59% of medium sized businesses were owned and headquartered in Scotland. Enterprises with ultimate ownership outside of Scotland (either in the rest of the UK or overseas) accounted for 3% of all businesses, but 35% of all employment and 58% of all revenues. These figures account for Scotland often being referred to as a "branch economy". However, large companies include a significant presence of multinational organisations which bring to Scotland a wealth of knowledge and skills on international business, accessing global markets and customers, supply chain development and most important of all, the management and delivery of innovation into the marketplace. In addition, Scotland hosts a number of headquarters of financial institutions with significant levels of funds under management in Scotland as well as the associated expertise in management of financial risk. However, these funds are not currently deployed at significant levels into IDEs.

3.2.5 *Government*

The Scottish Government has recently renewed its commitment to the development of the culture of entrepreneurship across Scotland through publication of the Scotland CAN DO framework. This operates alongside the commitment from government agencies to drive forward programmes which support the development and growth of IDEs and, at the same time, which help inspire and support the entrepreneurs who drive these businesses. There has been a systematic and intensive effort to develop the innovation ecosystem in Scotland over the past 10-15 years. Now similar attention is required to optimise the entrepreneurial ecosystem, in order to achieve the REAP objective of increased numbers of IDEs able to flourish in Scotland.

3.2.6 *Innovation and entrepreneurship in Scotland*

Having described the entrepreneurship ecosystem in general terms, it is also useful to consider innovation and entrepreneurship and how they link in Scotland, particularly given the team's recognition of the economic impact of IDEs and the importance of linking innovation and entrepreneurial capacity.

We begin by discussing R&D expenditure in higher education and in business and then consider the implications for business creation and growth.

Figure 3: HERD in Scotland in comparison with other OECD countries (Source: Scottish Government)

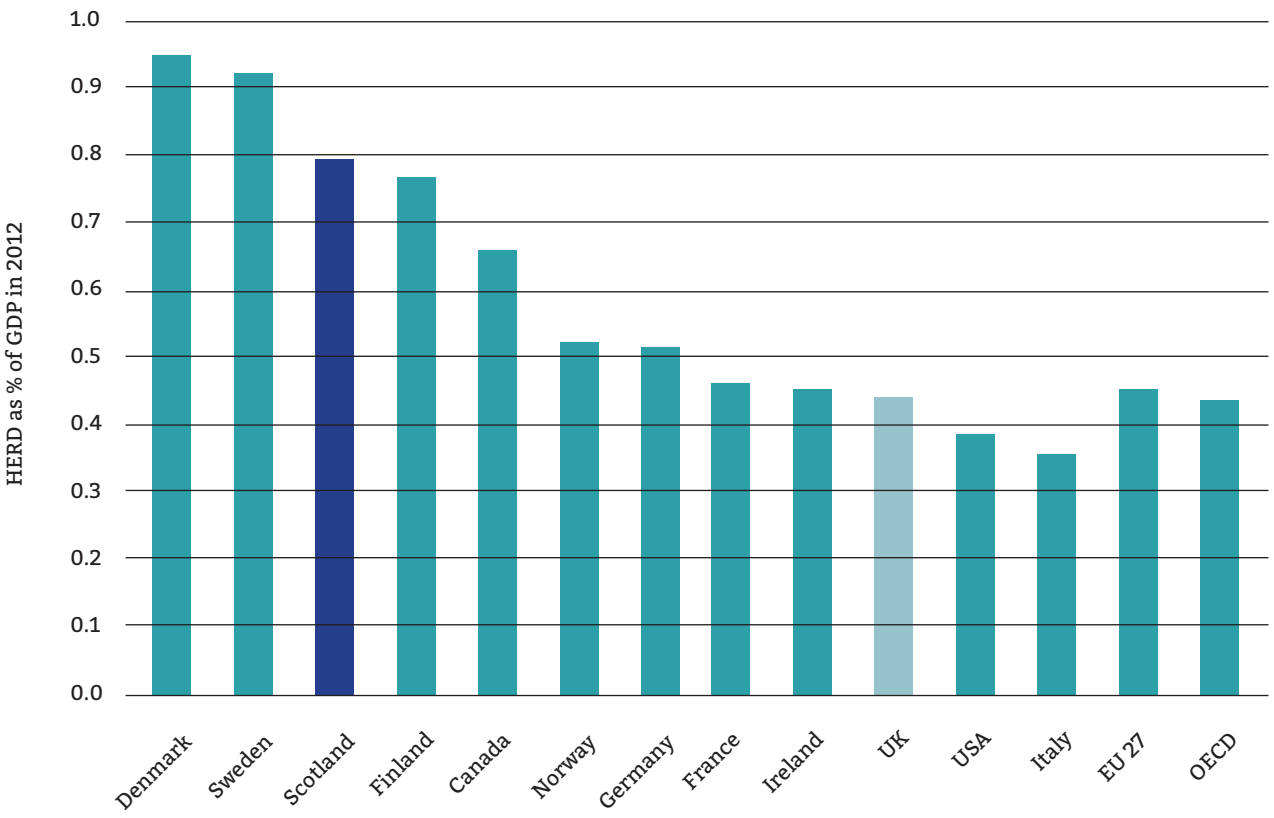


Table 3: Scottish Higher Education Institute spinouts as a percentage of all UK HEI spinouts (Source: Higher Education – Business and Community interaction Surveys)

Scottish spinouts as % of all UK spinouts with some HEI ownership	2010/11	2011/12
Businesses created	17%	14%
Businesses active after 3 years	16%	16%
Total active firms	17%	17%
Employment	21%	20%
Turnover	32%	28%
External investment	16%	23%

3.2.7 *Higher Education R&D expenditure (HERD)*

Scotland is an international leader in R&D expenditure within higher education (HERD). Our HERD as percentage of GDP in 2012 is relatively high at 0.80%, compared with the UK figure of 0.46% and a USA figure of 0.39%. See Figure 3.

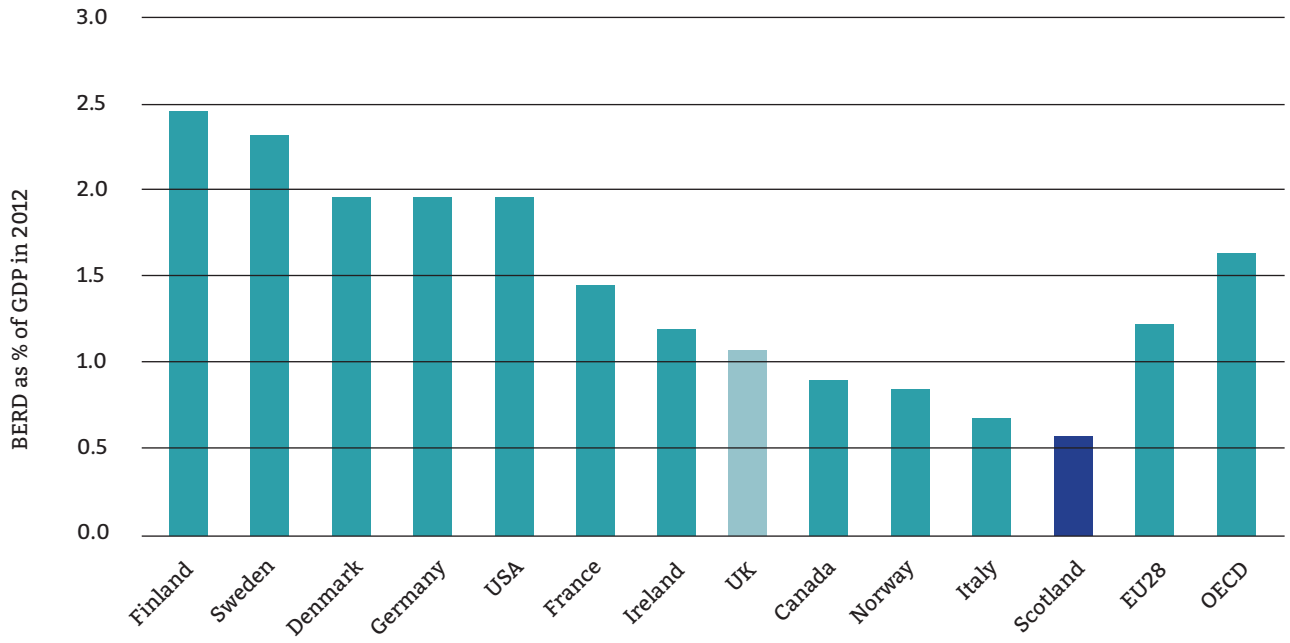
With this expenditure, one would expect a relatively high rate of spill-over into Scottish business. This could happen through university spinout companies, through technology licensing, contract research and consultancy, and through hiring of graduates, especially those with science and engineering (STEM) qualifications. In terms of spinouts, Scotland does indeed have a relatively high performance rate, as shown in Table 3. The 181 university spin outs from Scottish Universities active in 2012 represent 0.12% of the registered business population in Scotland, had sales equivalent to 0.13% of the total revenues of Scottish registered businesses at the start of 2013. In 2011/12, Scottish universities also captured 27% of the total value of contract research, 29% of the total value of consultancy, 19% of the total value of software licenses, and 15% of the total value of intellectual property income from SMEs across the UK university sector. However, only 9% of continuing professional development income from SMEs to universities across the UK went to Scottish institutions[8].

3.2.8 *Innovation in Scottish business*

In contrast to our performance in HERD, business R&D expenditure (BERD) in Scotland lags significantly behind that of the rest of the UK (0.59% of GDP, compared with 1.09% for the UK). See Figure 4, below. While BERD is low in Scotland, business R&D expenditure is a relatively crude input measure which does not accurately reflect the level of innovation taking place within businesses. It does not take account of structural differences across industrial sectors and, potentially, the positive spill-over effects of high R&D spending within the university sector.

Another way of measuring innovation is in terms of its outputs, such as the proportion of businesses with high levels of sales from new to market products.

Figure 4: BERD in Scotland in comparison with other OECD countries (Source: Scottish Government)



[8]Sources: Business Population Estimates for the UK and Regions 2013, BIS; Higher Education – Business and Community interaction Survey 2011/2012

Using this measure, the 2008 UK innovation survey found that Scotland had 9.35% of highly innovative businesses[9] , in a year when it had only 6.8% of the total of UK registered businesses.

People are the critical resource for innovation. Businesses with low rates of innovation hardly ever employ STEM graduates. But the more STEM graduates that Businesses employ, the more R&D they conduct, the more new to market products or processes they have, the more they co-operate with other organisations such as universities and the more use they make of external information[10]. Whilst Scotland produces a slightly higher share of these graduates, Scottish businesses employ a slightly lower share, thus reducing the innovative capacity in our companies.

3.3 BUSINESS FORMATION AND GROWTH AMBITIONS IN SCOTLAND

Having established that Scotland is a leader in R&D spending within higher education, but lags significantly in business R&D, we now turn our attention to how Scotland is performing in terms of the output that interested the REAP team most – business formation and growth.

By looking at performance in this area we can highlight where improvement may be required and perhaps move towards setting inspirational targets for achievement in the future.

In particular a more empirical review of the system helps to set in context the more analytical approach taken through the GEDI analysis described in section 3.4 of this report.

3.3.1 *Small businesses and entrepreneurship*

Scotland has a relatively small population of businesses: only 78% of what we would expect on a per capita basis, relative to the UK as a whole. Of Scotland's 150,000 or so registered businesses, 99.7% are SMEs, the majority of which are run by owner-managers making up around 9% of the Scottish working population. Table 5 reveals the

Table 4: Innovation-related business measures comparing Scotland and the UK [11]

Share of registered businesses in professional, scientific, technical sector, 2013	15.3% (UK – 14.0%)
Potential IDE rate (TEA entrepreneurs with over 25% of customers outside the country, expect to employ at least 20 in 5 years' time, some product or market or technology novelty), average 2009 to 2013	0.18% (UK – 0.21%)
Scottish share of UK firms with high levels of R&D in Scotland, 2008	8.77% (UK – 100%)
Scottish share of UK firms with high levels of sales from new to market products, 2008	9.35% (UK – 100%)

[9]UK Innovation Survey 2008 data; calculations by Coad et al. (2014)

[10]Coad et al., 2014, UK Innovation Survey Innovative Firms and Growth, BIS, March

[11]Sources: Business Population Estimates for the UK and Regions 2013, BIS; Business Demography Births, Deaths and Survival, ONS; Global Entrepreneurship Monitor UK estimates; TBR/Qa SME Growth Ambitions Survey 2012; UK Innovation Survey

Table 5: Growth-related business measures comparing Scotland and the UK [12].

Number (% of UK total) of high growth firms, 2010/13 period (based on OECD definition)	**669 (6.6%) (UK – 10,172 (100%))**
High Growth Firms contribution to all job creation in 2010/13 period	**17% (UK – 18%)**
% of SME owner-managers with substantive ambition for growth, 2011/12	**18% (UK – 22%)**
% of SME owner-managers with any intention of growth, 2011/12	**71% (UK - 80%)**
% of SME owner-managers satisfied with their organisation's current size, 2011/12	**44% (UK - 33%)**

attitudes of owner-managers in Scotland towards growing their businesses to scale. Only a minority are actively seeking to grow their businesses and create significant wealth – instead many are content with running a sustainable business which meets their needs and those of their dependants.

While Scotland seems to have more highly innovative businesses than one would expect given its relatively low business population, it seems to have fewer ambitious business owner-managers and considerably more owner-managers who are satisfied with their organisation's current size. It has fewer high growth businesses than one would expect and the proportion of individuals in the working age population who are actively trying to start or running new innovative, ambitious, internationally-oriented businesses is also lower in Scotland than in the UK – though not by much, and the gap may be narrowing[13].

In short, it appears that Scotland is not meeting its potential in delivering high-growth businesses from a population of innovative young companies. Scotland has fewer ambitious business owner-managers and considerably more owner-managers who are satisfied with their organisation's current size.

3.3.2 *Relationship between innovation and growth*

The relationship between innovation and growth across the UK is complex. Very few businesses sustain growth for more than a few years, and many of those who do are not necessarily innovative. Recent research by the Enterprise Research Centre suggests that only about 17% of job creation in Scotland comes from high growth businesses as defined by the OECD, dropping from a peak of 41% in the 2001-2004 period. Compared with the UK, job creation in Scotland seems to come more from established businesses with 10 or more employees than new or

[12] Sources: Enterprise Research Centre; TBR/Qa SME Growth Ambitions Survey 2012; UK Innovation Survey

[13] GEM data suggests that the three year average was 0.23% for Scotland and 0.21% for the UK.

very small businesses. The benefits of innovation may be captured by businesses other than those who developed the innovation; for example one business may copy another and implement the innovation in a superior way. It is rare for individual businesses to sustain innovation and growth over long periods; this requires a combination of talent, ambition, and good timing. But that does not mean that it is impossible or that the hit rate cannot be improved – quite the contrary. The REAP team has focused effort on exploring these issues and developing strategies to address them.

3.4 GEDI RESEARCH

To bench-mark Scotland's entrepreneurial performance, the REAP Scotland team commissioned an analysis of existing data. Drawing on sources such as the Global Entrepreneurship Monitor (GEM) and published regional and national data, a methodology was employed that enabled comparisons to be made with 27 innovation-driven economies. The team examined both the entrepreneurship and innovation capacities of the ecosystem in Scotland. From this analysis, seven "pillars" were identified as areas of weakness and possible bottlenecks in the Scottish entrepreneurship ecosystem and these were:

- Opportunity Perception
- Start-up Skills
- Networking
- Product and Process Innovation
- High Growth Aspirations
- Internationalisation
- Risk Capital

This research is summarised in the radar plot shown in Figure 5 which identifies the fourteen 'pillars' used to analyse the ecosystem. For each pillar, Scotland's performance is compared with the 27 innovation-driven economies. A full description of this GEDI analysis is presented as Chapter 4 within the GEM Scotland 2012 publication.

3.5 INTERPRETATION OF RESEARCH

Having considered the Scottish IDE entrepreneurship ecosystem using various methods, the REAP team considered their findings and further characterised them within the Scottish context as follows:

- There is a tendency for the majority of Scottish entrepreneurs to lack aspiration, or lack the confidence to show it - be that to achieve high growth in the international market place or just to develop new business processes. The high level of start-ups coming out of universities does not indicate a lack of ambition amongst inventors and technologists to commercialise their ideas, however these early enterprises may be being held back by a variety of factors, including vision, entrepreneurial skills and confidence to drive the business forward. The REAP team believe there are a common set of ecosystem factors that link these characteristics, and these can be addressed through focused action;
- Although there is a strong community of business angel groups in Scotland capable of providing early stage capital, there is a genuine lack of visibility and access to development-stage risk capital for Scottish businesses. This is partly due to a lack of suitable financial institutions in Scotland, but also due to the absence of the networks that entrepreneurs need to access capital further afield;
- Because few companies grow to scale in Scotland, the country is missing people with key skills and experience necessary to lead a business through a high-growth phase. Entrepreneurs may be unaware that they lack these skills, are unsure how to develop them, or do not know how or where to connect to others to learn from their experience. This contributes to the difficulties in accessing capital and reduces the confidence of business founders. Thus this factor manifests itself within the previous two issues.

3.6 STAKEHOLDER DISCUSSIONS

Having carried out the assessment of the entrepreneurship ecosystem in Scotland, the REAP team were keen to validate their initial findings through consultation with key stakeholders. Discussion group themes were selected on the basis of the GEDI research and grouped as follows:

- Opportunity Perception and Internationalisation
- Risk Capital

Scotland versus Other Innovation Driven Nations

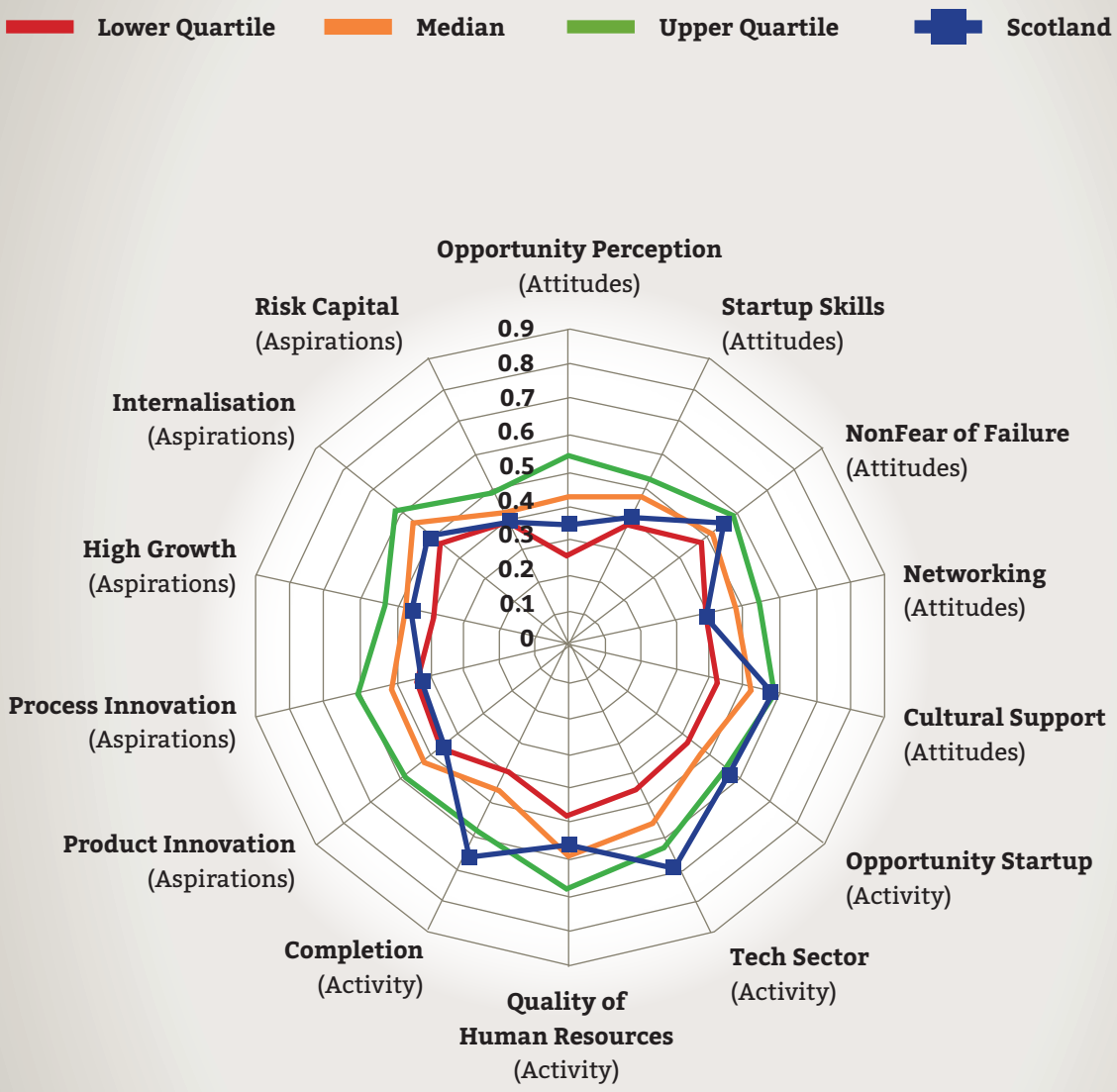


Figure 5: Comparison of Scotland with 27 innovation-driven economies using GEDI methodology

- Start-up Skills and High Growth Ambition
- Product & Process Innovation and Networking

Individuals with an interest, experience or expert knowledge in each of the areas were identified and invited to join a discussion group on each theme with the aim of validating the findings, assessing any underlying causes (i.e. potential constraints on IDE ecosystem), proposing solutions and potential actions, plus adding personal insights. The discussions were carried out during February 2013 and their timing within the overall REAP programme is shown in Annex C. These consultations confirmed and reinforced the research results and provided key insights into five underlying constrains on the IDE system. Annex D shows a full list of stakeholders consulted.

3.7 FIVE KEY THEMES

Based on these consultations, and follow-up discussions across the REAP Scotland team, five key theme areas were identified for the REAP stakeholder initiative. The REAP Scotland team believes these five theme areas, if addressed correctly, over time will strengthen all seven areas of weakness identified through the GEDI research. This strengthening of the ecosystem will drive a step-change in Scotland's performance in growing IDE businesses. The five key themes which underpin the REAP stakeholder initiative are:

- Effective Connections
- Skills for Growth
- Financing for Growth
- Role of Universities
- Role Models

The rationale for these five themes is summarised below.

3.7.1 *Effective Connections*

Networking provides the opportunity for entrepreneurs to meet like-minded people, financiers, technologists, advisers and potential employees, as well as gathering market and customer intelligence and potential sales leads. Interactions promote innovation, inspire and increase aspiration, stimulate new business ideas, provide learning, opportunity and sharing of best practice, offer new opportunities and can develop confidence through validation and peer support.

Opportunity for and quality of productive networking opportunities is recognised as a key factor in the effectiveness of an entrepreneurial ecosystem.

The REAP team concluded that networking opportunities in Scotland, whilst excellent in some areas were nonetheless fragmented. In particular the opportunity for technologists and potential innovators to meet entrepreneurs and the opportunity for early-stage entrepreneurs to meet successful business leaders was limited in certain regions and sectors. The opportunities for entrepreneurs and entrepreneurial teams to meet and network with other players in the ecosystem such as investors, academics, students and large corporate enterprises is also not evenly available across Scotland as a whole. Some geographies or urban centres do offer numerous opportunities but there are gaps where access and quality of provision could be improved.

The team decided to explore this area in more detail on the basis that improving the quality of networking in Scotland could help to address many of the weaknesses in the ecosystem.

3.7.2 *Skills for Growth*

A key weakness identified by the research was in the area of skills required to scale-up a business. Further to this, lack of management capability is often an underlying reason for growing companies to fail, either through failure to access or successfully use finance, or for a host of other reasons related to accelerating the growth of the business.

The REAP team therefore saw the development of skills for growth as a key requirement to better prepare entrepreneurs for IDE growth and success. Whilst provision of internationally outstanding executive education by the university sector will provide some of the answers, there are wider issues ranging from access to key technical skills, through to a general lack of awareness amongst entrepreneurs of the skills with which they need to be equipped. Being armed with the right skills for growth will ensure entrepreneurs and entrepreneurial teams are best placed to take maximum advantage of the opportunities offered by other players in the ecosystem.

Consideration should also be given to programmes which specifically encourage experienced mid-career Scots (or even those with a connection to Scotland, such as by family or by education) to return to Scotland to contribute to the pool of entrepreneurial talent here. An Industrial Fellowship scheme could provide a model here and stimulate a new wave of talented diaspora Scots to return to Scotland and add value to the ecosystem.

3.7.3 *Financing for Growth*

One of the primary characteristics of an IDE is that it is likely to require significant capital to achieve rapid scale-up, to industrialise production and to access international markets. Whilst Scotland has arguably one of the most active business angel investment communities in Europe, and Edinburgh is a major financial centre, access to scale-up stage risk finance, for example venture capital (VC), is very limited. Gaps exist in access to finance in the £1M-£5M investment range which is a major barrier to IDE growth. This problem is exacerbated by the lack of high quality growth-stage financial advisers and a lack of knowledge amongst entrepreneurs as to how to access capital markets in London or overseas.

The REAP team therefore identified the need for action to enable IDEs to access finance for growth and to seek to create new sources of risk capital which would be more compatible with working with existing business angel finance.

3.7.4 *Role of Universities*

The REAP team recognised that the role of universities is crucial to a vibrant IDE ecosystem and MIT provides a shining example of this within the Boston ecosystem. The team was interested to understand how Scotland's university sector could adapt to address the weaknesses identified by the GEDI research, becoming more intensively connected players in the ecosystem.

In particular the team was keen to explore three key areas: 1) how entrepreneurship education can be included much more widely within a wide range of undergraduate courses, particularly those of a technical nature; 2) how Scottish universities can create very high quality executive education for entrepreneurs and innovators, and 3) how universities can foster linkages and connections between innovators and entrepreneurs. Further opportunities to increase linkages with alumni and between universities were also identified as likely to have positive impact.

3.7.5 *Role Models*

The team proposed that a number of the identified weaknesses which related to aspiration could be linked to a combination of cultural conservatism and a lack of vision of what may be possible. For example, public attitudes towards success in business can be negative, perhaps based on envy or mistrust. To change these attitudes and raise the confidence and pride of entrepreneurs requires a change in general culture to one that accepts entrepreneurship as a valuable, worthy and vital contribution to society. The fear of failure issue also still needs to be tackled with a turnaround in perception required so that failure is seen as a valuable learning experience and as 'earning your stripes'. To achieve this, the REAP team suggested that entrepreneurial role models should be widely used and celebrated. This would raise public awareness of the importance of entrepreneurship and provide confidence and inspiration to other entrepreneurs.

SECTION 4

Developing solutions and actions

Having completed the assessment of the current state of the IDE ecosystem and validated this with stakeholders, the REAP team probed the five key theme areas by forming task groups with the purpose of identifying key actions to address the constraints, and in doing so to begin the application of the collective impact approach. This section of the report focuses on the actions identified through the task groups and further developed through discussion within the REAP Scotland team

With the exception of the Financing for Growth and Universities task groups, each task group was initiated through a meeting chaired by an individual of standing in the Scottish entrepreneurial ecosystem and co-chaired by a member of the REAP team. Around 20 individuals were invited to attend each one. Discussions focused on determining actions which could make a real difference to Scotland's entrepreneurial performance in the themed area and stakeholders were invited to accept responsibility for beginning to deliver on these actions.

Financing for Growth discussions took place within the REAP team, with input from a working group comprising the Royal Society of Edinburgh (RSE) working in partnership with the Institute of Chartered Accountants in Scotland (ICAS) and Scottish Financial Enterprise (SFE). This group was asked by the Scottish Government to advise on weaknesses in the risk capital market in Scotland. Given the important role of this RSE Working group, it was considered unnecessary to convene a similar working group through REAP. Instead, the REAP Scotland team sought direct input from the RSE Working Group which was chaired by Ian Ritchie who is also a member of the REAP team.

The Universities task group was convened by inviting senior "entrepreneurial professors" from research-intensive universities to take part in a series of discussions on the issues raised by the GEDI research. Group members were invited to inspire each other to identify specific actions they might promote within their own university. To add further inspiration, this group also commissioned a series of vignettes on the entrepreneurial ecosystems of outstanding universities across the world.

The initial task group meetings resulted in identification of stakeholder led "actions" which form the core of the REAP recommendations. These calls to action are a combination of "quick wins" and long-term changes, aimed at holistic culture change and lasting impact rather than short term piecemeal

"In terms of generating effective connections, the public sector support I received to develop connections in markets like Nigeria and Brazil where there is a larger demand for our product, was extremely helpful. It is our business to be seeking out new contacts and connections so any support we do get in this area is a bonus "

JOHANNAH BISSET, WEB RIGGING SERVICES

initiatives. The actions are listed individually under their related headings throughout the following section and then drawn together within the conclusions section of this document. All stakeholders who were consulted through the workshops or task groups, or approached directly for their views, have played an important role in helping to identify these actions and are listed in Annex D.

4.1 EFFECTIVE CONNECTIONS

Building effective connections through networking with helpful contacts is vital at every stage of business growth. Networks grow increasingly important as companies scale up, becoming the source of customers, suppliers, partners, employees, and investors and inspiration and support.

The right connections can provide entrepreneurs with links to people who might be able to answer specific questions relating to growing their companies, or might be able to provide mentoring (whether formal or informal) or other forms of support.

4.1.1 *Key findings*

In the commissioned research and subsequent consultations, though examples of pockets of good networking existed, as a wider topic networking was frequently seen as inefficient in Scotland. The term 'networking' means different things to different people, ranging from attendance at networking events to finding ways to engage with others who have faced similar business challenges. In essence however, the issue relates to information flows within the ecosystem, and between the ecosystem and the outside world – how well people are aware of others in the network and how to access them.

The stakeholders participating in this task group specifically noted that there are many sources of commercially valuable information and skills in certain pockets of the ecosystem, such as experienced entrepreneurs and the research base, and in the more formal networks. The problem seems to be that this information is not filtering through to less experienced entrepreneurs as much as it could. Some of the issues highlighted include the following:

- Current formal and informal networks appear not to be working as well as they might be in certain areas, and as a result fewer potentially successful entrepreneurs can find the connections they need. The need for peer-to-peer networking was particularly commented on as entrepreneurs learn from others facing the same challenges and can share experience and knowledge.
- Connections by entrepreneurs with markets and resources outside Scotland seem relatively weak.

- The REAP Scotland team has found that many early stage entrepreneurs do not appreciate the benefits of networking, or are very unsure how to set about building effective connections.
- The stakeholders within this task group were very supportive of proposals to greatly imprive networking for the benefit of ambitious entrepreneurs.

A highly functioning ecosystem would include an environment where entrepreneurs can quickly and easily find and contact people who can help them build or grow their businesses. Examples from other parts of the world (e.g. the Greater Boston area) show substantial benefits in mixing innovators and entrepreneurs from all sectors. In some areas such help is relatively easy to find in Scotland, such as exporting, software development, or taxation, but in fields such as product development, sales, marketing, regulatory approvals, or senior human resource management, answers to specific issues can be more elusive.

The REAP team believes that many business membership organisations and other networks in Scotland might be able to introduce entrepreneurs to relevant experts or mentors, but that this potential is often unrealised either because entrepreneurs are unaware of the resources available, or because of a lack of connectivity between organisations. Also, some business membership organisations don't see themselves as primarily providing this function.

There are already many networks active in Scotland, serving a very wide range of interests. These include organisations which exist primarily to bring together people with similar interests or backgrounds, such as trade associations, university alumni groups, and more specialist groups such as the Entrepreneurial Exchange or Informatics Ventures. Other networks exist as the outcome of another activity e.g. the Scottish MIT EDP Alumni network and these can produce very valuable connections. These also include the networks created in more formal ways by business incubators, the Saltire Fellows and RSE Fellows, and events organisers such as Business Forum Scotland.

Both physical /face to face networking and online/ remote networking opportunities were important.

Many of the actions required to improve information flows and facilitate more effective connections will be in the remit of existing networking organisations. To help stimulate further developments, the REAP team proposes three simple actions as first steps.

4.1.2 *Priorities for Action*

1. Guide to Networking for Entrepreneurs

It is proposed to produce a ***Guide to Networking in Scotland*** for entrepreneurs which could be used both to inform and educate first-time entrepreneurs themselves. This would be an ongoing resource/ reminder for established entrepreneurs and to help current network organisations to open more doors for them. The content will include:

- The value of networks both physical and online and how to get the best out of them
- Networking events – how to find and select relevant events
- Networking organisations – an outline of the main organisations in Scotland, and what to expect from them
- Personal contacts – how to find the person with the knowledge or experience you need
- Confidence – some tips for approaching people you have not met before
- Pitching – how to get your message across when meeting new contacts
- Further information – websites, blogs, articles and other sources of relevant material.

2. A 'network of networks'

The REAP team proposes to initiate a series of gatherings at which networking organisations can share information on their activities and discuss issues relating to the Scottish entrepreneurial ecosystem. The aim is both to help networks make connections with each other, and to consider the national dimension collectively and the part they each play in it. Through consideration of collective impact, networking organisations can assist entrepreneurs at all stages of growing their business to make the right contacts and broaden their knowledge of the ecosystem.

Participation will be open to all organisations which

can demonstrate the capacity to make introductions to individuals within their networks. Some of the major national organisations (e.g. GlobalScots, Entrepreneurial Exchange, trade associations, etc.) will be encouraged to form the core of the programme. Participation will also be open to all bona-fide entrepreneurs who wish to be part of this national conversation.

3. Online hub or forum for IDEs

Development of an online hub or forum for remote networking is recommended for sharing of knowledge, experience, success stories and successful handling of specific challenges – all targeting the needs of IDE entrepreneurs. This should include a message board to post current challenges and requests for help or new connections. It could include a database of entrepreneurs, support organisations, networking events and updates on risk capital.

4.2 SKILLS FOR GROWTH

4.2.1 Key Findings

Throughout the REAP consultation process, there has been consensus that continuously developing skills for growth is a key component of success for every ambitious entrepreneur. The REAP team has focused on the skills needed by entrepreneurs and entrepreneurial teams already in business, rather than on start-up skills. To drive a successful IDE, an entrepreneur needs an armoury of start-up, financial, operational, management, strategic, leadership and creative skills along with vision, belief and resilience. The availability of high quality opportunities for entrepreneurs to acquire or refine their skills is considered essential, and Scotland needs a comprehensive programme of international standing if we are to build global competitive IDEs.

Typically, as an IDE grows and employs larger numbers of staff, the entrepreneur will move from being a 'jack of all trades', essentially being responsible for multiple or all aspects of the business, to being in a strategic or leadership position, employing others to enhance business expertise in key roles. Most entrepreneurs agree that they need a sound understanding of all aspects of their business in order to be able to bring in the right people when the time comes to build, or change, their team.

"In terms of skills for growth, there is a great interest in public sector organisations providing training in the 'sexy' stuff like strategy and financing but there needs to be more of a focus on the very basic stuff that companies need to do like providing practical help in accounting and legal support"

NIGEL ECCLES, FANDUEL

"After becoming an entrepreneur at an early age and growing my business for some time, I took the decision to focus on developing my entrepreneurial skills. Taking part on leadership programmes and entrepreneurship development programmes with MIT allowed me to think in a more strategic and global way about my business, which took us from strength to strength. I also realised the key to growing my business has been access to 'very good people' and acquiring people with the right skill set "

MICHAEL LAURENSON, BLUESHELL MUSSELS

Whilst certain skills are learned 'on the job', a structured approach to building knowledge, particularly in a group learning environment, where networking, peer learning and the sharing of best practice between entrepreneurs, greatly enhances the learning experience.

A recurring theme amongst successful IDEs is the importance of hiring people at an early stage who have previous experience of growing a business to scale, and skilled individuals are often difficult to source from within Scotland, as discussed earlier. In addition, the experience gained from working in a large company, often a rich training ground for entrepreneurs and innovators, is frequently obtained by moving to corporate operations outside of Scotland. Attracting talent from outside of Scotland is essential to the growth of IDEs.

Skills in recruitment and talent retention is a core competency of successful IDEs. A year or two on, a company scaling up will be very different from when it first starts to grow significantly. The entrepreneur or entrepreneurial team must be capable of meeting the challenges the company will face at different stages of growth. Over the course of the REAP team's research on the subject of Skills for Growth, three key areas were identified as specific skills requirements for entrepreneurs and their teams to successfully grow their business:

- Continuing to build an entrepreneurial mindset, culture and global ambition
- Key entrepreneurial capabilities and knowledge in business
- International market knowledge and capability

There is widespread recognition that Scotland lacks high quality skills development opportunities for IDEs in the area of sales and in many aspects of financing for business growth. There was strong demand from those consulted for increased targeted support in these fields.

4.2.1 *Priorities for Action*

- Agreement on the composite set of entrepreneurial skills required for scaling up IDEs across providers of executive education for entrepreneurs in Scotland. There is a significant role here for entrepreneurs to be proactive in articulating their own skills requirements.
- Provision of a coherent, world class programme of training in Scotland for entrepreneurs, drawing on industry experience and international best practice.

"Technical skills or experience is not a must in terms of being hired in my company. For example, our current Financial Director did not have any pre-existing technical knowledge for the role but is smart enough to get the area and has been a great hire. It is clear that skills for growth can be taught to the right person with the right capability. You should hire for personality and fit with the company culture, rather than for existing skills"

PJ DARLING, SPARK ENERGY

Included in this is recognition of "just in time" learning provided via technology though by massive open online courses (MOOCs).

- Development of a clear, interactive map of the entrepreneurship skills development opportunities available in Scotland. This should be user friendly, widely communicated and easily accessible for entrepreneurs at each stage of their personal and business development.

- Introduction of a new programme to encourage suitably experienced mid-career managers to return to Scotland and bring new skills and economic value back into Scotland.

4.3 FINANCING FOR GROWTH

4.3.1 *Key Findings*

A key strength in the entrepreneurial ecosystem in Scotland is the highly developed and highly active business angel investment community which encourages and intensively supports early stage IDEs. This is arguably one of the most advanced business angel networks in Europe. However, there remain significant challenges in access to risk finance for businesses in Scotland, particularly in securing funds for scale-up.

There is a clear perception amongst entrepreneurs within IDE businesses in Scotland that access to the levels of risk finance required to grow their IDEs to the point of entry in the global marketplace is highly challenging. Entrepreneurs believe this is the case even for businesses with clear plans and credible management teams and often leads to businesses securing inadequate levels of funding. This contrasts with an investor perspective that funding is always available for the most compelling propositions. We summarise the historical context and current situation of the risk capital scene in Scotland in Annex E.

Independently from REAP, an RSE Working Group in partnership with the Institute of Chartered Accountants in Scotland (ICAS) and Scottish Financial Enterprise (SFE) identified a systemic weakness in routes for businesses to access follow-on funding. It is recognised that for some angel-invested companies an 'angel friendly' source of follow-on investment funding is required possibly through a Venture Capital Trust and/or pension or institutional investors. The REAP team supports this view and considers it will be important to build an evidence base which clarifies the numbers of companies per year which are in this 'seeking follow-on funding' scenario.

"I think there are big gaps in the funding landscape. There are difficulties at start up stage and then you hit particular difficulties again when you are stuck in the £1M-£5M turnover mark and try to raise money at this point. I have seen no change in this in the last 10 years. The visibility of investment in Scotland is not good. It's hidden. Any way we can make this easier in Scotland will lead to a more entrepreneurial society"

PETER MURPHY, SIMPLE AUDIO

While a new approach which enables access to 'angel friendly' follow-on funding should help more IDE businesses to scale-up, the REAP team also believes there are opportunities for businesses to explore a wider range of investment options, including for example an earlier and more targeted approach to Venture Capital (VC) funding. Again, the REAP team believes a stronger evidence base is needed to understand the scale of funding required by businesses to realise their ambitions and how the ecosystem can be developed to accelerate these opportunities. Connecting with our recommendations for development of skills for growth, the REAP team believes entrepreneurs should be assisted in developing their understanding of all potential financing routes for IDE businesses so that more informed investment strategies can be developed by IDE businesses at the outset. This should include improved dissemination of key funding options (including assessment of relevant pros and cons), improved networking infrastructure and advisory infrastructure to help businesses to target more effectively the potential investors both in Scotland, and internationally.

While the angel networks and VCs currently active in Scotland are the main source of risk finance for the portfolio of IDEs in Scotland, there are three specific opportunities.

- Firstly, a number of institutions which manage investment funds are headquartered in Scotland. This brings important expertise in risk management and investor opportunities which arguably remain under-represented in supporting IDE scale-up.
- Secondly, women in Scotland make up only a small part of the angel investment community, yet research indicates for many age groups the wealth of men and women across the UK is similar[14]. Women investors represent a significant opportunity to release more risk capital into the system. In addition to funding, private investors bring vision, resolve and key business skills to the company – and hence the opportunity, here, to increase the number of experienced business women active in IDE scale-up. The UK has the most favourable tax benefits for angel investors in Europe, yet this is not promoted widely, nor well understood as an alternative to traditional investment options.
- Thirdly, the advent of Crowdfunding introduces a new form of risk fundraising which has already proved successful for a number of businesses in Scotland[15]. It is likely that this will become more significant and greater communication of the benefits of this as a funding option should be communicated to early stage entrepreneurs and IDEs.

Before presenting the REAP recommended actions, further reference to the requirement for evidence of investment requirements of IDEs, and their experience, to date is appropriate. The REAP team takes the view that robust evidence of the level of demand for risk finance is necessary to appraise at national level the scale of the challenge. This information will help inform entrepreneurs, investors and policy makers. The REAP team recommends this information is collected using a voluntary on-line questionnaire methodology which explores a company's IDE growth potential, its investment requirements and experience to date in securing the required investment.

4.3.2 *Priorities for Action*

- Development and dissemination of a strategic guide document and supporting materials which help educate and inform IDE entrepreneurs of all key funding options for accessing risk finance to ensure the most effective option is selected from the outset and is understood.
- Development of a resource, both information and

[14]A survey in February 2014 of 2.059 adults by YouGov for Duncan Lawrie Private Bank found that among 45-54 year olds, average wealth of women was only 5% behind that of men, and that among those aged 55 or older, the wealth of women was on average 5% higher than that of men. See http://www.templars.co.uk/new-research-reveals-a-17-gender-wealth-gap/

[15]Aberdeen based BrewDog raised £4.25m in equity funding in 2013 from its customer base, and Edinburgh's RunRev raised £473k in pre-selling licenses and features via Kickstarter. New Scottish crowdfunding sites Squareknot, Bloom VC and ShareIn have been launched and are actively raising funds for enterprises.

appropriate facilitation, which assists businesses to target and engage more effectively with international VCs operating across sectors and geographies which are relevant to Scottish IDEs. This should include information on deal flow history and practical advice on establishing contact and building mutual interest.

- Better promotion of the advantages of becoming a business angel to women across Scotland, including promotion of tax incentives for investors (such as EIS).
- Development of an online questionnaire to collate evidence of demand by IDE businesses for access to risk finance to enable their scale-up.

4.4 ROLE OF UNIVERSITIES

4.4.1 *Key Findings*

Universities already make a significant contribution to entrepreneurship and the success of IDEs in Scotland. In developing strategies for the growth of entrepreneurship in Scotland the REAP team believes there are further opportunities for the university sector to play a pivotal role.

Many stakeholders identified and welcomed the opportunity for the university sector to consistently play an increased role in the ecosystem. Both the challenge and opportunity exist for Scotland's universities to provide an entrepreneurial experience for students, staff, alumni members, business collaborators and customers alike that matches the very best worldwide. This experience should span inspiration, ambition, access to skills development and, where appropriate, direct support for the development of business ideas which have potential to become successful IDEs. The REAP team believes the university sector has the opportunity to play a pivotal role in the further development of Scotland's entrepreneurial ecosystem and an entrepreneurial culture that is open to the world.

In consultation with stakeholders the REAP team explored areas where specific actions can help transform Scotland's universities to deliver a truly world-class entrepreneurial experience across the sector and across all subject areas.

4.4.2 *Priorities for Action*

- Continuing development of a high level task group made up of entrepreneurial university professionals with the objective of implementing a step-change in the contribution universities make to the entrepreneurial ecosystem in Scotland.
- Application of the Collective Impact approach to development and sharing of local and international best practice across Scotland's universities. There are many examples of excellent programmes/initiatives within Scottish Universities which inspire and support management skills but these are 'hot spots' rather than the norm. The purpose of applying the Collective Impact approach is to drive a more sector-wide implementation of this best practice. It is envisaged this will be taken forward through practitioner-led commitments, actions and review – including an annual conference event.
- Increased focus on leadership training, business skills and, where desired, entrepreneurship within all undergraduate and post graduate courses following the recommendations of the Scottish Science Advisory Council report on this area[16].
- Leverage of university alumni networks and encouragement of alumni mid-career decisions to build IDEs. This would combine entrepreneurial aspiration with a supportive environment for new founders who already have significant business experience. The REAP team recognises that IDEs are often driven by individuals with business experience at a mid-career point; university alumni networks could provide an important route for awareness raising of IDE opportunity and implementation support.

[16] http://www.scottishscience.org.uk/sites/default/files/article-attachments/Final%20SSAC%20Innovation%20report%20-%20FEB%2013_0.pdf

"I consider the role of universities and their linkages with industry very important. We purposely placed ourselves near Edinburgh University. We have a lot of great talent coming out of the Scottish University system, both home grown and foreign students"

GARETH WILLIAMS, SKYSCANNER

"We find it challenging working with universities, primarily because our project cycle timeframes are relatively short compared to typical university cycle times. The specialist nature of our business means, unsurprisingly, when they have not been involved from the very start, the university partners can struggle to get out of the 'catch up' mode. If they are engaged from the very start, that could alleviate some of the pressure. However, this should not distract from the important role of the universities to act as good feeders of engineers and skilled talent"

TOMMY COOK, CALNEX SOLUTIONS

- Development of a comprehensive set of IDE performance metrics for the international benchmarking of the sector and monitoring of ongoing developments.

4.5 ROLE MODELS

4.5.1 *Key findings*

It is widely accepted that contact with entrepreneurs, whether socially or within a family context, greatly improves perceptions of self-employment as an attractive career option. Positive exposure to entrepreneurs in the media increases general appreciation of their importance in our economy. As role models, Scotland's entrepreneurs can inspire and advise others as they grow IDEs. As well as sharing insights into achieving success, explaining the experience of coping with failure transfers invaluable knowledge and builds confidence in others.

Scotland has a tremendous variety of successful entrepreneurs and entrepreneurial teams across many fields of industry and commerce, but they tend to be largely invisible in the Scottish media. Some of this can be attributed to a belief that their story is not that impressive or worthy of attention. Scotland's people are largely inherently modest, alongside being very dynamic and versatile in business.

Compared to other occupations and professions, Scottish society seems to lend limited real credibility to entrepreneurship as a career or calling. Arguably cultural factors also contribute to a natural reticence among those with success stories to share their knowledge, fearing the accusation they might be "blowing their own trumpets."

This is not helped by a national media which regularly refers to a very small number of older, well known, largely male entrepreneurs while either ignoring, or being unaware of, a diverse group of younger and other business leaders. As a result the general impression of an entrepreneur can be closer to a caricature, based upon few individuals, rather than a broad church of individuals in businesses from across Scotland.

There is a clear need to find ways of raising the profile of our leading, most dynamic and risk taking entrepreneurs so they are visible, accessible where appropriate, and frequently inspirational to those who are driven to follow in their footsteps. Scotland should also draw in entrepreneurs from across the world – the rock stars of entrepreneurship – to celebrate the global nature of business and to reinforce key messages that our people are every part as capable, dynamic and able to build international businesses of scale, as any nation can be.

4.5.2 *Priorities for Action*

- We need more of Scotland's entrepreneurs to take an active part within the ecosystem. We need more entrepreneurs to offer to make themselves available to others, through the wide range of private and public sector organisations that run mentoring programmes.
- Wider availability of recent and relevant case studies. Agencies and organisations with a business growth focus, or in receipt of public sector business development funds, should explicitly make available a regular series of fresh case studies on business success. Those in receipt of public funds for business growth should "payback" into the system, through greater activity in becoming role models themselves.
- Encouraging female entrepreneurs to step into the spotlight and encourage other women to become entrepreneurs and role models. There is a need for more female entrepreneurial role models of all ages from Scotland to showcase diversity and to build critical mass. Young entrepreneurs should also feature more regularly in business pages, journals and online publications highlighting Scotland's future business leaders.

4.6 CORPORATE DISCUSSION GROUP

An additional discussion group was formed around the theme of "The Role of Large Corporate organisations in the Scottish Entrepreneurial Ecosystem". Input was sought from entrepreneurs in large businesses because the REAP team recognised this vital viewpoint was not fully represented on the team itself and that inclusion of the large corporate perspective would bring much additional value. The views of this group are woven throughout the findings and recommendations of this document.

4.7 APPLYING THE COLLECTIVE IMPACT APPROACH IN SCOTLAND

Having defined actions which address the identified constraints within the Scottish IDE ecosystem we now turn attention to how key stakeholders can work collectively to deliver these actions in order to realise IDE performance improvements. As stated earlier the Collective Impact approach requires the following conditions:

- **Common Agenda:** All participants have a shared vision for change including a common understanding of the problem and a joint approach to solving it through agreed actions.
- **Continuous Communication:** Consistent and open communication is needed across the many players to build trust, assure mutual objectives, and appreciate common motivation.
- **Mutually Reinforcing Activities:** Participant activities must be differentiated while still being coordinated through a mutually reinforcing plan of action.
- **Shared Measurement:** Collecting data and measuring results consistently across all participants ensures efforts remain aligned and participants hold each other accountable.
- **Backbone Organisation:** Creating and managing collective impact requires a separate organisation(s) with staff and a specific set of skills to serve as the backbone for the entire initiative and coordinate participating organisations and agencies.

The REAP Scotland team supports the view that continuous communication between stakeholders is important to the delivery of this initiative and will work to ensure a backbone organisation is formed with capability to support this communications function.

Further to this, the team has engaged intensively with stakeholders and is confident the proposed actions are mutually reinforcing. The team will work with the backbone organisation to ensure ongoing and intensive support is maintained by key stakeholders, which should include entrepreneurs, investors, academics, corporate organisations and agencies of government. We need to continue to harness the collective resources and commitment of all stakeholders to maximise the pace of delivery of each identified action.

Monitoring of the acceleration of the ecosystem which results from actioning of the REAP initiative is important – both in demonstrating the value of what we are achieving, in maintaining pace, and in guiding stakeholders in how best to refine the approach with time. Again, this will be a priority area for the backbone organisation working closely with all ecosystem stakeholder groups.

Turning attention to the backbone organisation, the REAP Scotland team proposes the Collective Impact approach is supported by an independent foundation, either new or existing, which operates to a 10 year horizon and beyond. This should be funded by a mix of public and private funding, moving to a fully private sector funding model at the earliest opportunity. However, recognising the time and attention required to develop the correct model and achieve collective impact, the REAP Scotland team will provide backbone support for this initiative on an interim basis over the next 9-12 months. The REAP team will require an effective secretariat function during this transition phase. We set out in Annex F the proposed specification for the foundation.

"Having mentors and role models in your network can be hugely valuable. Connections I have made through public sector training programmes have been invaluable in areas such as exporting, social media, marketing and IT.. From this and my own experience of mentoring, what is really important is being able to ask very basic questions of mentors and get straight-forward answers. Having an opinion that you can trust gives you confidence in your own decisions so you can keep pushing forward knowing you are doing the right thing"

SAMANTHA FAIRCLIFF, CAIRNGORM BREWERY

"I consider myself a role model to an extent. Until I get to ease off some of my workload, I am limited to how much impact I can have 1-2-1 or 1-to many in the Scottish start up scene. However, I do what I can through financial sponsorship of programmes such as TechMeetup and others. I meet with some interesting start ups and answer questions where I can. The greatest impact we are having, though, is showing that a $1bn internet company can be built in Scotland"

GARETH WILLIAMS, SKYSCANNER

SECTION 5

Conclusions and recommendations

Developing a world-class IDE ecosystem

The REAP Scotland team set out to understand how a world-class entrepreneurial ecosystem functions, and how the Scottish system could be improved to enable IDEs to grow to scale and compete globally. The team used a 14 pillar analysis (GEDI methodology) to establish those areas of the ecosystem where Scotland performs well and where we are weakest compared with leading innovation-driven economies. From this work, and in consultation with key stakeholders across the IDE ecosystem in Scotland, we established five theme areas which present important opportunities to improve, significantly, the overall effectiveness of the ecosystem. These five themes are:

- **Effective Connections**
- **Skills for Growth**
- **Financing for Growth**
- **Role of Universities**
- **Role Models**

The REAP Scotland team identified opportunities in each of these five theme areas and through consultation, identified specific priorities for action. The REAP team firmly believes that intensive and incisive delivery of these priorities for action, achieved working collectively with stakeholders will deliver a step change in both the numbers and rate of acceleration of IDE businesses across Scotland.

We summarise these actions in the following section "Calls to Action for stakeholders in Scotland". All of these actions require both commitment to the overall strategic vision and commitment of resources by stakeholders across the Scottish ecosystem.

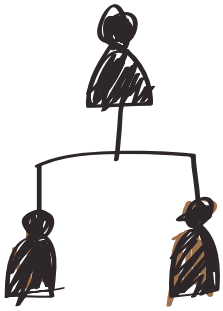
Recognising the importance of a backbone organisation in supporting this Collective Impact approach, we propose a foundation model which we introduced in section 4.

While the foundation model is being established over the next 9-12 months, we propose an interim arrangement whereby the REAP Team provide the backbone function assisted by an operational secretariat.

We have set out a vision for a highly developed IDE ecosystem in Scotland which seeks to inspire, nurture and support the ambitions of our IDE entrepreneurs. We can achieve this by building on the strengths of our world leading universities, by developing our capabilities to access risk finance, by drawing on the knowledge and capabilities of our corporate organisations and in partnership with government policies and initiatives that truly support the spirit of IDE entrepreneurship.

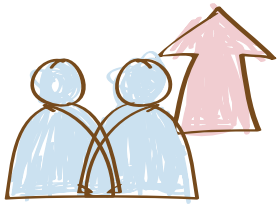
Collectively, let's work to redefine Scotland as a country of dynamic and high achieving entrepreneurs who gain and share inspiration, skills and capability for scale-up from the supportive and world class IDE ecosystem which we can, together, build.

Calls to Action for stakeholders in Scotland



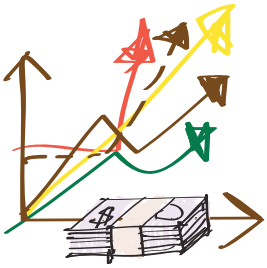
EFFECTIVE CONNECTIONS

- Production of a "Guide to Networking for Entrepreneurs"
- Stimulation of a connected 'network of networks'
- Development of an online hub or forum for networking and knowledge exchange of innovation-driven enterprises



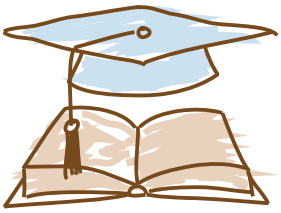
SKILLS FOR GROWTH

- Agreement of the composite set of entrepreneurial skills required for scaling up IDEs across providers of executive education for entrepreneurs in Scotland. There is a significant role here for entrepreneurs to be proactive in articulating their own skills requirements.
- Provision of a coherent, world class programme of training in Scotland for entrepreneurs, drawing on industry experience and international best practice. Included in this is recognition of "just in time" learning provided via technology though by massive open online courses (MOOCs).
- Development of a clear, interactive map of the entrepreneurial skills development opportunities available in Scotland. This should be user friendly, widely communicated and easily accessible for entrepreneurs at each stage of their personal and business development.
- Introduction of a new programme to encourage suitably experienced mid-career managers to return to Scotland and bring new skills and economic value back into Scotland.



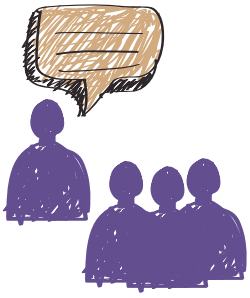
FINANCING FOR GROWTH

- Development and dissemination of a strategic guide document which helps educate and inform IDE entrepreneurs of all key funding options for accessing risk finance to ensure the most effective option is selected from the outset.
- Development of a resource, both information and appropriate facilitation, which assists businesses to target and engage more effectively with international VCs operating across sectors and geographies which are relevant to Scottish IDEs. This should include information on deal flow history and practical advice on establishing contact and building mutual interest.
- Increased promotion of the advantages of becoming a business angel to women across Scotland, including promotion of tax incentives for investors (such as EIS).
- Development of an online questionnaire to collate evidence of demand by IDE businesses for access to risk finance to enable their scale-up.



ROLE OF UNIVERSITIES

- Development of a high level task group with the objective of implementing a step-change in increasing the contribution universities make to the entrepreneurial ecosystem in Scotland.
- Application of the Collective Impact approach to development and sharing of local and international best practice across Scotland's universities.
- Increased focus on leadership training, business skills and, where desired, entrepreneurship within all undergraduate and post graduate courses (following the recommendations of the Scottish Science Advisory Council report on this area).
- Leverage of university alumni networks and the encouragement of mid-career decisions to build IDEs. This would combine entrepreneurial aspiration with a supportive environment for new founders who already have significant business experience.
- Development of a comprehensive set of IDE performance metrics for the international benchmarking of the sector and monitoring of ongoing developments.



ROLE MODELS

- Encouragement of more of Scotland's entrepreneurs to take an active part within the ecosystem. Encouragement of more entrepreneurs to offer to make themselves available to others, through the wide range of private and public sector organisations that run mentoring programmes.
- Increasing availability of recent and relevant case studies. Agencies and organisations with a business growth focus, or in receipt of public sector business development funds, should explicitly make available a regular series of fresh case studies on business success. Those in receipt of public funds for business growth should "payback" into the system, through greater activity in becoming role models themselves.
- Encouragement of female entrepreneurs to step in to the spotlight and encourage other women to become entrepreneurs and role models. There is a need for more female entrepreneurial role models of all ages from Scotland to showcase diversity and to build critical mass. Young entrepreneurs should also feature more regularly in business pages, journals and online publications highlighting Scotland's future business leaders.

ANNEXES

Annex A - The REAP Scotland Team

Donna Chisholm *(Team Leader)* is Head of Business Innovation and Growth Sectors at Highlands and Islands Enterprise (HIE), Scotland's economic and community development agency for the North and West of Scotland. She is responsible for HIE's work in the areas of entrepreneurship, business innovation, leadership, internationalisation and key sector development. Before joining HIE in 2007, for over five years Donna was project director for the redevelopment of Eden Court in Inverness, coordinating the £23million capital project from inception to completion. Prior to this she worked for East Ayrshire Council as a service head, and also in the private sector.

She sits on the board of the Digital Health Institute and is a member of the Interface Advisory Board.

Simon Grey is the Chief Executive of wave energy technology company AWS Ocean Energy Ltd. He also runs the innovation and engineering consultancy 4c Engineering. He is a chartered electrical engineer with 29 years' experience in power generation projects and business management of which 24 years have been in the renewables sector.

Simon founded his first company Edinburgh Hydro Systems Ltd in 1988 and since that time has founded and run several other ventures in renewable energy. In 2004 Simon founded AWS Ocean Energy and has led the growth of this new venture to commercialise leading wave-power IP. In that time he has secured over £18million of funding for the company.

In December 2013 Simon joined forces with 4c Design in Glasgow to form a new innovation, technology development and engineering company, 4C Engineering. He is now focussed on growing this new venture whilst also managing the next investment phase for AWS.

Ian Ritchie is the non-executive Chairman of Iomart plc, Computer Applications Service, the Interactive Design Institute, Cogbooks, Blipfoto and Red Fox Media. He founded OWL in 1984 which pioneered hypertext application development (a forerunner to the world wide web) and sold the company to Panasonic in 1989. Since then he has been involved in over 30 start-up high-tech businesses, including Digital Bridges, Voxar, VIS Interactive, Sonaptic and Orbital. He is an active Business Angel and a member of the advisory board of Pentech Ventures. He is Honorary Treasurer of the Royal Academy of Engineering (FREng) and the Vice President, Business of the Royal Society of Edinburgh (FRSE). He serves on the board of the Edinburgh International Science Festival and Chairs the Board of Our Dynamic Earth, Edinburgh's Science Centre. He is a Trustee of the Saltire Foundation, The David Hume Institute and the Nominet Trust. He was awarded a CBE in the 2003 New Year's Honours list for services to Enterprise and Education.

Professor Jonathan Levie is a Professor in the Hunter Centre for Entrepreneurship at the University of Strathclyde, Glasgow, where he is Director of Knowledge Exchange. He has held research and teaching posts at the London Business School, Babson College (US), INSEAD (France), and University College, Cork (Ireland). Professor Levie co-directs Global Entrepreneurship Monitor (GEM) in the UK. He is also a Research Theme Leader at the UK's Enterprise Research Centre, where he is engaged in research on ambition and venture growth. With Sharon Ballard, a US-based entrepreneur, he developed "Supercoach Entrepreneurial Training" a set of coaching tools and techniques for coaching first-time entrepreneurs, and has coached entrepreneurs in a wide range of sectors from agri-tourism to high technology in the US, Europe, and the Middle and Far East. His most recent articles have appeared in Journal of Management Studies, Research Policy, Entrepreneurship Theory & Practice, Small Business Economics, and Family Business Review, among others.

Jonathan Harris is the publisher and editor of Young Company Finance (YCF), a monthly review of early stage high growth companies in Scotland which focuses particularly on the issues of how to fund growth.

After graduating from Cambridge, Jonathan joined Scottish shipping group The Ben Line, and after four years in Japan worked with the group offshore drilling subsidiary Atlantic Drilling Co Ltd, eventually serving 15 years as director and general manager.

During the prolonged recession in the offshore industry in the early 1990s, Jonathan left Ben Line and started working with young companies, in various roles including adviser and interim chief executive. He acquired YCF from its founder Gavin Don in November 2000.

Since February 2011 YCF's activities in Scotland have been operated in partnership with LINC Scotland, the business angel capital association, of which Jonathan is a director. Besides publishing the YCF monthly journal and producing the YCF annual conference, Jonathan has carried out a range of research studies in the young company sector, including the recent Risk Capital Market in Scotland 2009-2011 report for Scottish Enterprise.

Outside Scotland, YCF's Spinouts UK project conducts an ongoing survey of all spinouts from universities across the UK.

Clive Reeves is Manager for Collaborative Funding at Scottish Enterprise. He has a Ph.D. from University of Glasgow for research into nano-scale silicon devices, and has worked for British Aerospace, BBC Television and IBM's Research Divison, New York. Before joining Scottish Enterprise, he was a senior lecturer in the Department of Electronics and Electrical Engineering at the University of Edinburgh. His current interests in economic development focus on inititatives to support both business innovation and the development and support of entrepreneurship. Over the past 2 years Clive has worked closely with the Scottish Funding Council and Highlands and Islands Enterprise in developing a £90m programme to support industry demand led Innovation Centres in partnership with Scotland's universities.

Assistance throughout the REAP project was provided by **Kate MacInnes**, Entrepreneurial Support Manager at Scottish Enterprise, and **Stephanie Anderson**, Development Manager for Entrepreneurship and Innovation at Highlands and Islands Enterprise.

Annex B – The MIT REAP Programme

The MIT Regional Entrepreneurship Acceleration Program (REAP) is a two year programme designed by the Martin Trust Center for MIT Entrepreneurship and the MIT Sloan School of Management to help regions accelerate economic development and job creation.

MIT REAP serves to educate, engage, and enable teams from key regions around the globe in the development and execution of a well-designed acceleration strategy, focused on entrepreneurial activity that can enhance innovation-driven economic development and job creation.

Learning Experience

The REAP programme enables regional team members to learn and collaborate with MIT experts, catalyze regional action, and leverage global best practice through cross-regional collaboration. Participants attend highly interactive two-and-half day educational workshop twice each year. Between workshops, they engage in significant action-oriented activities in their regions, leveraging faculty coaching and an online community of practice to enable regions to more effectively share analysis, execute action plans, and sustain impact.

Who Should Participate?

Through an application process, the REAP selection committee will choose eight regions as members of each REAP cohort. Each region participating in REAP will assemble an initial cross-functional team of five to seven members.

Participants from these sectors will be executives and decision-makers with:

1. An intimate understanding of their regional entrepreneurial ecosystem and their sector.
2. The ability to influence the creation and implementation of policy and programmes in their own sector.
3. A demonstrated deep commitment to working with this diverse core team to impact strategic change in their regions.

The REAP programme allows participants to:

- **Understand key drivers of successful innovation-driven entrepreneurial (IDE) ecosystems.**
- **Deploy MIT rigor and use frameworks to assess their region's capacities** and to evaluate the current entrepreneurial ecosystem as a foundation for further analysis, strategy, and implementation.
- **Build an interdisciplinary team** to create and validate a vision of their region's ecosystem at its full potential.
- **Compare and learn from other regions globally** through case studies and cross-regional dialogue. Connect to an active community of practice and collaborate with other regions.
- **Design a REAP Acceleration Strategy** to harness the power of innovation and entrepreneurship and accelerate growth in their region's ecosystem.

Annex C
Workshops, Stakeholder Meetings and Task Groups

Activity	Location	Date
REAP Workshop 1	Boston	1st February – 3rd February 2012
REAP Workshop 2	Edinburgh	30th September – 2nd October 2012
Stakeholder discussion: Opportunity perception and internationalisation	Edinburgh	12 February 2013
Stakeholder discussion: Risk Capital	Edinburgh	13 February 2013
Stakeholder discussion: Startup skills & high growth ambition	Edinburgh	13 February 2013
Stakeholder discussion: Product & process innovation & networking	Edinburgh	26 February 2013
Effective connections Task Group	Edinburgh	
REAP Workshop 3	Auckland	25th March – 27th March 2013
Additional Days	Christchurch	27th March – 29th March 2013
Corporate Discussion Group	Edinburgh	21st August 2013
Role of Universities Task Group Discussion	Edinburgh	26th August 2013
Skills for Growth Task Group Discussion	Edinburgh	27th August 2013
Role Models Task Group Discussion	Edinburgh	8th October 2013
REAP Workshop 4	Boston	24th February – 26th February 2014

Annex D – Stakeholder Participants and Consultees

Colin Adams (Informatics Ventures, University of Edinburgh)
John Anderson (Entrepreneurial Exchange)
Stan Arnauld (Weber Shandwick)
Erikka Askeland (Press and Journal)
Alastair Balfour (Company Creators)
Donella Beaton (Donella Beaton Associates)
Steve Beaumont (University of Glasgow)
Tim Bedford (University of Strathclyde)
Johannah Bisset (WEB Rigging Services)
Jim Bonar (Enterprise Fellowship)
Vicky Brock (Clear Returns)
James Browning (Mpathy Medical)
Craig Chatwin (Saltire Foundation)
Gaelle Ciriego (Ipso Facto)
Silvio Clemente (Scottish Enterprise)
Tommy Cook (Calnex Solutions)
PJ Darling (Spark Energy)
Paula Douglas (Scottish Enterprise)
Pete Downes (Dundee University)
Nigel Eccles (Fanduel)
Peter Estibeiro (i2eye Diagnostics)
Steve Ewing (Informatics Ventures, University of Edinburgh)
Samantha Faircliff (Cairngorm Brewery)
Paul Ferri (University of Strathclyde)
Ronnie Forbes (QikServe)
David Fraser (Fusion)
Mez Glasse-Duff (Saltire Foundation)
Fiona Godsman (Scottish Institute for Enterprise)
Patrick Graham (Business Group Fund)
Ben Gray (DC Thomson)
Colin Hewitt (Float)
John Innes (Selex)
Mervyn Jones (Maple Jones)
Sandy Kennedy (Saltire Foundation)
David Lane (Heriot Watt University)
Michael Laurenson (Blueshell Mussels)
Geoff Leask (Young Enterprise Scotland)
Ewen MacPherson (Ideality)
Colin Mason (Adam Smith Business School, University of Glasgow)
Jim Mather (University of Strathclyde)
Brian McGuire (Entrepreneurial Spark)
Ryder Meggitt (Saltire Foundation)
David Milne (Wolfson Electronics)
Andrew Mitchell (Edinburgh Centre for Carbon Innovation)
Eleanor Mitchell (Scottish Enterprise)
Simon Mone (Metadigital)
Keith Muir (Cytomos)
Kenny Mumford (MBM Commercial)
Peter Murphy (Simple Audio)
Ken Naismith (Ken Naismith)
Phil Newman (Pergali)
Stewart Nicol (Inverness Chamber of Commerce)
Alasdair Northrop (Scottish Business Insider)
Ben Panter (Blackford Analysis)
Darren Peattie (Inside Industry)
Darren Pirie (Royal Bank of Scotland)
Andy Porter (Aberdeen University)
Beth Scott (Scottish Development International)
Alex Scott-Tonge (The Power of Youth)
Leanne Sherry (Saltire Foundation)
Morna Simpson (flock.edu)
Maurice Smith (TVI Ltd)
Colin Stewart (Citi)
Alan Suttie (FearsomEngine)
Ian Underwood (Scottish Science Advisory Council)
Rob Walker (MonitorHub)
Neil Wilkie (Scottish Enterprise)
David Wilkinson (Institute of Directors)
Gareth Williams (Skyscanner)

Annex E – History and Challenges to Risk Capital in Scotland

The availability of risk finance for IDEs in Scotland has changed radically over the last few decades and the current climate is heavily influenced by significant UK Government's tax breaks for business angels (EIS and SEIS) and the co-investment fund operated by the Scottish Investment Bank (SIB), the investment arm of Scottish Enterprise and Highlands and Islands Enterprise.

The huge loss of capital in the dot.com boom and bust of 2001, compounded by the financial crash of 2008 when post-2001 enterprises might have been expected to begin to mature, led to a relatively poor performance of technology investments. As a consequence, fund managers no longer regard this as an investment sector in which they want to engage.

Venture Capital (VC) companies have generally moved away from early stages towards later stages and larger investments, or have moved to a private equity (PE) model where they replace public listings of companies. Other VCs have exited the market having failed to raise follow on investment funds.

The Enterprise Investment Scheme (EIS), first introduced in 1994 and its early stage version, the Seed EIS (SEIS) introduced in 2012, provides very generous tax breaks for individual investors (the best such tax support anywhere in the developed world). As a result the UK has built a strong community of business angels.

In Scotland, the development of Scottish Enterprise's Co-Investment Fund has been very significant in the development of syndicates of business angels. The Co-Investment Fund accredits investment groups, syndicates and VCs, following which they can call on SIB to match their investment on the same commercial terms. The Co-Investment Fund has been largely responsible for the development of angel syndicates - ten years ago there were three syndicates and today there are nearly twenty.

Because the vast majority of new IDEs in Scotland need seed funding in the sub-£1m range this system works well, and many enterprises are now being funding as a result of this support. Follow-on funding, however, remains a significant challenge, compounded by the fact that business angels are often reluctant to encourage their companies to raise Venture Capital due to restrictions imposed with their tax breaks. This often leads angels to prefer to sell businesses rather than grow them, possibly too early.

Annex F – Backbone Organisation

The REAP team propose that a backbone organisation is founded to coordinate the Collective Impact delivery of the REAP recommendations. It will have a relentless focus on improving the ecosystem for IDEs in Scotland. Its mission will be **to foster innovation-driven entrepreneurship in Scotland through stakeholder collaboration and engagement.** It will be established with the following principles of operation:

- Private funded, non-profit
- Government endorsed but private sector led
- Stakeholder representative leadership group
- Major currency is work-in-kind
- Initially supported by HIE/SE but transitioning to self-sustainability within two years
- Network of stakeholder groups collaborating to promote conditions for IDE growth in Scotland
- Ambitious - seeks to have significant impact.

COLLECTIVELY, LET'S WORK TO REDEFINE SCOTLAND AS A COUNTRY OF DYNAMIC AND HIGH ACHIEVING ENTREPRENEURS WHO GAIN AND SHARE INSPIRATION, SKILLS AND CAPABILITY FOR SCALE-UP FROM THE SUPPORTIVE AND WORLD CLASS IDE ECOSYSTEM WHICH WE CAN, TOGETHER, BUILD.

MIT REAP
REGIONAL ENTREPRENEURSHIP
ACCELERATION PROGRAM

www.hie.co.uk | www.scottish-enterprise.com
entrepreneurship@hient.co.uk