Scottish Government
Riaghaltas na h-Alba

The Entrepreneurial Campus

Ross Tuffee and
Professor Joe Little

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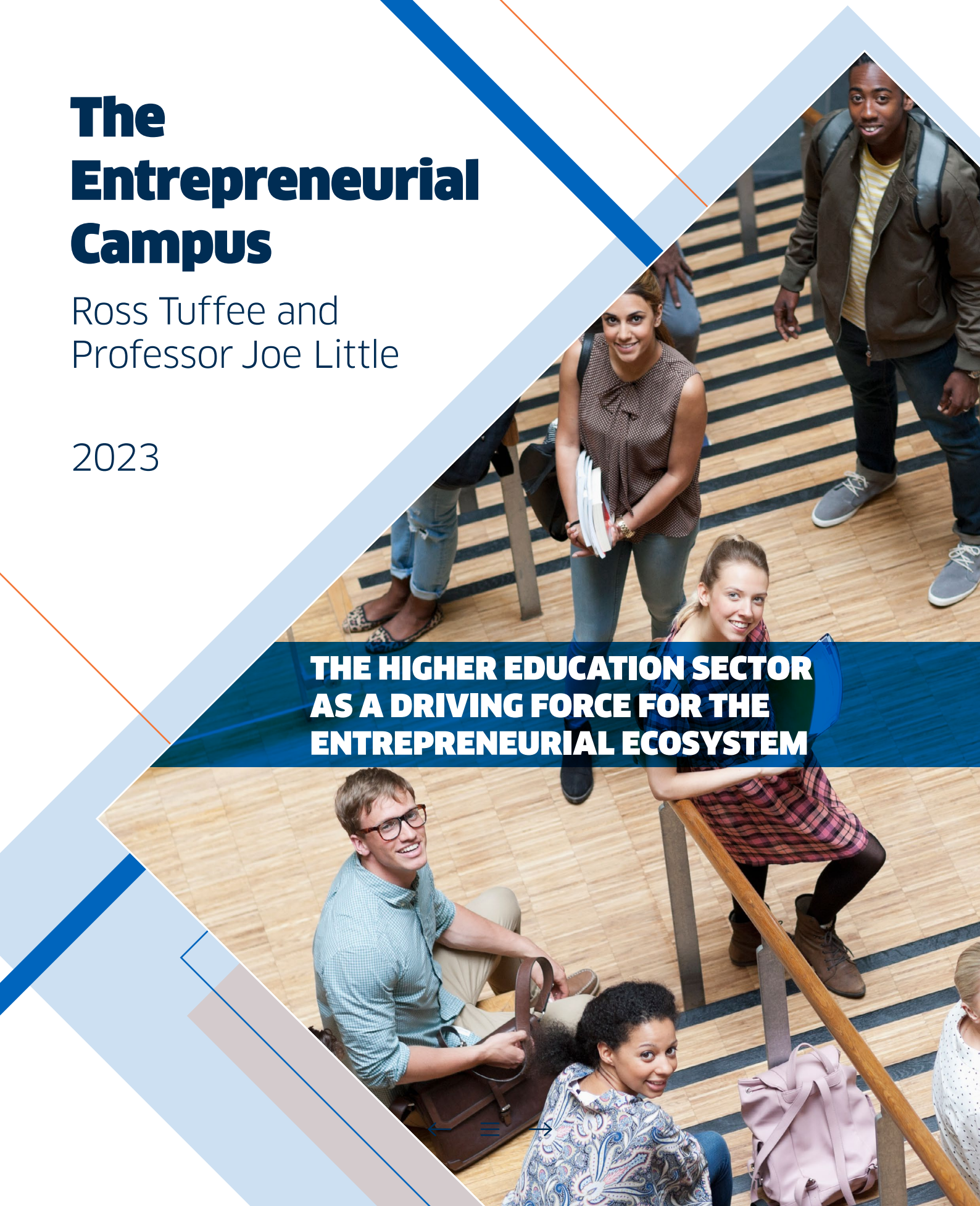

THE HIGHER EDUCATION SECTOR AS A DRIVING FORCE FOR THE ENTREPRENEURIAL ECOSYSTEM

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Ministerial Foreword

Evidence from around the world tells a compelling story of how entrepreneurship, when properly harnessed, can be a key driver of innovation and economic growth.

The publication of this blueprint for entrepreneurial campuses across Scotland marks our clear commitment to supporting entrepreneurship in our universities and colleges, in order to capitalise on the world-leading research and development work that already goes on, by inspiring and encouraging our students and faculty-members to engage with entrepreneurship and innovation learning.

I am confident that this blueprint will lead to more Scottish students going on to found their own start-ups or taking up employment with one of our scaling business, helping them to develop and grow while retaining their skills and entrepreneurial talent in Scotland.

By doing this, we will catalyse entrepreneurship and regional economic growth throughout Scotland making us more prosperous, more productive and internationally competitive.

We will build on the foundations already in place in our universities and colleges, our renowned, cutting-edge research and an active investment market, to embed a culture in which entrepreneurship is encouraged, supported and celebrate for what it is - the democratisation of business and enterprise success across different levels of society.

This publication marks an important milestone as a key action from our **National Strategy for Economic Transformation (NSET)**, helping establish Scotland as a world-class entrepreneurial nation.

Our entrepreneurial campuses will provide opportunities for people who may not have the skills or experience necessary to start their own businesses. This will include mentoring, coaching, and networking, helping them build the knowledge they need to succeed as entrepreneurs.

They will bring together people from diverse backgrounds to share their knowledge, and ideas and to learn from one another, inspiring entrepreneurial outreach within each campus' local region.

Entrepreneurial campuses will also serve as a vital link between academia and industry, creating new opportunities for collaboration and knowledge transfer. This will help to bridge the gap between research and commercialisation, ensuring that Scotland's world-class research institutions are fully able to contribute to the growth and success of our economy.

The Scottish Government and its agencies are committed to supporting the development of new businesses and the expansion of existing ones. We recognize that entrepreneurs face many challenges, from securing funding to navigating complex regulatory environments.

Having entrepreneurial campuses across Scotland will help address some of these

issues, equipping students and faculty-members with insights, knowledge and connections that will help them access the resources and support they need to overcome these challenges and flourish.

Our entrepreneurial campuses will both work alongside, and also provide a clear, accessible pathway to our Techscaler network - our national platform offering co-location opportunities in any of seven hubs around the country, and which is already delivering world-class commercial education to support the next generation of Scottish start-ups.

I am grateful to Ross Tuffee and Professor Joe Little for carefully working through the evidence of international best practice in order to set out the roadmap to take us forward. My thanks also to Scotland's academic institutions who have joined in our ambition and engaged in the development of the concept.

I look forward to us collectively embracing this opportunity to develop a network of entrepreneurial campuses over the coming decade, ready to welcome future entrepreneurs and start-ups launching their careers and supporting them as they flourish and grow in the years to come.

Neil Gray,
MSP, Cabinet Secretary for Wellbeing Economy, Fair Work and Energy

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Introduction:

A call to action and Scotland's approach to developing our Entrepreneurial Campuses (ECs)

I. Why we need to act now

Following the publication and full adoption of the **Scottish Tech Ecosystem Review** (STER) in August 2020 and the publication of the National Strategy for Economic Transformation (NSET) in March 2022, there is a clear imperative to accelerate the development, and amplify the impact, of a number of world-class Entrepreneurial Campuses (ECs) across our network of institutions (colleges and universities) in order to deliver the vision set out in the above reports.

Institutions that are considered as world-class have had a significant impact on the regions that they inhabit, creating companies, jobs, and tax revenues. In addition, by retaining the expertise in an area, they are able to inspire and educate future generations of entrepreneurs. That is what we mean by a successful Entrepreneurial Campus.

Our colleges and universities provide a solid foundation that we can leverage to deliver this change. However, when comparing our approach and outcomes with global institutions we have identified several opportunities for improvement. By aligning our resources, enhancing our support for start-ups and academic spin-outs, and developing an entrepreneurial mindset across our students and staff populations, we will create businesses and social enterprises that will bring about the socio-economic impact we require.

In this paper, we set out a framework by which the Scottish Government, its agencies, Scottish colleges and universities and other institutions, organisations, groups and individuals with an interest can accelerate the development and amplify the impact of entrepreneurial campuses across Scotland's network of post-16 educational institutions (i.e., colleges and universities).

This paper presents the attributes displayed by successful ECs around the globe over the past 50+ years that will be critical for Scotland to embrace across our academic institutions if we are to develop a network of ECs over the next 10+ years.

In assembling this paper, we have adopted the same approach as the original STER report, using the **guiding principles** published in August 2020 and as such advocate a coming together and increased collaboration across the ecosystem to achieve the change needed.

By clearly stating our ambition (based on global best practice), adopting the necessary culture and behaviour changes, and re-aligning existing resources/investing in new resources and approaches, we will build on the current activities across our educational institutions in Scotland to achieve the required growth in impact. It will not be easy – many of the successful institutions around the globe have taken over 50 years to reach their current level of entrepreneurial activity and economic impact. Today, in Scotland, we don't have the luxury of the same timescales and therefore we need to act now and leverage all the learning we can to achieve our potential in a far shorter time period.

II. What do we mean by an "Entrepreneurial Campus"?

Across our tertiary education sector in Scotland, we have around 45 "post-16 institutions" (colleges and universities) dedicated to supporting the lifelong learning of Scottish residents. We have the opportunity to create the conditions across these institutions where entrepreneurial teaching and activity flourish and, in turn, drive economic development. We define an Entrepreneurial Campus as any institution that:

- Inspires the development of an entrepreneurial mindset in their students and staff and academics, promoting and teaching entrepreneurship (including social and impact-led entrepreneurship);
- Provides co-curricular opportunities for students and staff to learn and experience how to succeed as an entrepreneur, linking in with past and current practitioners;
- Provides a launchpad with wraparound support for student start-ups and spin-outs, facilitating access to funding;
- Nurtures cross-faculty learning, projects, and research, rooted in solving global challenges;
- Amplifies regional economic development;
- Develops skills for workers who will staff the start-ups and scale-ups; and
- Provides a pathway to our emerging national Techscaler network and beyond.

We recognise that many of our post-16 institutions are already providing some of these conditions; however, as a whole, we have the opportunity to increase our impact.

III. What we can learn from the experience of others?

In terms of increasing entrepreneurial activity across our institutions, we are starting from a variable baseline with different levels of activity occurring across the network.

As we look outside of Scotland at successful ECs around the globe, we see an opportunity to transform our economic outcomes by building a strong national entrepreneurial platform that leverages the existing teaching and research excellence of our post-16 campuses.

We believe that by learning from the well-documented experiences of successful international institutions such as Massachusetts Institute of Technology (MIT), Aalto University, **Technical University of Denmark (DTU)** and Stanford over the past 50 years, and applying the learning to our own environment, we will be able to accelerate the development of our own Entrepreneurial Campuses.

Students attend institutions like MIT **not just to learn, but to found a business**. In doing this, on graduating (or maybe not graduating!), they often remain in the local area and leverage the facilities and support infrastructure offered by their institution and feeding back into the community.

Our observation is that the institutions that we consider as world-class have had a significant impact on the regions that they inhabit, creating companies, jobs, and tax revenues. In addition, by maintaining the expertise in an area, we are able to inspire and educate future generations of entrepreneurs.

We can also learn from each other as individual institutions or groups of institutions working together. Collaboration, rather than competition, between institutions (e.g., between those that are already achieving success and those on a journey to success) is critical, especially with our aim of driving regional economic development as well as broader national economic development.

It is the role of the government to support and encourage the development of our ECs in terms of how funding is made available and targeted as well as how we measure the impact and success of any interventions. The foundation of successful entrepreneurial campuses is world-class research and teaching and the support we propose should be incremental to, and ring-fenced from, the continued funding aimed at the core teaching and research.

IV. Attributes that are vital for entrepreneurial success

The most successful entrepreneurial institutions globally demonstrate a number of the attributes listed in this paper. No institution displays every attribute; however, we see adoption of entrepreneurial initiatives across the many of those represented. We live in a time of exponential challenges (climate change, cost of living, war in Europe, etc) and being "good" is no longer enough. We need exponential solutions to the exponential challenges we face and to achieve this we need to significantly increase our investment in socio-economic impact-related innovation.

We have grouped the attributes that we see as vital for entrepreneurial success under the following themes:

1. ALIGN WITH REGIONAL ECOSYSTEM - Align and interact with your regional ecosystem and external partners to accelerate

2. INSPIRE THROUGH IMPACT - Inspire young people to engage in entrepreneurial thinking through social and impact-led activities

3. LEAD FROM THE TOP - Establish institutional policies that support the development of an entrepreneurial mindset in students and staff

4. TRANSFORM CURRICULUM - All students undertake credit-bearing courses in support of entrepreneurial development as well as set, and optional, cross-faculty, practical entrepreneurial learning opportunities during their student journey

5. ENHANCE EXTRA-CURRICULAR SUPPORT - Provide a systematic approach to extra-curricular support for student start-ups

6. ENGAGE EXTERNAL EXPERTISE - Develop (and engage with) an active alumni network and your local entrepreneurial community

7. ENHANCE SPIN-OUT SUPPORT - Develop support for academic/staff spin-outs

8. ALIGN FUNDING - Provide access to funding for student-and staff-led enterprises

9. DEVELOP A TALENT PIPELINE - Create a vibrant and developing pre-16 domestic talent pipeline as well as attracting entrepreneurial students from around the world

10. DEPLOY A FRAMEWORK FOR CHANGE - Establish a framework for change that incentivises our institutions and ensures quality outcomes.

We develop these themes in Section 3 below and suggest a number of recommendations that might lead to establishing these attributes across our institutions in Section 4.

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Background

I. Foundations in the Scottish Technology Ecosystem Review (STER)

In May 2020, Mark Logan was commissioned by Kate Forbes, Cabinet Secretary for Finance, to undertake a short-life review into how Scotland's technology sector can contribute to the country's economic recovery after the COVID-19 pandemic. The review's recommendations are primarily concerned with stimulating and accelerating the maturity of Scotland's "Technology Ecosystem". By this we mean the system, in its widest sense, that supports and nurtures technology businesses in Scotland, from the early start-up phase through to fully scaled maturity.

The attributes described in this addendum (**"The Entrepreneurial Campus | The Higher Education Sector as a driving force for the Entrepreneurial Ecosystem"**) align with the **guiding principles** laid out in Chapter 5 of the main STER report:

- Improve ecosystem output
- Address all three dependencies: education, infrastructure, and funding
- Accelerate towards a tipping point to achieve virtuous network effects
- Avoid artificial stimulation of start-ups that should be allowed to fail
- Target global ecosystem optimisation over the local optimisation of its parts
- Measure the ROI of interventions in relation to the overall ecosystem
- Our ecosystem must learn from outside of itself
- Focus on core horizontal capability, avoid over dilution of support
- Have a balanced portfolio of interventions across early and later stage companies
- Build out a world-class backbone of core capability.

Within the Foundation Talent Pipeline section of the STER, the report referred to the need to evolve our universities and colleges (referred to in this document as "institutions") into **"Post-16 Entrepreneurial Campuses".** To encourage this, the original STER report made the following recommendations:

Rec. 9. Adjust university incentivisation and funding to improve tech-entrepreneurial focus.

Rec. 10. Increase university funding to create more local software engineers.

Rec. 11. Adjust university incentivisation to improve spin-out scale and quality.

Rec. 12. Relax other KPIs in the overall university KPI portfolio to accommodate the new KPIs.

Rec. 13. National, pan-university **Tranzfuser**-style summer-school.

Rec. 14. Increase the number of start-up internships available to students.

We have taken the above guiding principles and recommendations and have looked more broadly at examples of "entrepreneurial campuses" across the globe in order to collate a set of attributes and recommendations that we believe will help us achieve our goals in terms of the entrepreneurial impact of our post-16 institutions.

We have also considered how "entrepreneurial campuses" will connect with the overall Tech ecosystem as outlined by the STER report so that our recommendations align with the report's wider recommendations (see below).

II. Alignment with the National Strategy for Economic Transformation (NSET)

In March 2022 the Scottish Government published its National Strategy for Economic Transformation (NSET). The aim of NSET is "to establish Scotland as a world-class entrepreneurial nation founded on a culture that encourages, promotes and celebrates entrepreneurial activity in every sector of our economy".

At the heart of this are the Scottish people and their ability to take advantage of opportunities that are presented, whether that is solving global challenges or creating solutions that enhance our overall standard of living. Our colleges and universities play a pivotal role in achieving this and are the subject of this report. **Our educational institutions' ability to inspire, educate and innovate resulting in the creation of the talent that can found, lead and staff sustainable high growth start-ups and scale-ups is essential for our economic success.**

This report examines what it takes to create an **entrepreneurial mindset and capability** in students and staff across our higher education institutions and the communities.

NSET lays out a three-pronged approach to achieving this:

1. Increase the total number of new businesses created in Scotland
2. Dramatically increase the percentage of start-ups and existing mid-sized businesses that grow to scale
3. Build entrepreneurial mindsets right across the economy.

Our tertiary educational institutions do, and will, play a critical role in this approach.

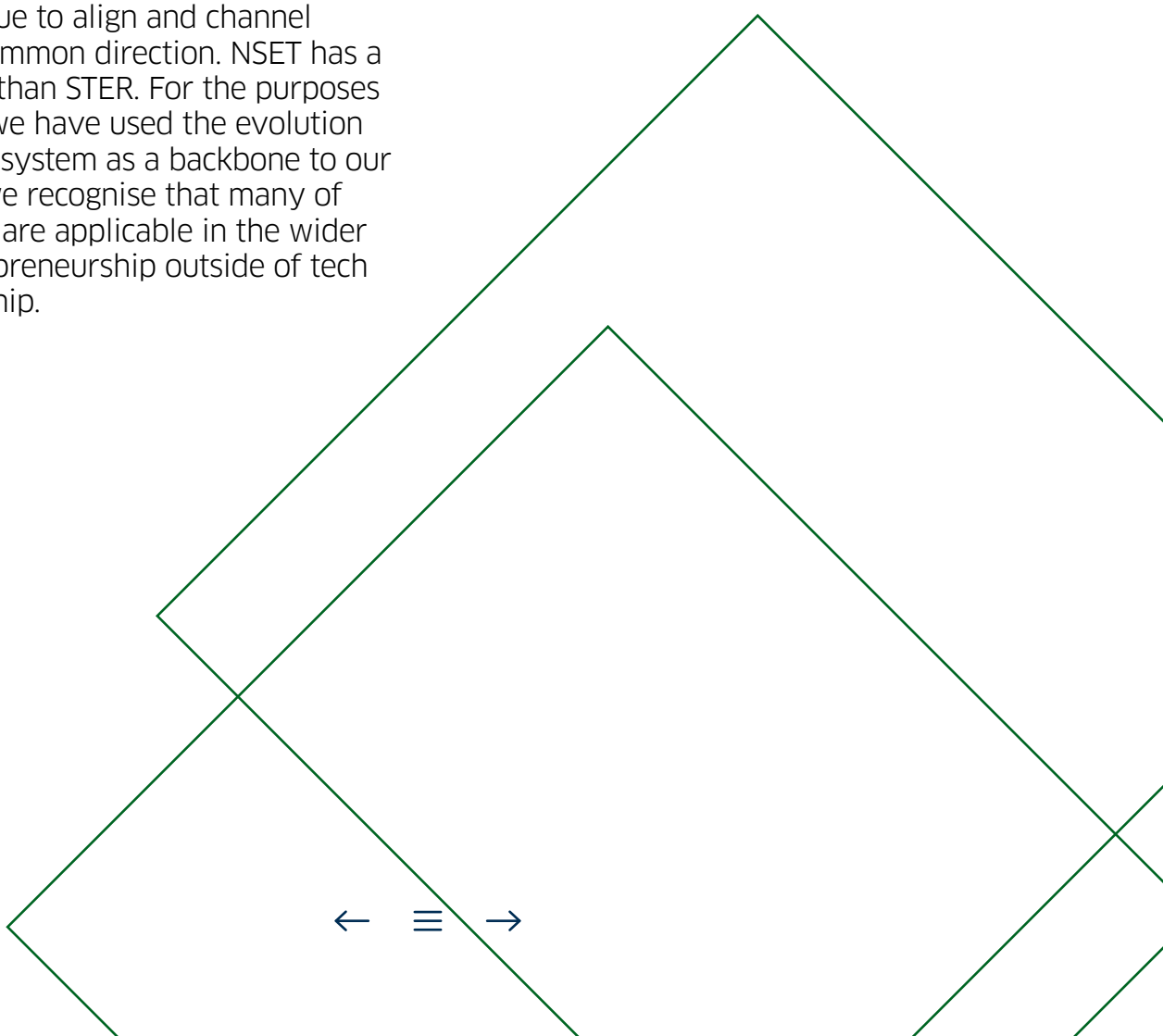
The Scottish Government's Programme of Action lists the following that will be directly or indirectly supported by the development of Entrepreneurial Campuses across Scotland:

- Embed First Rate Entrepreneurial Learning Across the Education and Skills Systems
- Create a World-class Entrepreneurial Infrastructure of Institutions and Programmes Providing a High Intensity Pathway for High Growth Companies
- Attract and Retain the Very Best Entrepreneurial Talent from at Home and Abroad
- Build an Entrepreneurial Mindset in Every Sector of our Economy.

We have taken the above ambition and used it in shaping our thinking to ensure that we continue to align and channel activity in a common direction. NSET has a broader focus than STER. For the purposes of this paper, we have used the evolution of the tech ecosystem as a backbone to our thinking, but we recognise that many of our comments are applicable in the wider sense of entrepreneurship outside of tech entrepreneurship.

We recognise the links to Scotland's emerging "National Innovation Strategy" and have reflected some of the key themes raised in that draft document across our proposals. Some of these include:

- Alignment of activities across regions, key sectors, and technology clusters
- Adoption of an investor mindset in supporting our scaling businesses
- Identifying ways to increase the rate of adoption of new innovations across our economy with the aim of increasing socio-economic impact
- Recognising the need to collaborate across public and private sector to enable change
- Recognise the need to measure impact.



III. Where do Entrepreneurial Campuses (ECs) fit in the overall Tech Ecosystem model?

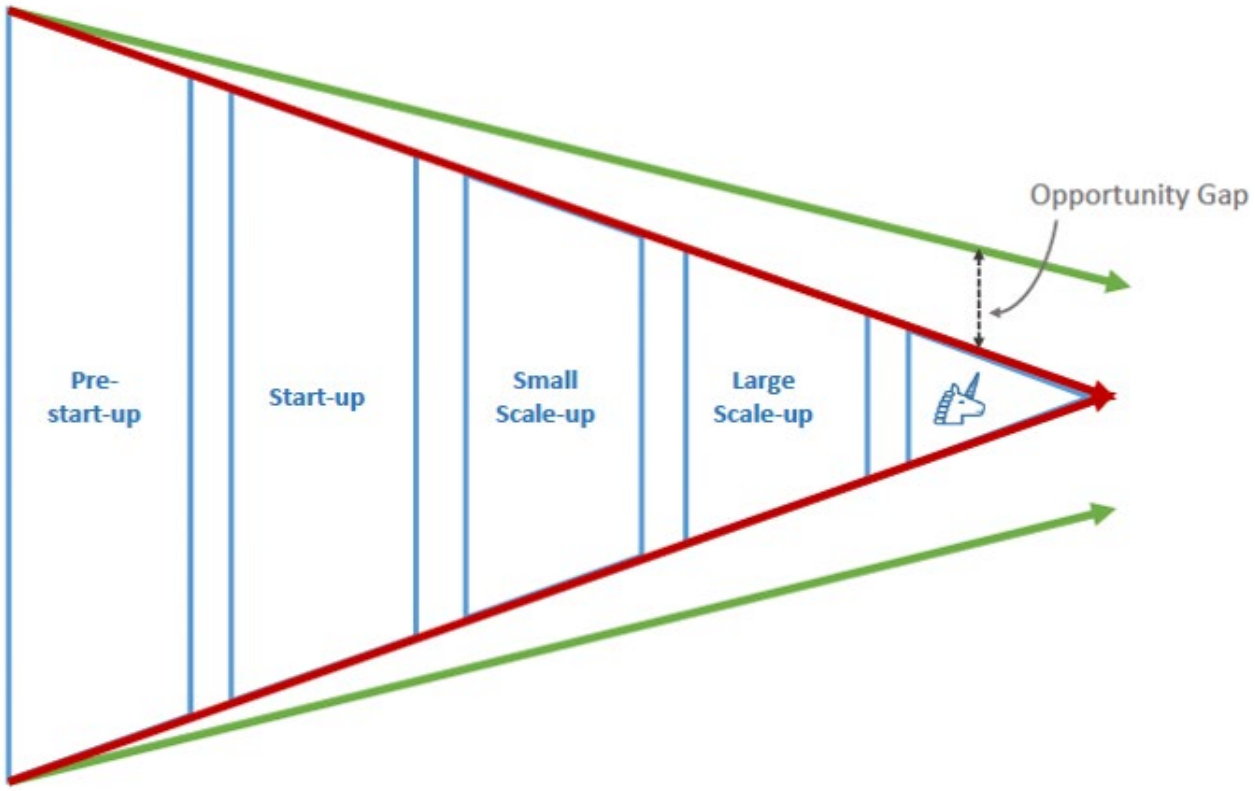
ECs do, and will continue to, form a key component of the overall tech ecosystem in Scotland.

ECs play a significant role in the creation of the pipeline of talent that will help found, lead and staff scaling businesses as well as in creating IP itself behind the start-up businesses that will hopefully continue their growth journey in our emerging Techscaler network (see wider recommendations of STER).

The role of ECs is critical as they have the potential to deliver many of the attributes required for a successful and scaling tech sector outlined in STER.

One of the key findings of STER is that the start-up stage of the overall eco-system needs to be populated by many vibrant early-stage companies that – critically – are given the right levels of high-quality support. When discussing the funnel from 'pre-start to unicorn' STER notes:

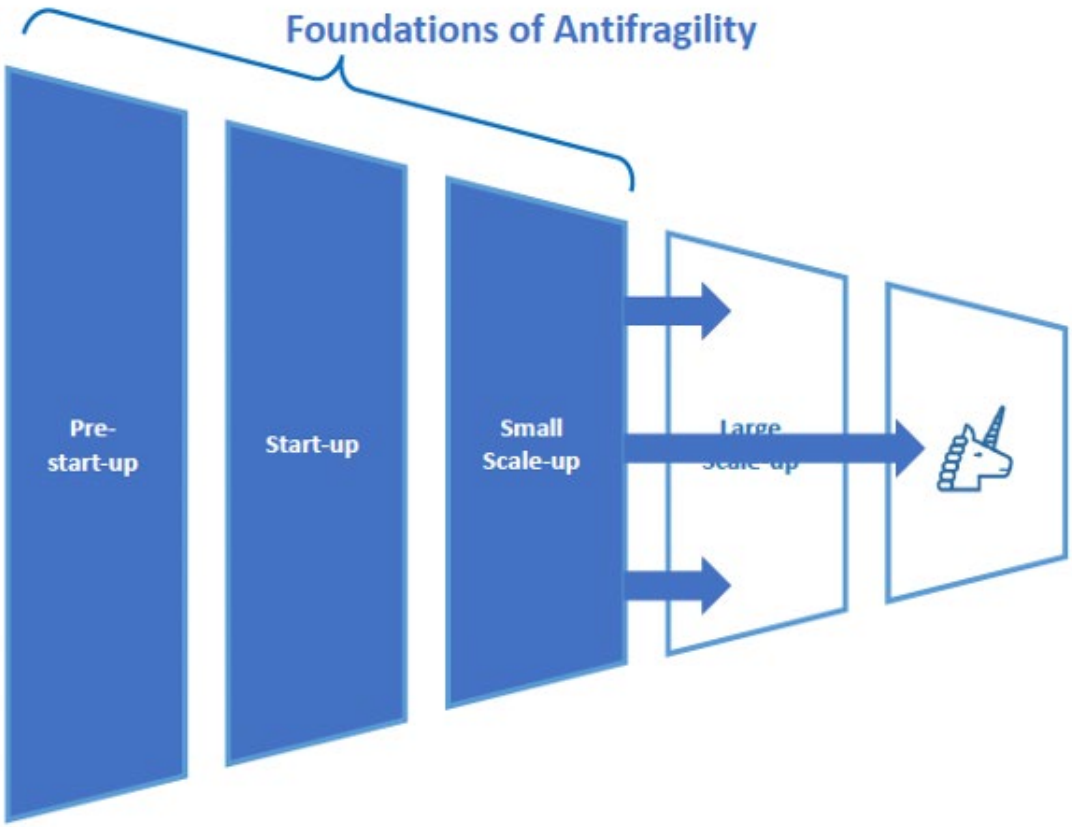
Naturally, the funnel narrows from left to right – not all start-ups become scale-ups and not all scale-ups become unicorns, nor should they. So, there's a minimum narrowing rate of the funnel that it's impossible to improve upon. But, in most ecosystems, the rate of narrowing is much faster in practice than this natural rate. This is certainly true of Scotland's ecosystem. The difference between these two rates is the opportunity available to us.



We assert that the difference in these two rates is due to deficiencies in the local ecosystem's support environment for start-ups and scale-ups. One aim of this review is to make recommendations that close the gap between our current rate of funnel decay and the natural rate.

Student start-ups and university spin-outs commence their journey on a university or college campus – undertaking what is potentially the hardest part of their company life cycle. STER makes the point that while the creation of new companies is key to the growth of the Scottish tech ecosystem, the final outcome of the hard, early-stage work will often not be fully realised for many years after that, and may often be realised completely outside of the environment in which the early-stage interventions were made.

Furthermore, even with companies that do not go on to grow, there is real value delivered indeed, founders and employees from early-stage companies in the funnel that fail will take those hard-earned lessons to other start-ups, thereby strengthening them.



This is what's known as **an antifragile ecosystem** – stresses acting on the system actually make it stronger. It's a highly desirable feature of our target ecosystem.

If these companies are to start their life on campus, then they need the support that we see in other successful programmes (such as Civtech) in order to increase the chances that they thrive and reach scale. This includes access to facilities, funding as well as mentors and experts who have "been there and done that" and are experienced in starting and scaling technology businesses.

We see from the above therefore that ECs are not synonymous with "Techscalers" (although some aspects of the Techscalers may incorporate university/college capabilities and resources).

However, our ECs play a foundational role in developing the start-ups and talent that will populate and enable our tech ecosystem by (amongst other things):

- **Inspiring students and staff** to consider their potential as tech entrepreneurs
- Teaching and providing **co-curricular opportunities** for students and staff to learn **and experience** how to succeed as an entrepreneur
- **Providing a launchpad with wraparound support** for student Start-ups
- **Supporting academics with technology spin-outs**
- **Facilitating access to funding** for early-stage start-ups/spin-outs
- **Developing skills for workers** who will staff the start-ups and scale-ups
- **Representing the heart of our communities** and regions across Scotland. ECs are a location where we can bring together emerging technological talent with creative and entrepreneurial talent
- **Nurturing cross-faculty learning and research, rooted in solving global issues** (often enhanced by combining with regional economic focus)
- **Promoting and teaching social entrepreneurialism**
- Creating a melting pot where we can **align the ambitions of big business with the priorities of academic research with the aim of driving innovation** (See MediaX example)
- **Providing a pathway to our emerging Techscalers**
- Our **colleges provide vital pathways for students** in terms of:
    - **a route into university** for students where they might progress their entrepreneurial pathway (note c.one third of students in Scottish Universities articulate from our college network)
    - the **creation of the talent that will be needed by the scaling businesses** that are created as a result of the EC programme
    - providing an **education that might lead to the establishment of their own enterprise** - subsistence or innovation driven enterprise (IDE)
- **Facilitating the support of professionals focused on making it "stupidly simple" for feasible start-ups to form and scale**
    - Alumni
    - Professionals e.g. IP lawyers, corporate finance
    - Mentors
    - Business leaders relaying practical experience in overcoming barriers as well as challenging ideas.

We will examine these and other areas in more detail throughout this paper.

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Key components
of a “world-class entrepreneurial campus”

This change is large and complex and will take place at varying rates across different campuses over many years. In addition, each institution is starting from a different baseline in terms of sophistication, capability, ambition, and culture. We can, however, look for commonality in approach across institutions which will help accelerate the change required.

We also recognise that we are entering a post-Covid period where our institutions are establishing a "new normal". We recognise the tremendous efforts of our institutions and the impact of the pandemic, and we realise that conversations about Entrepreneurial Campuses may be seen as "a bridge too far" on top of the challenges of the past 2+ years. **We believe, however, that establishing the new normal presents an opportunity to continue to evolve how we deliver our tertiary education, particularly in terms of entrepreneurial teaching and support, leveraging the developments in video and collaborative technologies in how we approach this opportunity (which in itself requires new and different ways of working).**

In this paper we discuss the attributes of a world-class Entrepreneurial Campus. For convenience we have grouped them into ten key themes:

1. **ALIGN WITH REGIONAL ECOSYSTEM** - Align and interact with your regional ecosystem and external partners to accelerate
2. **INSPIRE THROUGH IMPACT** - Inspire young people to engage in entrepreneurial thinking through social and impact led activities
3. **LEAD FROM THE TOP** - Establish institutional policies that support the development of an entrepreneurial mindset in students and staff
4. **TRANSFORM CURRICULUM** - All students undertake credit bearing courses in support of entrepreneurial development as well as set, and optional, cross-faculty, practical entrepreneurial learning opportunities during their student journey
5. **ENHANCE EXTRA-CURRICULAR SUPPORT** - Provide a systematic approach to extra-curricular support for student start-ups
6. **ENGAGE EXTERNAL EXPERTISE** - Develop (and engage with) an active alumni network and your local entrepreneurial community
7. **ENHANCE SPIN-OUT SUPPORT** - Develop support for academic/staff spin-outs
8. **ALIGN FUNDING** - Provide access to funding for student and staff-led enterprises
9. **DEVELOP A TALENT PIPELINE** - Create a vibrant and developing pre-16 domestic talent pipeline as well as attracting entrepreneurial students from around the world
10. **DEPLOY A FRAMEWORK FOR CHANGE** - Establish a framework for change that incentivises our institutions and ensures quality outcomes.

In the final theme (Theme 10) we present a framework for our proposed approach along with actions and recommendations for deployment.

Theme 1: Align and interact with your regional ecosystem and external partners to accelerate

Entrepreneurship requires great people (alongside great technology). Developing an Entrepreneurial Campus (EC) involves a large number of stakeholders, all of whom need to engage and interact for the outcome to be successful, including:

- Students
- The Institution's academics & staff
  - Teaching
  - Research
  - Non-academic staff
- Alumni (particularly those with entrepreneurial interests)
- Large corporates ("Big Business")
- SMEs
- Government (national and local)
- Economic Development/Skills Agencies
- Social enterprises/not-for-profits
- Providers of risk capital/Investors
- Private Sector Venture Studios.

Each of the above have an important but distinctive role to play in the development of our Entrepreneurial Campuses.

In Section 4 Theme 3 below we discuss the importance of ensuring equal emphasis is placed on achievements in industrial collaboration, start-up facilitation, teaching, and research across our institutions.

As a fundamental part of teaching, research, and innovation our institutions are catalysts for initiating collaborations between stakeholders, creating a public space for local, regional, national, and international conversations, setting the direction of travel of technologies and markets.

This should include a focus on industrial collaboration and start-up facilitation. In this context, our tertiary institutions should carry out research on future trends/areas of highest growth potential, advocate on behalf of entrepreneurs, bring together organisations/businesses with a common interest and encourage synergies/cross-sectoral collaboration.

To give an idea of potential scale and maturity reached in the teaching and facilitation of entrepreneurship, if we look at the ecosystem that surrounds MIT in the US, we see over 80 entrepreneurial programmes and 50 or so incubators supporting the start-up ecosystem, with the university itself delivering on average 30 technology spin-outs, and students creating 100+ start-ups each year (we look in more detail at the need for these facilities in Section 4 Theme 5 below). The ecosystems that grow around our institutions are critical in driving the level of innovation and enterprise in a region. In the above example, students don't just go to MIT to learn, **they also go to MIT to start a business** and in doing so they will leverage the resources of the institution as well as the surrounding region, ultimately remaining in the local area which provides all the facilities they need to grow their business. This is a core aspect of growing a regional economic ecosystem. **Entrepreneurial campuses are regional anchor institutions.**

The importance of aligning with regional economic development

In Scotland, the Enterprise & Skills Review's twin outcomes of: **National Economic Coherence** and **Regional Economic Diversity** are an important backdrop to the development of our ECs. This regional focus on the emerging core characteristics of each of Scotland's nine regional economies, as part of a national collaborative effort will provide the skills which Scotland's economy demands now and will require in the future.

There are nine regional development partnerships:

1. Northeast Regional Economic Strategy (Aberdeen City and Shire);
2. Ayrshire Regional Economic Partnership;
3. Capital City Region - Edinburgh & South East Scotland Regional Economic Partnership;
4. Forth Valley Regional Economic Partnership;
5. Glasgow Regional Economic Partnership;
6. Highlands and Islands Region;
7. South of Scotland Regional Economic Partnership;
8. Tay Cities Regional Deal; and,
9. Moray Growth Deal.

Each region has emerging economic characteristics/focus including:

- Air and Sea Ports of Ayrshire,
- Economic Diversity of Glasgow's Metro Region,
- Decarbonisation of the Forth Valley,
- Capital Effect on and of the City and Region in and around Edinburgh,
- Sustainable Mobility in Michelin Scotland Innovation Parc (MISP) in the Tay Cities region
- Aberdeen's Journey of Transition.

Alignment of the above with the Techscaler network is important. Techscalers are to be established in the following locations:

- Aberdeen
- Dundee
- Edinburgh
- Glasgow
- Inverness
- Stirling
- Dumfries

In terms of regional development themes, there is a high degree of "fit" with the regional development zones in terms of geography. Entrepreneurial Campuses will play a key role in creating a pipeline of potential scale-ups who may take advantage of the facilities provided by the Techscaler network. Indeed, the relationship between the Techscalers and our ECs is critical to get right on a local and regional scale. How a specific Techscaler works with its local EC is important and should be the focus of combined thinking and collaboration.

We are cognisant that our Techscalers will also operate on a remote hub and spoke basis as well as being physical entities; however, it is safe to assume that where there are gaps in Techscaler physical and educational network then the role of our tertiary educational institutions and the network of pre-scalers becomes particularly important in providing access to facilities to support scaling businesses.

Alignment and leverage of our Innovation Centres and Technology Clusters

Across Scotland we have a number of Innovation Centres (**Digital Health and Care Centre**, **Censis**, **DataLab** etc.) and technology clusters (**Fintech Scotland**, Cyber Cluster, **Travel Tech for Scotland** etc.) that work with academics across our institutions supporting innovation amongst other things.

As we look to develop our entrepreneurial campuses it is important that we recognise the role that these organisations play in the overall ecosystem and the impact of introducing/scaling the activities relating to our entrepreneurial campuses on them.

It is also critical that we leverage the capabilities and funding that already goes to these organisations and understand their relationship with our emerging entrepreneurial campuses and how this might change as activity ramps up.

We need to investigate further the potential to extend the role of our Innovation Centres to further support entrepreneurial activity across our campuses. Innovation Centres have a unique inter-campus view of the activity across academic research. One example of how we might extend this is by **identifying and facilitating the interaction between student bodies (e.g. clubs/ societies and enterprise organisations) and academic staff.** By identifying opportunities and acting as a catalyst between staff and students in bringing together such activity we believe that we will see an acceleration in the number of student start-ups across our campuses.

We can see **the opportunity of aligning clusters and academia** in countries like Germany where during the late 2000s and early 2010s the German government invested heavily in technology research and innovation. The German government recognised that research and innovation are key in order to remain at the forefront of worldwide competition. To provide new impetus for this collaboration, the German Federal Government developed the successful High-Tech Strategy furthering their comprehensive innovation strategy. A key factor contributing to the success of the High-Tech Strategy is the Leading-Edge Cluster Competition.

Effective cluster management requires an umbrella organisation that can coordinate and align activity across clusters in the tech sector. In Scotland the Scottish Cluster Ecosystem Alliance, managed by ScotlandIS (a Silver accredited organisation from The European Secretariat for Cluster Analysis, ESCA), fulfils this role. With the emergence of ECs, we believe that there is a role for this organisation to work with our academic institutions to ensure that entrepreneurial activity across the tech sector is mapped and coordinated so that best value is gained through alignment of government funding across this space.

We have the opportunity to establish and grow UK-wide clusters. These should align where possible with the innovation priorities (see Scotland's National Innovation Strategy) but should also take advantage of gaps in the cluster landscape. For example, the Travel Tech for Scotland Cluster is the leading travel tech cluster across the UK and therefore might claim the role of "Travel Tech Cluster for the UK". They are also based at the Edinburgh Futures Institute (EFI) thus creating a symbiotic relationship with the Edinburgh University.

A good example of the need for greater collaboration between universities and industry facilitated by tech clusters in the work of Fintech Scotland in developing their Fintech Research and Innovation Roadmap 2022-31.

Fintech Scotland has recently been recognised and a leading fintech cluster management organisation in Europe: **https://www.digit.fyi/fintech-Scotland-achieves-top-cluster-excellence-accreditation/**

Clusters are great at highlighting the opportunity and facilitating collaboration across business, universities, and colleges in the pursuit of innovation. They also provide a mechanism through which to provide tailored and targeted growth support.

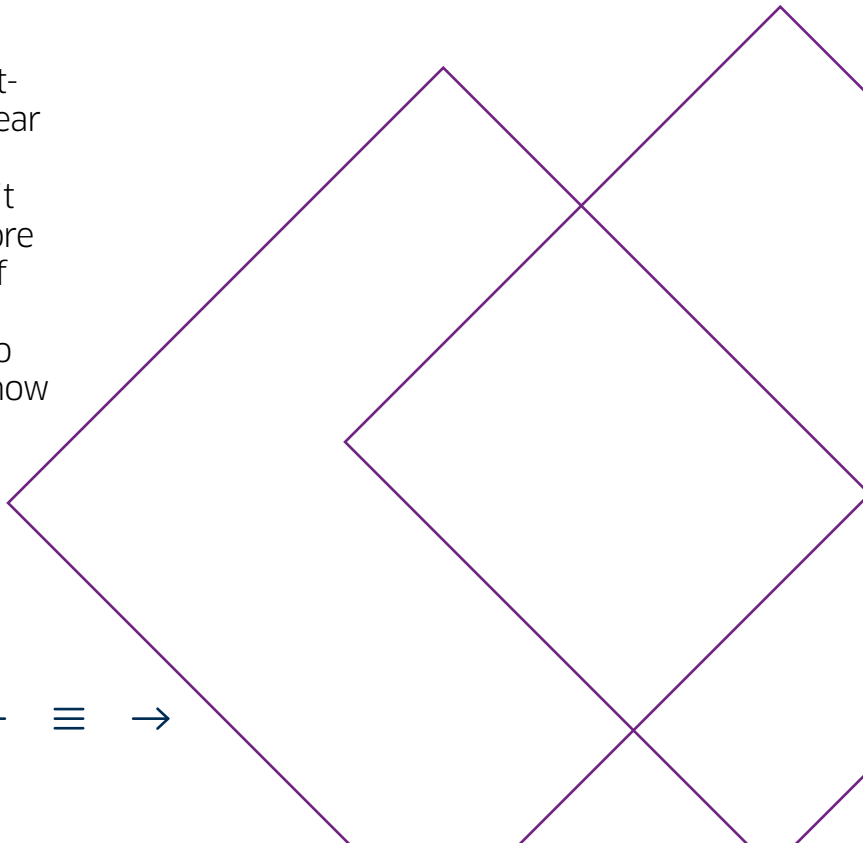
The role of "Big Business" and academia in driving innovation

The complementarity of start-ups and big corporations is often misunderstood and underestimated by institutions. We have examined the work of MediaX, Stanford University's programme that brought together business and Stanford researchers for open and mutually beneficial explorations of the problems and possibilities arising from the growing use of information technologies.

MediaX was an industrial affiliate program that brought academics across Stanford and industry together on a range of topics that combined issues of human performance with technological solutions. The program listened to the interests of industry and then cast those interests into a form that captured the imagination of faculty members. The community that resulted then provided thought leadership and engaging exploratory dialogue across faculties to share early results, preliminary findings, and nascent research questions. A significant effort was needed to bring forth faculty members and encourage them to share their research, collaborate with other faculty and with industry. In time faculty members would be allowed temporary secondment to develop the resultant start-ups providing they returned within a 3-year window to distil their learnings. Thus, creating a virtuous cycle of mutual benefit and catalytic impact to take risks to explore new intersections in research. The DNA of industrial collaboration that then resulted after 20 years of effort is now woven into Stanford's day to day programs and has now been published as a playbook.

The success of the MediaX programme over 21 years is testament to the fact that programmes like this act as a catalyst to innovation, resulting in the creation of student start-ups and academic spin-outs. MediaX acted as a gateway for corporations to approach Stanford's faculty experts doing research relevant to the company in question. It addressed one of the key barriers to collaboration – the short termism of businesses vs long term foresight of university researchers. One of the important facts of the programme was the way that academics were given the flexibility to step out of the university and work with the start-ups, but they were encouraged to return in order to bring back the information and learning that they gained, to potentially do the same again.

Collaboration between large corporations and academia to drive innovation is not easy. It requires investment of time and effort on both sides – this is clearly illustrated in the case of MediaX at Stanford.



Venture Studios

We referenced above the number of venture studios and incubators that surround MIT (and similar institutions) that are not attached to the university or funded by the public sector, but constitute a key part of the ecosystem.

We see a growing number of incubators, accelerators and venture studios emerging around the globe with varying business models, all of which support the development of start-ups.

There are many examples including **Conception X**, a programme that helps PhDs become Venture Scientists launching deeptech start-ups based on their research, connecting with industry experts, and be eligible for innovation grants and awards through training designed for scientists and engineers. Conception X's mission is to help the brightest people move from lab to start-up.

Venture Studios are found in various forms including attached to banks, flexible office space etc etc. Another example is **Entrepreneur First**, a **highly selective, 3-month long programme** run in 6 cities across the globe. They bring together individuals with the potential to found globally important technology companies, to meet their co-founder and build start-ups from scratch. Alongside that, founders are given access to leading advisors, the opportunity to pitch for pre-seed funding, and a network of the world's best investors to break down the barriers to founding, and move fast.

There are also impact-driven Venture Studios like that founded by **Crisis in London.** This studio is on a mission to accelerate the end of homelessness for good through entrepreneurship. The studio invests in, builds, and scales ventures that end homelessness for those experiencing it, or prevent homelessness from happening in the first place.

Theme 2: Inspire young people to engage in entrepreneurial thinking through social and impact led activities

Globally we are seeing young people at the forefront of social and environmental impact awareness and change. We are also seeing an increase in the role of business in solving society's greatest challenges.

Social impact and wider impact creation can be used as a 'hook' to inspire young people to consider entrepreneurial activity more generally (See reference to Durham University Game Changer Innovation Programme in Section 4 Theme 5). The **United Nations Sustainable Development Goals (SDGs)** offer an engaging and robust impact framework which can ignite entrepreneurial activity. The **Impact Management Project's** impact norms provide the methodology for entrepreneurs to consider positive and negative business impacts, and impact depth and scale, alongside unintended consequences.

It is therefore sensible (and indeed advantageous) that our ECs support "social" and impact-led entrepreneurship alongside other "for-profit" entrepreneurship activities.

There is an opportunity to elevate and amplify scalable social and impact-led enterprises, and their resulting impact, across our post-16 entrepreneurial campuses. A vision for social and impact-led entrepreneurship in post-16 education should include the following imperatives:

- Social and Impact-led entrepreneurship is taught as a natural part of 'mainstream' entrepreneurship, finance, and business studies activities
- Educational institutions facilitate access to a range of funding mechanisms to encourage and grow early-stage, high risk, emerging social and Impact-led business ideas, and enterprises
- Educational institutions embrace and support the full reach of their networks and governance structures including:
    - those with enterprising ideas from local communities and regions;
    - the student body;
    - alumni; and,
    - staff teams - past and present
- Educational institutions maximise the use of their resources to progress and scale positive social and environmental outcomes.

According to an article by **Mario Calderini, Veronica Chiodo, Francesco Gerli & Giulio Pasi** in the Stanford Social Innovation Review (June 2021) social-tech entrepreneurship is an important area of opportunity:

"Technology in the service of social entrepreneurship presents many opportunities. It can enable robust new solutions and help scale existing ones. It can also support engagement, contribute to the sustainability of social enterprises, and boost financial investment."

There is clearly an opportunity for Scotland to lead across this space. We already have a vibrant and growing social and impact investment infrastructure that will help us to achieve this potential. Much of this work is driven by organisations such as **Social Investment Scotland (SIS)** and its subsidiary **SIS Ventures**, and there is an opportunity to leverage these organisations to embed social entrepreneurial capabilities and practices throughout all stakeholders across our ECs by working closely with such organisations. By doing this we will not only create further positive impact but also attract a cohort of individuals into entrepreneurship who may not have originally engaged directly.

We already see some social and impact-led entrepreneurship activity within the 16+ education sector in Scotland. The University of Edinburgh (UoE), for example, is an investor in the SIS managed Scottish Social Growth Fund; it participates in the SIS Retail Academy connecting UoE procurement and other teams with social enterprises; and with SIS being the strategic impact partner for **Converge**.

There is a potential to scale this and similar activity through the establishment of a **"National Centre for Social and Impact-led Entrepreneurship"**, supported by appropriate funding mechanisms, that would connect 16+ education partners with social entrepreneurship experts and expertise, facilitating access to knowledge, expertise, industry placements, social supply chains, and dedicated funding mechanisms. Establishing a national resource will allow immediate and dedicated access to sector experts and actors who can co-design curriculums, access appropriate seed and growth funds, collaborate, champion, and guide the sector in harnessing its significant economic footprint for scalable social good. It also contributes to building and growing a pipeline of innovative enterprises fit for local, national, and global marketplaces.

There is interest from the university sector in exploring funding models, driven partly by the wealth of some universities via their own endowments, and student-led pressure to ensure these are invested responsibly. All of this will inspire and support the student body, teaching teams – and others reached by educational bodies – to develop impactful enterprising activities that maximise positive social, environmental and economic outcomes for the people of Scotland, and beyond.

We see further examples of the desire to create impact through programmes like **Demola Scotland** based at University of the West of Scotland (UWS). Demola Scotland is Demola Global's first UK "home" with the potential to scale this across the whole of the UK.

Intrapreneurship vs Entrepreneurship

Not all students will go on to found their own business. There are many career paths that can be taken following tertiary education. **Entrepreneurial skills acquired by students during their education are useful across the total spectrum of student destinations.** Students who aim to go on to work for a private company or public sector/3rd sector organisation will benefit by being exposed to **both entrepreneurship and intrapreneurship** (i.e. acting like an entrepreneur **inside** an organisation).

It is the people closest to the problems faced by customers who often have the best solutions – but these ideas rarely make it into reality. Intrapreneurship unlocks that potential. Organisations like **The Lens** help develop the mindset and skills of intrapreneurs, with employees forming a community of change-makers that inspire and influence others to see and think differently. Programmes of this type:

- Harness creativity and builds a pipeline of ideas
- Invest in ideas, turning them into action
- Increase innovation skills
- Build teamwork and new collaborations
- Enhance partnerships, both internally and externally.

These are all skills that might be acquired (or at least seeded) during a student's educational phase.

Working with philanthropic and not for profit organisations focused on entrepreneurial (social and mainstream) development

Across the globe we see a growing number of successful entrepreneurs who are keen to support economic growth through entrepreneurship. We touch on this in Section 4 Theme 6 below when discussing the role of alumni but it is worthy of mention here. With a history of entrepreneurial success in Scotland we have a number of individuals, organisations and foundations who are incredibly active in the entrepreneurial space, each providing support and knowledge into the entrepreneurial community. These include:

- The Hunter Foundation, founded by Sir Tom Hunter, who invests heavily in entrepreneurial initiatives in Scotland, from the £5m initial endowment that funded the Hunter Centre for Entrepreneurship at Strathclyde University to the ongoing investment in scale-up activity of **Scale-up Scotland**. Recent announcements in this space includes a free online resource (open to all) **Scale-up.scot** and the **Scale-up 2.0 Programme**. The Hunter Foundation also supports Social Entrepreneurship.
- **Entrepreneurial Scotland Foundation** (ES) is an independent charity that exists to equip organisations with the mindset, skills, and connectivity to deliver personal and business growth. ES has 20 years' experience supporting 1000s of talented people to unlock their potential by providing transformative programmes that blend experience, world-class teaching and peer to peer learning. They are supported by experience, generosity, and goodwill from their community of 5,000 leaders.

By continuing to align and leverage the resources, knowledge and networks created and made available by these organisations we believe that there is a huge opportunity to accelerate the development of our entrepreneurial campuses across Scotland.

Theme 3: Establish institutional leadership and policies that support the development of an entrepreneurial mindset in students and staff

Entrepreneurialism in tertiary education will only thrive where there is a cultural alignment with the institution supported by policies that ensure a conducive environment. The culture of each institution is unique and therefore it is important to consider under what context an entrepreneurial mindset fits with a particular institution's purpose (or at least ensure that an entrepreneurial mindset would not clash with the existing culture and purpose of an institution). Start-ups/ founders should be seen as sector assets that an institution should be proud of.

Culture is the coming together of many facets, but one of the key points is that it is led from the top.

In developing their ECs, successful institutions have recognised the varying levels of student motivations related to the teaching of entrepreneurship. As discussed above, not all students want to start their own business – indeed some may consider a career in "business" as a complete turn off. With this in mind many institutions started their journey by focusing on developing an "entrepreneurial spirit" rather than simply focusing on developing "entrepreneurs" (although this is important in its own right). Enterprise thrives where there is an innovative mindset and the ability to solve problems. These attributes align well with a strong and progressive learning environment.

Traditional career paths are receding; therefore it is a natural imperative that we consider alternatives including a career as an entrepreneur. **In addition to equipping those who pursue careers in research/education, small and large corporations, governments and the third sector organisations, successful institutions also prepare students for a career as an entrepreneur.** Indeed, the skill sets are not wildly divergent at their core (meta skills) with skills being applied across all sectors, particularly in the form of intrapreneurship (discussed above). Students learn to be agents of change within all organisation types if they are exposed to the skills that underpin entrepreneurship during their studies.

When we look at developing entrepreneurial skills, significant resources are required to launch entrepreneurial courses, as well as extracurricular activities. Entrepreneurial courses cannot simply be copied and pasted from other institutions, they require considerable efforts and deep experiential knowledge that is accumulated over many years.

Those institutions who have developed at pace have senior leadership that have prioritised the development of an entrepreneurial mindset across their institution, funding activities and fostering behaviours in line with their institutions mission. These institutions place an equal emphasis on achievements in entrepreneurship and rewards its staff accordingly, providing academic pathways across Industrial collaboration, start-up facilitation, teaching and research. They encourage and reward academics who gain experience in start-ups, scale-ups and other external opportunities, but strongly encouraged them to return to academia and share the knowledge gained and continue with their research (see Media X example).

Theme 4: All students undertake credit-bearing courses in support of entrepreneurial development including set and optional, cross-faculty, practical entrepreneurial learning opportunities during their student journey

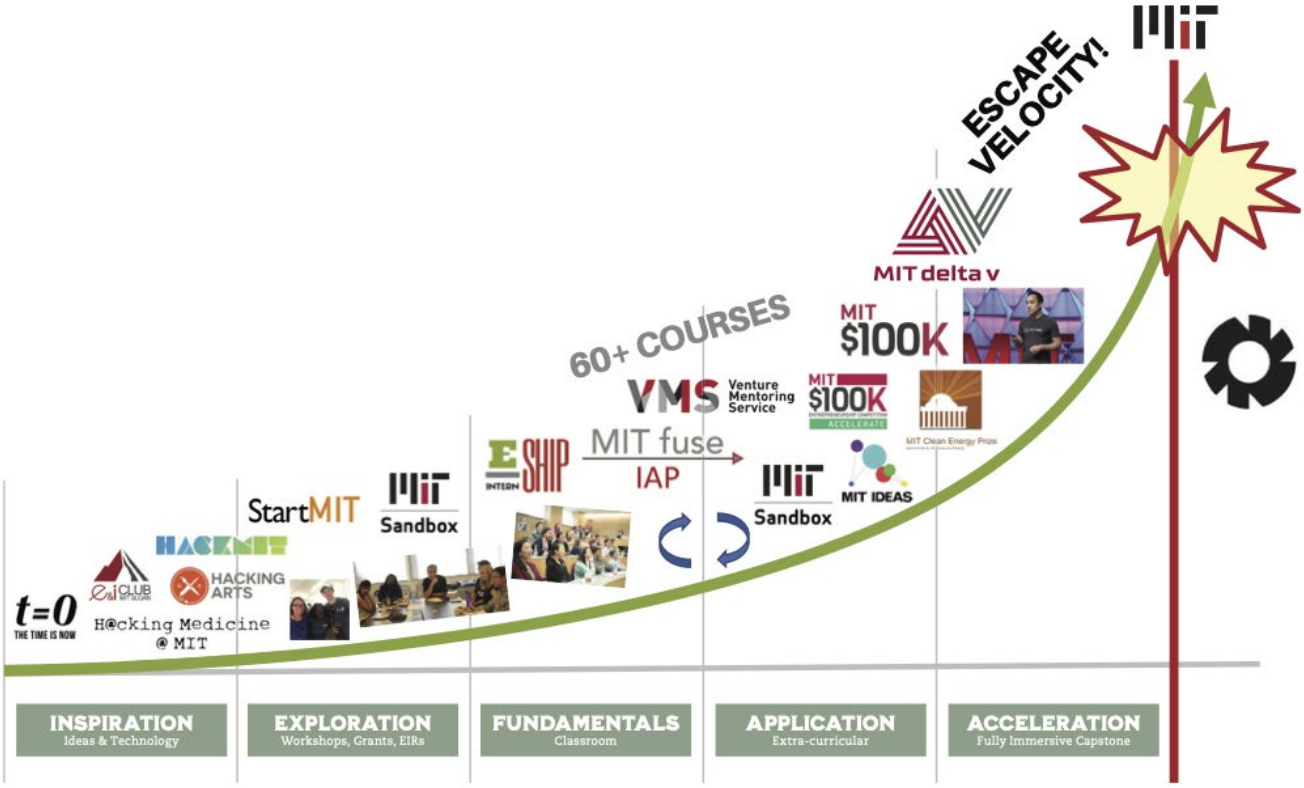
Entrepreneurial education is not simply about preparing students to pitch a business plan. It spans a wide variety of capabilities including the development of meta skills (e.g. creative thinking, problem solving, collaboration & teamworking, etc) as well as specific skills around product and organisational development and, importantly, the practical application of classroom learning.

The most entrepreneurial campuses deliver interventions that stimulate interest in entrepreneurship at an early stage of a student's educational career, as well as training students to deal with the specifics of the entrepreneurial journey. Students are given opportunities to explore their motivations for entrepreneurship and are given help to build both fundamental and specialised entrepreneurial skills. They are also provided with scenarios in which they can apply the skills learned through a multitude of labs, internships and competitions.

A systematic approach to developing entrepreneurial skills is key with the top institutions offering the opportunity for students and staff to engage with various interventions that recognise their starting point and can be summarised as:

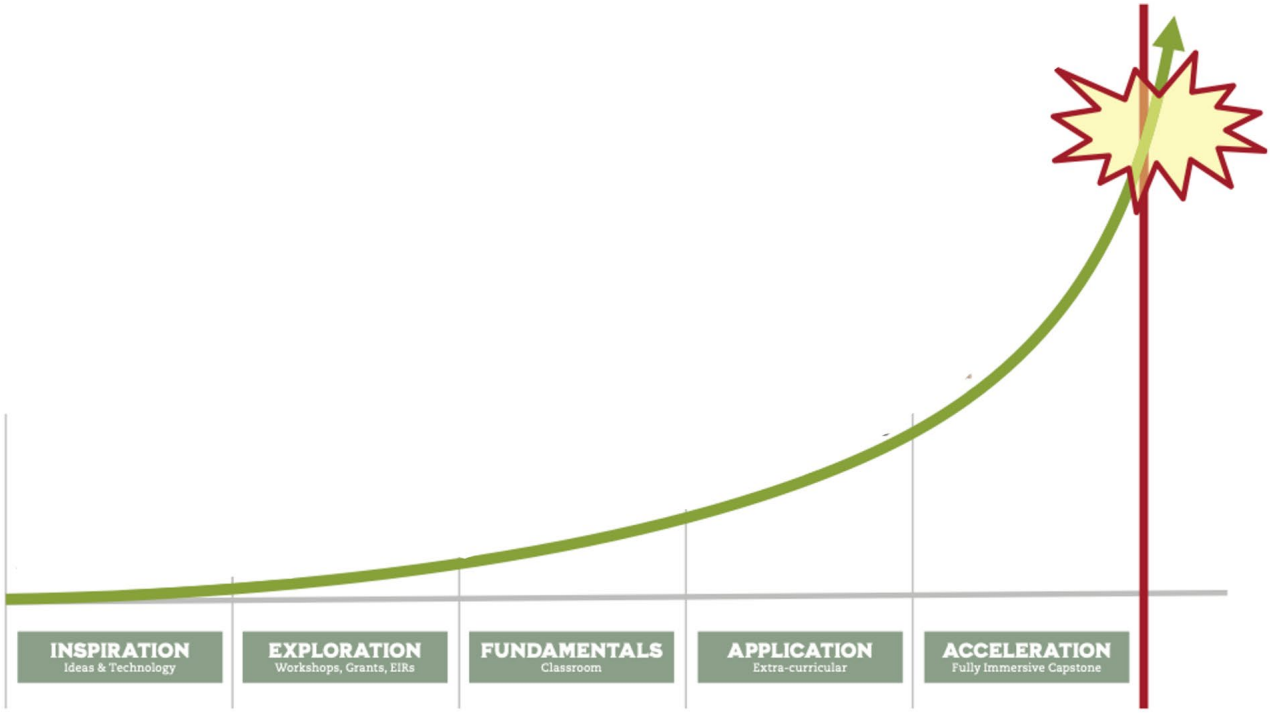
- **INSPIRE:** Inspire students and staff to engage with the entrepreneurial space via innovation and creative thinking – whatever their motivations and potential destination
- **EXPLORE:** Encourage them to explore opportunities to create impact
- **LEARN:** Teach the fundamentals needed to develop an entrepreneurial offering
- **APPLY:** Create opportunities to apply their learning in a practical way (lab, project, internship, competition)
- **ACCELERATE:** Support and accelerate the growth of viable enterprises.

Below we show an example of the interventions currently available at MIT to illustrate this approach:



Trust Centre Entrepreneurship Ramp (Source: **https://entrepreneurship.mit.edu/**)

As an institution, it would be interesting to complete the attached template with the activity at your institution:



Entrepreneurship is a "craft" as opposed to a science or an art (Bill Aulet, MIT) and therefore requires some learning of the basic concepts in classroom settings but also opportunities to learn by doing. The craft analogy also then opens doors to viewing entrepreneurship as a profession like medicine and architecture. **Learning by doing is critical.** This might be initiated in extracurricular activities in those institutions that have a more traditional approach to learning. Indeed, the more times a person engages with an entrepreneurial venture more likely they are to succeed (Prof Ed Roberts, MIT).

Entrepreneurship is not a spectator sport. Hands-on work and achieving results is one of the tenets of an entrepreneur (Bill Aulet).

Internships, fieldwork, bootcamps and competitions play a key role in teaching entrepreneurship (these are covered in more detail in Section 4 Theme 5 below). This dual track teaching approach also provides relevance whilst not giving up academic rigour.

This approach, however, places increased demands on logistics – not least, access to a pool of great practitioners willing to give up time (see Section 4 Theme 6 below – Develop (and engage with) an active Alumni and/or Local Entrepreneurial Community).

We also recognise the role of the leadership of both faculties and the institutions as a whole in developing a co-curricular approach to teaching entrepreneurship. It cannot happen without complete buy-in from the senior leadership; however, if we track the evolution of early entrepreneurial teaching in institutions in the US, we see that this was often catalysed by students and alumni initiating activity that was then picked up by the teaching staff.

Theme 5: Provide a systematic approach to extra-curricular support for student start-ups

Student start-ups cover a broad spectrum of types of businesses. They are generally categorised into two types of start-ups:

- Subsistence (small businesses, unlikely to grow substantially or create many jobs)
- Transformational (catalysts for innovation, job reaction, productivity, and competitiveness).

Both categories of entrepreneurship are important as platforms for developing entrepreneurial mindsets, skills and experience, however transformational entrepreneurship has a far greater potential to drive forward economic development than subsistence-based entrepreneurship. **Transformational entrepreneurship** results in the creation and growth of **"Innovation Driven Enterprises" (IDEs).** In the context of the EC, these can be student start-ups or academic spin-outs (dealt with below). IDEs are scalable and may lead to enterprises of considerable size and impact. IDEs also tend to serve international markets (supporting a positive balance of payments). For example, a company based in Edinburgh may have its customer base located within 3 hours of its office. For a subsistence business this might mean customers in Inverness, for an IDE it would probably mean Krakow or Vienna!

Subsistence entrepreneurship provides an income and return for the founder but is not generally scalable. Subsistence-based enterprises are however important as they can provide a platform for the development of entrepreneurial skills that may later lead the founder to launch an IDE.

In successful ECs we see strong links between academic teaching and extra-curricular entrepreneurial activities (each feeding off one another). Indeed, in MIT, it was extra-curricular activities between students and alumni that triggered the provision of entrepreneurial education by the institution itself. A list of the activities that support entrepreneurship at MIT can be seen here: **Guiding Principles**

Start with "Inspire"

As described in Theme 4 above, we need to start with "Inspire". Developing an entrepreneurial mindset can often start with engagement in "innovative and creative thinking", e.g. Durham University "**Game Changer Initiative**" uses UN SDGs as a trigger to **inspire** students and staff into action. Not only do UN SDGs provide a call to action, but they also provide a common language (i.e. "impact") between academic curricular and extracurricular entrepreneurial activities. Game Changer is a fast-paced, **extra-curricular** innovation program that uses 'design thinking' to find impact driven solutions to UN SDG challenges. Its purpose is to foster ingenuity, creativity, and innovative design to deliver environmentally, socially, and economically sustainable solutions. This began as an initiative run by the Student Enterprise Team and is now being embedded across core curriculum teaching at the request of academic staff.

Provide access to a robust and systematic programme of support

ECs that perform strongly provide a wide range of flexible, user centric, extracurricular support (at scale and year-round) to students and recent graduates including:

- A clear programme of inspirational and structured learning opportunities for students
- Opportunities to apply their learning (projects, competitions, internships etc)
- Extensive interaction between students and alumni
- Professional support from experts outside the institution
- Access to case studies (on paper and in person)
- Signposting and access to infrastructure (incubators, labs, communities, platforms etc).

Activity is organised in a **user-centric** way, often student-led before being absorbed into the fabric of the institution's offering. These interventions can be delivered through the different delivery mechanisms of student enterprise support, societies, academic faculties, or externally organised.

Successful ECs create, signpost, and actively promote systematic and logical entrepreneurial pathways/frameworks for students, staff, and recent graduates, through extra-curricular activities. They:

- **INSPIRE:** Inspire students to engage in entrepreneurship via innovative and creative approaches that capture the imagination of students and staff
- **EXPLORE:** Encourage students and staff to explore opportunities to create impact often though global level challenges, eg. using UN SDGs
- **LEARN:** Teach the fundamentals needed to develop an entrepreneurial offering
- **APPLY:** Create opportunities to apply their learning in a practical way (labs, projects, internships, competitions)
- **ACCELERATE:** Provide support to help accelerate the growth of viable enterprises
    - Eg: **Imperial Enterprise Lab**
    - In MIT Martin Trust Centre we see the following pattern of activity through the year (see diagram above):
        - September: **Getting started** (Demo Day, "Yes I can", t=0 Festival)
        - Fall: **Increase exposure** (Low friction events, Classes, hubs)
        - IAP: **Starting to Commit** (fuse, StartMIT, Internships, $100K pre-Accelerator treks) **IAP – MIT ELO**
        - Spring: **In the race** (Advanced classes, competitions, service, independent studies)
        - Summer: **Total immersion** (Delts V Accelerator, other full commitment options).

National/International Competitions

At national (and international) level competitions provide a platform for new start-ups and spin-outs to demonstrate their capabilities. Examples of competitions include:

- **Converge Challenge**. Working in collaboration with Scotland's universities, Converge offers Scotland's thinkers and creators the opportunity to test, validate and accelerate their business idea from concept to commercial reality. The programme creates a diverse pipeline of investor ready companies. Converge is open to all university staff, students and recent graduates and the competition offers intensive business training, networking, 1-2-1 support and generous equity-free cash prizes.
- **Venture Catalyst Challenge - Imperial Enterprise Lab**
- **Stage Two** is the largest pan-European competition for the best start-ups spinning out of leading universities.

Theme 6: Develop (and engage with) an active alumni network and your local entrepreneurial community

Active engagement with an institution's alumni network and local entrepreneurial community has been critical in ensuring the successful development of ECs around the globe.

Successful ECs recognise the vital role that alumni and local entrepreneurs play in both developing an interest in entrepreneurship and delivering solutions amongst students and staff. This is seen in institutions such as MIT & Stanford where the interaction between students and alumni was a key catalyst for the development of an entrepreneurial culture across their respective institutions. At MIT, much of the current entrepreneurial activity can be traced back to October 1969 when a group of 10 locally based alumni organised a weekend seminar, "Starting and building your own company". We can track continued involvement and leadership of the alumni community through the 70s and 80s in different forms, including the publishing of the MIT Entrepreneurship Registers in 1971/72, listing the resume style information about each participant with the purpose of facilitating networking. The seminars were later turned into a book in 1974 "How to Start Your Own Business" described as follows:

"We think this book is unique because it is not a collection of success stories. Many of the authors are still only a few years beyond the start-up phase. They haven't yet had time to forget the problems of start-up or to romanticise them. It is this quality of immediacy that we hope to communicate to our readers."
William Putt 1974

It is noteworthy that we are revisiting this statement 50 years later to draw insights on the role and importance of entrepreneurial alumni in developing our ECs in Scotland.

From the above, we see the importance of engaging with an active alumni/local entrepreneurial community in starting and growing entrepreneurial activity across an institution.

The motivations of alumni with an entrepreneurial background to engage with their university or college are different to alumni who may have remained in the employment of others. This difference needs to be recognised in terms of how an institution reaches out to alumni who might support the development of their EC. Entrepreneurial alumni are often more motivated to spend time supporting student start-ups in terms of providing advice and support as well as identifying potential investment/non-exec opportunities, over and above simple philanthropic activity. As individuals they often have more flexibility to "get involved" (portfolio career, more flexibility in how they choose to spend their time, less corporate governance preventing them holding other roles etc). Those institutions that retain connections with their entrepreneurial graduates immediately after they graduate by offering access to the university's resources both socially (e.g. sports etc) and to support their entrepreneurial activities will, by definition, maintain closer ties. It is therefore beneficial for institutions to offer ongoing support to graduates as described in Section 4 Theme 5 above "Provide a systematic approach to extra-curricular support for student start-ups".

It is also not all about engaging with iconic founders. It is often the case that institutions focus on the very successful founders and entrepreneurs that have connections to the institution. Whilst this is understandable in terms of "crowd pulling" and potential philanthropic support, **there is much to be learned from founders who are still on their journey and for whom the challenges and learnings are still very fresh in their minds** (see William Putt's quote above). They may not know they have something to say, but should be sought out and encouraged to share their experience. Tapping into these communities and this knowledge is vital.

In addition to engaging with the alumni of an institution to develop entrepreneurial activity, engaging with the local entrepreneurial community is a key part of driving up levels of entrepreneurial activity across our institutions. In his book, **The Start-up Community Way,** Brad Feld states that **"Entrepreneurs must lead start-up communities"** for them to be successful. We rarely see this across our institutions with entrepreneurs being invited in to speak with students, rather than the entrepreneurs themselves actually driving the direction of travel when it comes to our institution-based start-up communities. Where it does happen/has happened (e.g. Boulder, Colorado) we see dramatic growth in these communities through collaboration with local academic institutions.

In terms of use of funding, successful institutions channel alumni funds into specific programmes of activity that encourage entrepreneurial behaviour amongst students, including competitions, hackathons, internships etc., rather than the money being handed to the university for more generic activities/works.

Theme 7: Develop support for academic/staff spin-outs

Although there are some overlaps, there are significant differences between student entrepreneurship (i.e. Student start-ups) and technology transfer from an institution to a spin-out.

	Student Start-up	Technology Transfer
Technology content	Lower	Significant
Time horizon	Shorter (months)	Longer (years)
Resources	MVP – lowest cost and iterative	Often capital-intensive R&D
Development approach	Identification of a need and development of a solution to that need	Often a solution in search of a problem
Aim	Usually commercialisation	Often primary education, learning to commercialisation
Customer input	Benefit from early customer input	Benefit from early customer input

It is understandable therefore that the conditions attached to spin-outs are different from those that might be applied to student start-ups. However, these conditions may have longer term consequences on the success of the spin-outs, hindering their growth and stopping them reaching their full potential. Institutions provide support to potential spin-outs; however, it can be the case that institutions, by trying to ensure a value return from their spin-outs (e.g. by taking significant equity stakes against intellectual property or taxing them relative to royalties), end up incentivising the founder to found an SME rather than grow an IDE. Those institutions that have adopted a successful technology transfer function create the conditions for the spin-out to thrive and scale resulting in the long-term return of value through various means including ongoing engagement of the founder with the institution over decades.

The relative performance of Scottish Universities (in terms of the number of spin-outs) compared to the rest of the UK was highlighted recently in **Spotlight on Spin-outs** report published by Beauhurst and The Royal Academy of Engineering.

Top origin universities by total number of spin-outs tracked since 2011 - Top 40 (Jan 2022)

1	University of Oxford	193
2	University of Cambridge	137
3	Imperial College London	106
4	University College London	88
5	University of Manchester	73
6	University of Bristol	66
7	University of Edinburgh	58
8	Royal College of Art	58
9	Queen's University Belfast	50
10	Swansea University	48
11	University of Warwick	45
12	University of Strathclyde	45
17	University of Glasgow	34
21	Heriot-Watt University	24
22	University of Aberdeen	23
25	University of Dundee	17
35	University of St Andrews	12

It is difficult to gauge comparative figures for outside of the UK. In an overall sense, when looking at Pitch Books tables of **colleges that produce the most successful entrepreneurs** (measured by the number of venture capital backed founders in their alumni) we see Oxford University leading Europe at number 47 in the list for Undergraduate Programmes (there are no Scottish universities in the top 100) and University of Cambridge and University of Oxford leading Graduate Programmes table for Europe (7th and 8th respectively) with University of Edinburgh 81st.

The above table also gives no indication of quality or ongoing performance of individual spin-outs. Whilst the overall number of spin-outs is a useful indicator, the number of successful spin-outs is a more robust indicator. A spin-out might be created but fail to achieve its ultimate potential for several reasons (lack of business training of founder, limiting commercial terms etc.).

Theme 8: Provide access to funding for student and staff-led enterprises

Access to appropriate levels of funding at specific times is critical for scaling businesses. Funding is available in many different forms from multiple sources. It is the lifeblood of a scaling business and enables the deployment of other resources such as talent while the business grows to a level where it can generate its own independent revenue streams.

In world-class entrepreneurial campuses, we see access to, and a balance between, government, institutional and private funding (PE, Alumni, VC etc).

UK and Scottish Government funding remains essential as core research funding in driving innovation, the foundation of a significant proportion of the entrepreneurial activity of an institution (potentially with years of lead time). Measuring the impact of funding is vital and, as such, we should focus on the level of socio-economic impact generated. We should include in our impact assessments the level of entrepreneurial success as a measure of research success, thereby incentivising academia to increase their focus on research which has potential for entrepreneurial success.

In addition to core research funding, in successful entrepreneurial communities and campuses we also see coordination across the ecosystem of funding bodies, providing access to funding aimed at various stages of business development including:

- Micro grants
- Proof of Concept/Prototyping grants
- Competition prizes
- Seed and Series A funding for growth.

By this we mean businesses (and in particular, IDEs) have access to grants and funding of appropriate amounts at key stages of development, e.g. micro funding at early stages of ideas testing, support pre and during development, incubators (see Civtech model) as well as access to patient capital for spin-outs and deep tech.

Over the past 2-3 years, funding has been made available to protect businesses though the pandemic; however, we now need to ensure that funding gets to the right organisations at the right time in order to support rapid economic growth.

It is critical to map performance and impact back to funding programmes so that we can continue to learn about where funding should be applied in the future. Recording funding and its impact was the subject of a recent **CivTech Sprint Challenge**, the output of which should be noted.

Building on the recommendations of the **Muscatelli Report "Driving Innovation in Scotland - A National Mission"** 2019 we agree with many of the recommendations made in this report and hopefully our thinking builds on these recommendations. In terms of funding, we agree that the Scottish Government via its agencies (SFC and Enterprise Agencies) should look to attract more funding from UK wide funders as well as from the private sector. Indeed, we hope that this paper articulates the clear common purpose of driving forward tech entrepreneurialism and that this will help in the alignment of funding and activity.

Coordination of UK and SG funding by sector, location or purpose is critical and we believe that greater impact can be gained in the entrepreneurial space in doing this.

In the recommendations and actions listed in Section 4 Theme 2 we describe the potential for our institutions themselves to invest in developing their own entrepreneurial teaching and activities needed to support their individual entrepreneurial agendas. This can be both in the form of investing in interventions (education, infrastructure etc.) as well as directly (via individual funds) in start-ups and spin-outs similar to the Northern Gritstone investment vehicle in England **Northern Gritstone – The value of ideas (northern-gritstone.com)**.

The **Scottish National Investment Bank (SNIB)** was established in 2020 as the development investment bank for Scotland delivering patient, mission impact investment to the Scottish Economy over 10 years (£2bn). Its three core missions are:

- Place Mission - Extending equality of opportunity through improving palaces by 2040
- Net Zero Mission - Achieving a just transition to Net Zero
- Innovation Mission - Harnessing Innovation to enable our people to flourish.

Whilst the Bank's minimum investment size is £1m (far too high for start-ups) we believe that there is an opportunity for SNIB to facilitate funding of start-ups via a tertiary education focused fund that, for example, supports start-ups and/or by funding the Summer School Programme/ Incubator in a similar way that Tranzfuser has done with UK government funding.

Under the Bank's Investment Strategy we see:

1.1.1 Investment in Tertiary Education
Scotland has a strong and enduring reputation as a leading provider of tertiary education. It is expected that the Bank will be able to support the Scottish tertiary education sector with investment in specific capital projects in Scottish universities and colleges to ensure they maintain their reputations as internationally leading tertiary education and research providers; and, in supporting the development of university-developed and incubated innovative businesses and projects.

Funding approaches are the subject of other STER addendum, and we propose that their lead is followed and aligned across the tertiary education sector.

Theme 9: Create a vibrant and developing pre-16 talent pipeline as well as attracting entrepreneurial students from around the world

The focus of our report to this point has been the activities during and immediately after attendance at one of Scotland's post-16 institutions (colleges and universities). However, it would be wrong to think that entrepreneurial activity in the education system should be limited to the activity of 16-year-olds and over. The student's entrepreneurial journey starts at preschool. Indeed, if we look to countries like Estonia, we see that investment in STEM and introduction to problem solving etc. starts at a very early age.

Raising a Tech Savvy Nation: In Estonia - even Kindergartens teach robotics

More than half of schools and a number of kindergartens in Estonia teach children programming and robotics through play, so that they would – without too much effort or screen time – pick up IT skills.

It is not only sensible but also effective (in terms of developing core meta skills) to start to think about developing an entrepreneurial mindset at an early stage. We have, after all, taken a user-centric approach to this paper and by starting their entrepreneurial learning journey at school, pre-16-year-old students would arrive at college and or university better prepared for activities offered during their tertiary education phase (indeed with an expectation of being able to continue). This would create an elevated starting point for students arriving at our colleges and universities, with students arriving with similar and enhanced levels of interest and capability.

Similar frameworks apply to pre-16 students as they do to students post-16, maybe with slightly different emphasis.

There is still a need to engage students in the opportunity that entrepreneurialism offers, so we can still apply:

- **INSPIRE: Inspire** students and staff to engage with the entrepreneurial space via innovative and creative thinking - whatever their motivations and potential destination
- **EXPLORE:** Encourage them to **explore** opportunities to create impact
- **LEARN: Teach the fundamentals** needed to develop an entrepreneurial offering
- **APPLY:** Create opportunities to **apply their learning** in a practical way (lab, project, internship, competition)
- **ACCELERATE:** Support and **accelerate the growth** of viable enterprises.

We see a number of interventions relating to pre-16 years education which we have included here. Some of the examples listed are delivered within our colleges as well as our high schools:

Young Enterprise Scotland

Young Enterprise Scotland (YES) runs a series of well proven and inclusive challenges and programmes across Scottish schools and colleges helping young people to discover who they are and what they are good at. YES has a broad programme portfolio covering many aspects of education including enterprise, teamwork, circular economy, creative thinking, financial literacy and employability. Their focus on enterprise inspires and teaches young people the basics needed to engage in this space as they grow.

Fuel Change

Fuel Change runs a series of programmes aimed at young people at both schools and colleges. Their aim is to engage the next generation within the workforce to drive a positive transition to Net Zero. As well as their successful programme "**Challenge for Workplace**" they run a programme for schools, "**Challenge for Education**", where students take on real world climate challenges set by industry. As well as developing a strong understanding of climate impact and challenges, the students engage in an environment of teamwork, decision making, problem solving, Creativity, leadership and innovation and feedback.

In the same way that we advocate in our post-16 campuses the importance of "purpose" and "inspiration" as the motivator to act, we see programmes such as those mentioned above as critical parts of our education that, in some instances, will lead to direct entrepreneurial activity – and in others, will provide the young person with the tools that they need to flourish whatever their chosen career path.

Theme 10: Establish a framework for change and a robust quality assurance approach

We recognise that this change will happen over an extended period of time and therefore the impact of the change will need to be measured over several years if not multiple decades. To help ensure that the change is successful we are proposing an approach where we:

- Understand your current maturity in terms of entrepreneurial activity
- Adopt a change framework that provides a common language and approach
- Identify key measures and KPIs
- Establish a Quality Assurance approach that focuses on the quality of the **inputs** rather than purely measuring the **outputs** achieved.

Understand the current maturity in terms of entrepreneurial activity

On any journey we need to establish the start point and have an idea of the ultimate destination (recognising that this will change over time). We can then measure the **distance travelled** as each institution progresses along its pathway. It is this distance travelled that is important to track within each institution/region as a comparison across and between institutions/regions is fraught with issues (this does not, however, mean that we cannot learn from each other and share best practice etc.).

We are proposing a simple three tier system to help an institution understand where it is on its individual entrepreneurial journey.

Bronze: The institution demonstrates significant progress and achievement in at least 5 of the actions/recommendations listed above (with at least one from Section 3 Theme 3: **Establish institutional policies that support the development of an entrepreneurial mindset in students and staff**)

Silver: The institution demonstrates significant progress and achievement in at least 10 of the actions/recommendations listed above (with at least three Section 3 Theme 3: **Establish institutional policies that support the development of an entrepreneurial mindset in students and staff**)

Gold: The institution demonstrates significant progress and achievement in at least 15 of the actions/recommendations listed above (with at least five from Section 3 Theme 3: **Establish institutional policies that support the development of an entrepreneurial mindset in students and staff**). In addition, plays a significant role in leading the development of Entrepreneurial Campuses both regionally **and** nationally.

We believe that the accreditation gained will also help to support the external-facing activity of an institution (student recruitment, business connections etc.) – providing a data point of the capability and outcomes of the institution in terms of entrepreneurial activity.

This accreditation framework will be further developed during the implementation phase.

Adopt a change framework that provides a common language and approach

We believe that a change of this magnitude requires a change framework to support its implementation. Changes of this scale are complex and often difficult to achieve. However, with a framework that helps to identify and address the barriers to the change that we see in a "multi-organisational" change, we believe that there is a better chance of a successful implementation. We outline a high-level framework in Section 4 below.

For each stage and part of the change we need to understand the commitment to, and readiness for, the change across each of the stakeholder groups as well as the culture and belief sets that make up the environment on each campus/organisation. **It is critical that we have commitment and drive from the leadership teams of each of our institutions and delivery organisations to ensure that this change is successful.** All of the above needs to be supported by a robust and comprehensive communications plan that addresses the concerns and potential resistance to the change.

Identify Key Measures

Tracking this sort of change, and the impact thereof, is not easy, partly because the change has so many moving parts and partly because the indicators and measures are tracked across several years making it difficult to course correct in a timely fashion. We do however need to establish relevant KPIs that can be used to monitor the direction of travel of the change itself and also provide an indicator of the socio-economic impact of delivering a successful entrepreneurial campus.
Tracking of progress should NOT be seen as a competition between institutions. Measurement should be focused on "distance travelled" in a specific region/community/institution over time, rather than between (what might be) very different regional conditions.
The measures should also be closely linked to the funding of the specific inputs/interventions to ensure that we continue to fund only those activities that achieve the impact that they are intended to achieve (in a particular region).

We believe that we should look to the interventions that others have adopted to achieve success and follow their lead. We should focus on the quality of the individual inputs to the system rather than simply wait to measure the outputs of any interventions. In doing this we are moving the agenda forwards without having to wait for specific KPIs and lagging indicators to measure progress. As institutions we should be asking ourselves how many of the recommendations in this paper my institution have already implemented.

To begin the journey, ask: "Does my institution…?":

- Seek out international best practice and bring it to Scotland and implement it?
- Create an environment that celebrates entrepreneurial success and normalises the entrepreneurial journey?
- Have a student incubator?
- Have an appropriate number of Entrepreneurs in Residence on the staff?
- Search for founders in the institutions and equip them for their foundering journey?
- Take a reasonable equity stake in spin-outs that enables the ongoing success of the business and encourages follow on investment and inspires future founders?
- Integrate entrepreneurial teaching across the curricular into all the non business school subjects?

- Take business school students, technical students, and creative students and align them in start-up simulations?

We outline some further thoughts on measurements in Section 4 below.

Quality Assurance of inputs rather than measurement of outputs

We recommend that a strong **quality assurance** regime is established that supports the spread of best practice. This will greatly improve the likelihood of success by ensuring the quality of the **inputs** to the system. An example of this might be:

Establishing the role of Entrepreneur in Residence (EIR) is recognised as having a positive impact on the quality of entrepreneurial teaching and support in an institution. The impact of the individuals appointed into these roles will only be as good as the capability and experience of the individual EIR undertaking the role and the time that they are able to spend delivering. It is vital therefore that the right calibre of person is appointed and that the role profile of a potential EIR is developed, and shared, and best practice is baked into the role.

For example, we would propose that successful candidates might have the following attributes:

- Have founded their own company or has been deeply involved in the venture community
- Have worked internationally across different cultures
- Have raised funds and/or sold a bootstrapped business
- Have experience of growing a company from a handful of employees to a scaled entity
- Have experienced failure and learned from it
- Looks externally for best practice
- Have time to deploy their experience and expertise to the institution.

Quality assurance is not a simple box ticking exercise; it is vital so that we can maximise the potential for success. We see examples of where this has been successful in **CivTech** where they take great care over the quality of the people that they deploy to support their start-up cohorts.

Driving change to achieve our ambition

Strategy and direction are in themselves not sufficient: what we need is action. It is clear from the above that there is a significant potential that we can achieve should we get it right.

In the following section we list a series of actions that we believe will have a significant positive impact on our economy and support our ambition laid out in NSET. Whilst a handful of our higher education institutions have achieved a level of success in terms of delivering/supporting entrepreneurial driven economic impact, there is far more that can and should be done within each institution and across our regions. If we compare our overall impact to that of other UK, European and US institutions, we realise that we have a long way to go to reach the levels of success that we will require to achieve the “tipping point” and subsequent economic transformation outlined in NSET. We note that many of the most successful Entrepreneurial Campuses around the world have evolved over 50 years, leaving Scotland a long way behind the pack at a national level. This report has focused on what we can learn from these institutions and apply to our current level of capability (which varies across Scotland).

4

Actions/ Recommendations

4 Actions/Recommendations

In the following section we provide recommendations and actions for how to build a successful entrepreneurial campus. We see some of the activities described present in a number of our institutions who are already demonstrating entrepreneurial success. However, across all institutions, we see an opportunity to collaborate, evolve and adopt the attributes and behaviours that have led others to globally recognised levels of positive economic impact.

Theme 1: Align and interact with your regional ecosystem and external partners to accelerate

By focusing and aligning our entrepreneurial activity around our regional plans we will amplify the impact of our efforts. Working across the academic and private sectors will also drive breakthrough innovation and deliver impactful solutions.

Theme 1 - Regional Alignment Action 1 (All Stakeholders)

Develop an aligned "place based" approach that forges close links and strong industrial collaborations across your regional stakeholders

- Balance national economic growth objectives with regional economic diversity through regional and city deals funding/Innovate KTN place based funding etc.
- Align with existing clusters e.g., Tech clusters **(Scottish Cluster Ecosystem Alliance - SCEA)**
- Build sector specific alliances that support a specific regional focus
- Create international collaboration and links based on regional/sector focus
- Align activities and share knowledge across colleges, universities and private sector incubators, accelerators, and venture studios within your region/neighbourhood
- Locate specific programmes where the relevant seat of industry is located (e.g., Media Studies at MIT is based in New York as opposed to Boston).

Theme 1 - Regional Alignment Action 2 (Institutions)

Collaborate and align across institutions within a region sharing programmes and initiatives rather than replicating them on each site

This is particularly important where:

- **Subject mix of a particular institution is limited** and would benefit from a variety of inputs (eg. Institutions may offer business studies but not computer science etc.)
- **Institutions are small and do not have the resources required** to evolve an EC
- Institutions with **established experience in entrepreneurship education** should share resources with others at a local or regional level

- **The pathways for students are aligned around the student journey.** With a third of students in Scottish universities articulating from colleges, it is important that entrepreneurial interventions and teaching are aligned in a user-centric way (eg 2+2 courses between colleges and universities, shared extra-curricular activities, access to competitions for both colleges and universities).

Theme 1 - Regional Alignment Action 3 (Institutions)

Simplify and enable access to academics for businesses looking to innovate

- Enhance business engagement by ensuring that the interface between institutions and businesses is stupidly simple
- Learn from **MediaX**, the industrial affiliate program that brought Stanford and industry together on a range of topics that combined issues of human performance with technological solutions. (Note: MediaX has recently published its 'playbook' outlining how it achieved success over 21 years)
- Coordinate/align the activities of **Interface**, **SG Innovation Centres** and Innovate KTP relative to our EC agenda.

Theme 1 - Regional Alignment Action 4 (Techscalers/Institutions)

Map and align the activities of Scotland's Techscalers and local/regional institutions

- Facilities and programmes
- Extra-curricular activities
- Learning and teaching/curriculum.

Theme 1 - Regional Alignment Action 5 (Institutions)

Provide access for graduates and local entrepreneurs to your institution's incubator programme and campus resources

- Offer aspiring graduate/local entrepreneurs free or low-cost space and high-quality business support along with connections to local, national, and international business networks
- Encourage more graduates to remain local, boosting regional economic growth and job creation as well as give back to their local university or college.

Theme 1 - Regional Alignment Action 6 (Government)

Investigate how Venture Studios/3rd party Incubators/accelerators might support the Scottish entrepreneurial ecosystem

- Review existing Venture Studio offerings
- Review the learnings and approaches that can be taken from programmes such as **CivTech**.

Theme 2: Inspire young people to engage in entrepreneurial thinking through social and impact-led activities

Inspiring young people to engage with and develop an entrepreneurial mindset is a critical first step in raising the bar around entrepreneurial education. Social impact and wider impact creation can be used as a 'hook' to inspire young people to consider entrepreneurial activity more generally.

Theme 2 - Inspire Action 7 (Institutions)

Broaden the focus of entrepreneurial activity to include social and impact-led entrepreneurship as part of 'mainstream' entrepreneurship teaching and support

- **Curriculum Development** drawing on global standards and best practice
- **Programme support and development:** e.g. Entrepreneurial competitions, challenges and other early engagement activities to embrace impact and ESG – e.g. Social Investment Scotland (SIS) are strategic impact partners to Converge; and advisors to Scottish EDGE. These activities should be extended
- Particular consideration should be given to making **programmes attractive and accessible to all.** These early interventions should encourage entrepreneurial activity by people that are currently under-represented in start-up and business growth activity
- **Structured support on diversity, ESG and impact.** Interventions should be part of a systematic approach to entrepreneurship (both academic teaching and co-curricular experience).

Theme 2 - Inspire Action 8 (Government'/Agencies /Institutions)

Provide a range of funding to our emerging social and impact-led businesses

- **Provide funding to SIS (or similar)** to develop the entrepreneurial activities above
- **Align existing and future funding** in social and impact-led businesses with regional and educational funding of entrepreneurship
- **Universities invest in social ventures/ enterprises.** Eg. Edinburgh University is an investor in the SIS-led Scottish Social Growth Fund, which provides debt funding for social enterprises. There is a potential to de-risk investments and attract other investors, building an unique fund, or range of financial grant/loan/equity blended products, eg: Northern Gritstone investment vehicle **Northern Gritstone – The value of ideas (northern-gritstone.com)**.

Theme 2 - Inspire Action 9 (Institutions)

Work with organisations like (SIS) to leverage the full potential of combined networks

- **Local communities** – individuals, third sector organisations, social enterprises, and local business. Includes supporting Community Wealth Building and place-based approaches (focus on engaging with communities experiencing multiple disadvantages). We note the activity of **Preston City Council** in this area
- **Students, teaching, and support staff (past and present) and alumni.** Allow those gaining life experience to develop their enterprising ideas

- **Joining up social entrepreneurial activity across regional communities:** eg SIS's Retail Academy – Connecting buyer teams (including a university procurement team) to social enterprises.

Theme 2 - Inspire
Action 10 (Institutions)

Maximise use of regional and national resources/assets to progress positive social and environmental outcomes

Our institutions present a significant opportunity for creating social and environmental value through re-imaging how they approach the full range of their activities. Some success areas which could be amplified include:

- Incubators and support for innovation
- Research staff and teams supporting impact propositions particularly through research expertise and impact evidence
- Knowledge exchange
- Tech transfer
- Procurement – social, local and fairtrade supply chains broker activity
- Onsite retail units – preference for social/local suppliers
- Campus events and festivities – providing opportunity to showcase social and local supply chain and initiatives.

Theme 2 - Inspire
Action 11 (Government)

Create a National Centre for Social and Impact-led Entrepreneurship that provides services to institutions, helping them to develop their social entrepreneurship offerings. The Centre would:

- **Connect 16+ education campuses with social entrepreneurship expertise**, facilitating access to knowledge, expertise, industry placements, social supply chains
- **Signpost and provide funding mechanisms.** There is interest from the university sector in exploring funding models, driven partly by the wealth of some universities via their own endowments, and student-led pressure to ensure these are invested responsibly
- **Inspire and support the student body & teaching teams etc to develop impactful enterprising activities** that maximise positive social, environmental, and economic outcomes for the people of Scotland, and beyond.

Theme 3: Establish institutional policies that support the development of an entrepreneurial mindset in students and staff

Many of the successful institutions have taken decades to develop their entrepreneurial offering (e.g. MIT – 50+ years!). In Scotland, we have the opportunity to learn from these institutions and accelerate the development of our ECs. We need to adopt policies that drive rapid evolution and development of entrepreneurial activities over a far shorter period of time. Those institutions who have developed at pace have senior leadership that have prioritised the development of an entrepreneurial mindset across their institution, funding activities and fostering behaviours in line with their institutions mission.

Theme 3 - Leadership Action 12 (Institutions)

Senior leadership prioritise the development of an entrepreneurial mindset across their institution creating a culture that embraces entrepreneurship amongst students, staff, and academics

- **Raising the profile of achievements in entrepreneurship, rewarding staff accordingly and providing academic pathways across all of the following:**
  - Industrial collaboration
  - Start-up facilitation
  - Teaching
  - Research.
- **Encourage and reward diversity of thoughts amongst academics through gaining experience in start-ups, scale-ups and other external bodies, but strongly encourage them to return to academia** to share the knowledge gained and continue with their research
- **Develop locally relevant, entrepreneurial focused, KPI's and assign accountability**
- **Celebrate entrepreneurialism and entrepreneurs and create a dynamic and energetic culture** that actively encourages students & staff to explore start-up ideas
- **Encourage experimentation** with different approaches to entrepreneurial development (testing new courses, extra-curricular activities etc).

Theme 3 - Leadership Action 13 (Institutions)

Ensure that staffing levels (including external mentors and advisors) support the potential for entrepreneurial behaviour across the institution

Eg: Imperial College London (ICL) has c. 20 staff actively supporting student enterprise. Staff members actively connect with 1 in 8 students at the institution. This level of staffing excludes mentors and expert advisors (of which there are c. 140 at ICL).

Theme 3 - Leadership Action 14 (Institutions)

Create an organisational structure and accountabilities that strengthen entrepreneurial teaching and support in your institution

Individuals who are given the accountability for developing entrepreneurship across an institution also require accountability for (or strong influence over) the key foundational elements of entrepreneurialism including: innovation, research and alumni/business engagement and fundraising.

Theme 3 - Leadership
Action 15 (Government)

Partner with, and leverage, government funded/3rd sector organisations that have relevant expertise

Extend funding to enable organisations to engage directly with institutions and advise/deliver service/training programmes that support entrepreneurial learning. Organisations include:

- **Civtech**
- **Social Entrepreneurship: Social Investment Scotland (SIS)**
- **The Lens**
- **Codeclan**
- etc.

Theme 4: All students undertake credit bearing courses in support of entrepreneurial development as well as set and optional cross-faculty, practical entrepreneurial learning opportunities during their student journey

Develop a curriculum that delivers high quality entrepreneurial education

Theme 4 - Curriculum
Action 16 (Institutions)

Offer high-quality, credit bearing entrepreneurial courses to all students and postgraduates. Courses should:

- **Inspire and encourage** the development of an entrepreneurial mindset
- Deliver specific entrepreneurial skills (internet economy, product development etc.)
- **Promote social and impact-led entrepreneurship**
- Be tailored to **support regional/sector aims.**

Theme 4 - Curriculum
Action 17 (Institutions)

Attract and develop high quality computer science students by providing flexible pathways into education. eg:

- Offering Modern and Graduate Apprenticeships in CS
- Broadening frameworks to include UX, design and product development techniques
- Increase the number of 2+2 courses shared between colleges and universities within a region.

Theme 4 - Curriculum
Action 18 (Institutions)

Technology students should be taught the fundamentals of the internet economy through case studies of tech start-ups and be exposed to internet economy best practice in product development. Leverage external organisations such as **CodeClan** and our Techscaler network in delivering capability eg:

- Personal development (eg: ideas generation, team development, interpersonal/ soft skills, career application)
- Product definition and delivery (eg: UX design, Prototype development, no-code/low-code, product market fit, market research, strategy)
- Venture development (spectrum of capabilities that are required to scale an organisation).

Theme 4 - Curriculum Action 19 (Institutions)

Students have access to a significant number of co-curricular, cross-faculty, entrepreneurial based courses including learning about tools/techniques and have the opportunity to apply their learning in lab-based/project based/internships.

- Offer students **full semester courses focused specifically on high tech entrepreneurialism**
- Align extra and co-curricular activities creating a natural reinforcement loop.

Theme 4 - Curriculum Action 20 (Institutions)

Students participate in interdisciplinary/ joint undergraduate projects

Encourage interdisciplinary working between different faculties/schools and disciplines (eg joint projects between computer science students and business school students etc).

Theme 4 - Curriculum Action 21 (Institutions)

Provide field trips and learning experiences to regions where best practice is demonstrated (e.g. Silicon Valley).

Theme 4 - Curriculum Action 22 (Institutions)

Offer courses in social and impact-led entrepreneurship alongside conventional "For Profit" Entrepreneurship

Students are taught global standards and practices for Impact Management, particularly in relation to impact investing.

- Financial services (social and impact investing including impact management, measurement, and practice; ESG investing)
- Business studies (teaching presents social and impact-led models as standard; how responsible business practices are embedded across business operations eg: people, environment, supply chain, local community, charitable activities and cross-cutting diversity and governance)
- Tech-based enterprises should include data integrity, security, protection from online exploitation
- Economics – Wellbeing economy, Donut Economics and Impact economy
- Students study community wealth-building approaches, models, implementations, and alternatives within co-partners (e.g. community banks, community housing land trust, cooperative, etc.). These experiences are formally linked to curriculum and learning at all levels, and they are not merely seen as "community service."

Theme 4 - Curriculum Action 23 (Institutions)

Ensure every opportunity is taken to review course content across all faculties, integrating entrepreneurial thinking, teaching, and approaches where applicable

- Potential for adding in broad as well as specific interventions
- Students themselves or student societies should initiate changes, nudging the institution in that direction (as happened in MIT).

Theme 5: Provide a systematic approach to extra-curricular support for student start-ups

Increase the range and number of user-centric extra-curricular entrepreneurial interventions available to students and staff across our institutions (e.g. events and programmes). A potential benchmark is Imperial College London Student Enterprise Lab which engages with 1 in every 8 students at the Institution over the period of an academic year.

Theme 5 – Extra-curricular support Action 24 (Institutions)

Provide structured, open, and extensive access for staff, students and graduates to entrepreneurial extra-curricular support not constrained by location, background, or personal circumstances

- **Adopt a systematic approach:**
  - Inspire
  - Explore
  - Learn the fundamentals
  - Apply the learnings
  - Accelerate growth.
- **Provide a start-up incubator programme** that provides students, graduates and staff access to high quality inputs and facilities including:
  - Learning and development programmes
  - A community of like-minded individuals
  - Access to tools and equipment (see below)
  - Access to mentors and advisors (see below).
- **Provide access to people with knowledge, experience and expertise** (in specific roles, eg EIRs, Venture Mentors). At Imperial College, students and staff have access to over 140 experts or mentors supporting start-ups. Note: Significant work is being done by Civtech developing a **Mentor Guide** and this should be leveraged across our institutions.
- **Provide infrastructure (physical and virtual).** Provide students and graduates access to high quality start-up incubators, labs, communities/ platforms etc. Students and staff also have physical and/or virtual access to social infrastructure to exchange ideas, learn from each other and collaborate across specialisms and domains. Assets might include:
  - 3D printers
  - Computing power
  - Knowledge resources such as IP training, finance, and product development knowledge etc
  - Mentors
  - Work-space, etc.
- **Create a register of assets, resources and services** that are freely available to students, staff, and local entrepreneurs.
- Recognise the benefits of supporting diversity and inclusivity. This includes all areas of diversity, eg. gender, thinking styles, culture and socio-economic background etc. Interventions should be congruent with the needs of the local area/region/community. Examples might include addressing:
  - gender balance:
    - WE Innovate @ ICL **WE Innovate - Imperial Enterprise Lab**
    - WE Accelerate @ ICL **WE Accelerate - Imperial Enterprise Lab**

  - economically challenged areas and the profile of students making up the institution's population – eg UWS

- **Facilitate student cross-society activities** (eg running joint events and initiatives between the "Entrepreneurial Society" and "Computer Club" etc.
- **Invite Alumni and local entrepreneurs to engage** with students considering starting or running a start-up.

Theme 5 – Extra-curricular support Action 25 (Government)

Establish and scale a national, cross institution competition for start-ups and spin-outs

Create/evolve a national competition that encourages and rewards both student start-ups and academic spin-outs. Competitions can be themed (similar to CivTech Challenges) or simply open to all "institution based" start-ups. One possibility is scaling out the **Converge Challenge**. Going forward Converge is looking at how it can evolve and adapt to a changing environment. Potential changes include:

- Extending the challenge to the college network (students and staff)
- Consolidate its regional model of engagement to ensure broader geographic participation
- Strengthen support for its cohorts and further develop the training programme etc.
- Consider multi-year funding to secure larger, more diverse, and ambitious cohorts.

Theme 5 – Extra-curricular support Action 26 (Institutions)

Create opportunities for CS students to experience developing products/prototypes as well as deliver a prototyping service

Several Scottish universities have established in-house software services that provide cost effective prototype development capability to both internal and external clients.

- **Hire student software engineers to undertake commissioned projects.** Students should be managed and mentored by professional software project managers or a member of academic staff. Projects supported include funded research and impact projects within a university through to providing consulting and development support to SMEs, social enterprises, and charities. University software services fill a gap in the market, providing low-cost, lightweight but reliable development capabilities that support impact focused collaborations, whilst providing students with valuable and paid work experience.
- **Scale this capability via Scottish Informatics and Computer Science Alliance (SICSA)**. Establish services at 14 SICSA member institutions through a federated hub-and-spoke model.
- **Enable very early-stage start-ups, whether university based or external, to access small amounts of funding to enable prototype software development work to take place (See Theme 8 - Funding below).** This capability would enable start-ups to road test and enhance their business model, seek additional investment based on the results and accelerate the growth of the start-up ecosystem in Scotland – as well as providing an opportunity for CS students to engage and learn.

Theme 5 – Extra-curricular support Action 27 (Government)

Launch a National Summer School for tech start-ups

As part of the fully immersive "Acceleration" Phase of entrepreneurial learning we see the success of Summer Schools such as the **Tranzfuser** initiative from the UK Games Talent and Finance CIC). A similar approach should be taken to address the broader tech sector, providing a focal point for early-stage IDEs. Teams taking part would have access to funding, an academy with bespoke learning materials, industry expertise, pitch development support, dedicated showcase floorspace, and the chance to pitch for prize money (c.£20k in the case of Tranzfuser). The opportunity will be:

- Challenge-based
- Independent, i.e. not attached to a particular college or university - nationally funded
- Be open to UK-wide (and further afield? applications but remain based in Scotland
- Provide winners with a pathway to entry into the pre-scaler and Techscaler network
- Ensure attendees are being paid during the period of the summer competition; experience from Tranzfuser indicates that the best graduates are more likely to be retained in the programme if this is the case.

Further example of a summer school: ICL **Summer Accelerator - Imperial Enterprise Lab**

Theme 5 – Extra-curricular support Action 28 (Institutions)

Deliver a range of extracurricular activities focused on grand challenges and creative problem solving

e.g.: Durham University **Game Changer Innovation Programme | Department of Economic and Social Affairs**, recognised as best practice by the UN in implementing SDG initiatives. The success of this programme has led to the production of a toolkit allowing the programme to be replicated in other institutions. To date it has been shared with over 35 universities including Princeton and Yale, with the ambition to collaborate on activity to increase engagement with the SDGs in higher education and ultimately driving entrepreneurialism.

Theme 5 – Extra-curricular support Action 29 (Institutions)

Make available more computer science and entrepreneurial internships to students

Provide simple access to: internships (for students) and, to interns themselves (for the host organisations). Encourage partner organisations to put forward opportunities for students. This will involve some level of flexibility in terms of time and subject flexibility from the student and institution.

- **Increase the number of technology-based start-up and scale-up internships available to students.**
  - Note: SDS are working on a project to look at how this might work
  - Engage with all sizes of organisation to establish intern opportunities
  - Provide grant support to start-ups who take on interns, provided they meet certain quality standards in the provision of those internships

- Work with and support **Entrepreneurial Scotland Saltire Scholars** and **AAI Employability** and other similar organisations to **increase the number of available tech based internships, particularly targeting international tech scale-ups**
- Continue to support and develop project based placements across the tech industry (again - targeting tech scale-ups) providing work placement experience for students through organisations such as **E-Placement Scotland**.

Theme 5 – Extra-curricular support Action 30 (Government/Institutions)

Develop/grow institution-based start-up events similar to SLUSH

Slush Helsinki is based at Aalto University, Finland. Aalto is an interesting university to reference as it has the following characteristics:

- Heavily student lead and student driven entrepreneurship
- Non prescriptive and experimental
- Well-funded with multiple programmes
- Focuses on ideation and collaboration
- Hosts SLUSH - "The World's Leading Start-up Event" - a key showcase for student and graduate start-ups
- VCs and trade journalists pay to attend
- Has a number of anchor organisations including Rovio, Microsoft
- Considerable disciplinary mix
- Contains Engineering, Arts & Business Schools resulting in an interesting fusion of mindsets.

Theme 6: Develop (and engage with) an active alumni network and your local entrepreneurial community

Successful ECs recognise the value of external input in supporting entrepreneurial development opportunities and provide access to experts.

Theme 6 – External/Expert Advice Action 31 (Institutions)

Connect, and create meaningful relationships, with your entrepreneurial alumni and local entrepreneurial community

- **Invest in alumni relations recognising entrepreneurial alumni as a vital resource** for the establishment and growth of entrepreneurial mindsets in the student and staff populations
- **Encourage and actively engage with your local entrepreneurial community**
- **Promote student start-ups and spin-outs to the alumni / local community** providing opportunities for students and staff to showcase their businesses directly to experienced entrepreneurs
- **Create specific programmes that recognise that the interests of entrepreneurial alumni and local entrepreneurs are often different to those of other alumni**
- **Create a defined programme of entrepreneurial activity.** Successful engagements with entrepreneurial alumni and local entrepreneurs are only effective if the institution has defined a strategy for entrepreneurial activity (i.e. the institution has a shopping list of activities similar to those listed in the Trust Centre activity illustration in Section 3 Theme 4 above). It is important to be clear on what is "the ask" of the alumni and local entrepreneurs.

Theme 6 – External/Expert Advice
Action 32 (Institutions)

Build a database of entrepreneurial alumni expertise that can be easily accessed and interrogated

We see similar and effective databases in the private sector e.g. JP Morgan Chase Alumni founded Companies: **https://www.crunchbase.com/hub/jp-morgan-chase-alumni-founded-companies** that provides a list of organisations founded by former employees of JP Morgan Chase.

Theme 6 – External/Expert Advice
Action 33 (Institutions)

Create roles within the institution that facilitate easy access to alumni as advisors and mentors - including:

- Entrepreneur in Residence (EiR) with specific and relevant experience:
  - Founded their own company or been deeply involved in the venture community
  - Worked internationally across different cultures
  - Raised funds and/or sold a bootstrapped business
  - Experience of growing a company from a handful of employees to a scaled entity
  - Experienced failure and learned from it
  - Looked externally for best practice
- **Potential for a sabbatical Student Union role "Entrepreneur Co-ordinator"** to coordinate activity across Student Societies and/or with academics.

Theme 6 – External/Expert Advice
Action 34 (Institutions)

Ensure graduate founders remain connected with their institution in order to coach the next generation of founders

We see successful institutions offering not only free support for business start-ups but also a continued connection into student clubs and societies at student discounted rates. Many students continue to engage with various different societies for many years (e.g. climbing, sports, business, etc etc) maintaining their connections to the institution.

Theme 7: Develop support for academic/staff spin-outs

Develop a supportive long-term culture and approach where spin-out "researchers turned founders" are seen as "future donors" rather than "short term cash cows". Academics should be supported in establishing a "spin-out" and also encouraged to return to an academic post within 3 years, enabling a virtuous circle of knowledge.

Theme 7 – Spin-out Support
Action 35 (Institutions)

Design and implement a user centric technology transfer approach that meets the founders' expectations in terms of timelines to complete an investment

This is particularly important for software/technology companies that need to move quickly to capture market share. Seed funding takes 3 months to raise. A spin-out can take in the region of 6–12 months to "spin-out" of an institution.

Theme 7 – Spin-out Support Action 36 (Institutions)

Reduce expectations of the level of equity to be retained by the institution

Ensure that there is sufficient equity left in the business to facilitate follow-on investment from external investors ensuring that the founder's shareholding in the company remains a motivation to continue and grow the IDE.

- Reduce equity stakes to levels that motivate founders and attract investors. Stakes must be practical and workable in the world outside of the institution (e.g. Stanford 10%, MIT 5%). These should be targets that we aim for
- Align equity stakes based on the specific level of pre-incubation and follow-on support provided to the fledgling start-up.

Theme 7 – Spin-out Support Action 37 (Institutions)

Where an institution requires involvement in the ongoing governance of a spin-out, ensure that the skill set, knowledge, and capability of the institution's representative on the spin-out's board is at the appropriate level.

Theme 7 – Spin-out Support Action 38 (Institutions)

Set royalties at rates that ensure that revenues are being used for rapid growth rather than paying debt

Royalties should kick in once the business has reached scale and reduced its liabilities.

Theme 7 – Spin-out Support Action 39 (Institutions)

Ensure that the level of support and engagement offered by an institution encourages future pay back and ongoing relationships between the university and founder

Active alumni founders are a huge asset supporting the ongoing growth of entrepreneurship in the institution. Work with start-up industry experts to ensure that articles/contract terms are appropriate and encourage ongoing relationships.

Theme 7 – Spin-out Support Action 40 (Institutions)

Provide support and education for spin-out founders:

- Improve their readiness to run a start-up
- Mentorship from experienced founders and investors
- Commercialisation best practice – Linking to recommendations in the Scottish National Innovation Strategy
- Link in with support offered by other Scottish Agencies – e.g. SE.

Theme 8: Provide access to funding for student and staff led enterprises

Access to timely and appropriate funding is crucial for start-ups and scale-ups.

Theme 8 - Funding Action 41 (Government/Agencies)

Establish an easy to access/ understand guide/directory listing grant-makers and inventors

Funding environments are both critical and often difficult to understand for a start-up. Guidance and direction are extremely useful to founders as they look at options to fund their start-up.

Theme 8 - Funding Action 42 (Government/Institutions)

Provide students with access to micro grants (linked to a learning programme) to test ideas

Example: ICL Discovery Fund: An experiential learning programme that provides specialist training and micro grants of £250 for students and recent alumni who want to explore and test early-stage ideas. **Discovery Fund - Imperial Enterprise Lab**

Theme 8 - Funding Action 43 (Government)

Provide a VC-managed Proof of Concept/Prototyping Grant Fund

Example: The **Techstart Proof of Concept Grant Fund** is a competitive pre-commercial grant awarding fund. The fund supports entrepreneurs in Northern Ireland with grants to explore the viability and commercial potential of an innovative concept. The fund is managed by **Techstart Ventures**. Applicants can apply (on a quarterly basis) for fully funded grants (paid in arrears):

- Concept Grant (up to £10K)
- Concept Plus Grant (up to £35k).

Note: This fund should be linked to the SICSA initiative for delivering prototypes discussed in Section 3 Theme 5 above

Theme 8 - Funding Action 44 (Government)

Create specific funds aimed at early-stage EC company development (take a regionally aligned approach)

These funds should be managed by a 3rd party.

- VC input into public-sector equity funding decisions should be a default
- Encourage co-location between investors and start-ups (e.g. at Techscaler hubs)
- Create a platform for matchmaking companies with investors
- Interrogate investment decisions/ outcomes rigorously and share the learning to create opportunities for more start-ups to benefit
- Investigate the potential of working with SNIB.

Theme 8 - Funding Action 45 (Institutions)

Encourage and enable institutions to invest in start-ups/spin-outs directly or indirectly

Some institutions have facilities to support student and early post-graduate start-up activity through limited seed-funding mechanisms. Whilst this is a positive approach, blurring the lines between teaching and investing can be problematic. In particular, by having academic institutions investing in companies, makes academic entrepreneurship education dramatically less effective as it undermines the educator's

role as an "honest broker" looking out for the students' best interest (Bill Aulet). How this is implemented needs to be looked at carefully, but there is a potential for a "cross institution" fund that might mitigate the above issue.

Indirect investment can also come in the form of funding of programmes and interactions that support the wider entrepreneurial ecosystem of the institution/region. Funding of these "inputs" is an important part of the overall funding of start-ups and scale-ups.

Theme 8 - Funding
Action 46 (All Stakeholders)

Provide access to, and active attraction of, Alumni, VCs and PE funding

Theme 8 - Funding
Action 47 (Government)

Provide access to reliable and intelligent funding

The expansion of the current CivTech Business Growth System to include post incubator support is a good example of how the Scottish Government is extending its wrap-around support and investing in the success of start-ups and scale-ups. A similar approach could be taken with start-ups emerging from our institutions.

Theme 8 - Funding
Action 48 (Institutions)

Investigate alumni funding opportunities

Funding from Alumni can be hugely important in initiating entrepreneurial interest and activity amongst staff and students (see Section 3 Theme 6 above) with alumni funding entrepreneurial education/competitions etc (rather than legacy buildings…).

Action 49 (Institutions)

Identify corporate funding opportunities

- **Support specific entrepreneurial programmes** e.g.: ICL's flagship programme that supports women studying at ICL to develop entrepreneurial and leadership skills and early stage business ideas **"WE Innovate"** is sponsored by BP, and **"WE Accelerate"** sponsored by Santander Universities. They also have a **Venture Catalyst Challenge** (with £90,000 prize money) sponsored by Huawei
- **The MediaX model,** outlined above, saw businesses paying a membership fee to join MediaX and take advantage of the services they offered/access to academics. Whilst this is not funding as such, it can create a potential revenue stream for an institution.

Theme 8 - Funding
Action 50 (Government)

Establish funding for an ongoing summer school programme

We discussed in Section 3 Theme 5 the concept of a Summer School and Competition for technology start-ups that is funded in a similar way to the Tranzfuser competition by the UK Games Fund **About - UK Games Fund** . We believe that a similar approach could be deployed supporting a competition/summer school for Tech start-ups based around a grand challenge.

Theme 8 - Funding
Action 51 (Institutions)

Establish funding that supports programs that drive diversity and inclusivity (e.g. **WE Accelerate - Imperial Enterprise Lab**) Include in this socio-economic diversity aimed at supporting students from more challenging socio-economic areas and backgrounds.

Theme 8 - Funding
Action 52 (Government/Agencies)

Include "entrepreneurial success" as part of the measure of research success

Positive socio-economic impact is an important outcome of research funding. We should focus research funding where we see an uplift in entrepreneurial activity, resulting in positive socio-economic impact. The above funding proposals will be aligned with any ongoing plans to review research and innovation funding as part of the Scottish National Innovation Review.

Theme 9: Create a vibrant and developing pre-16 domestic talent pipeline as well as attracting entrepreneurial students from around the world

Young people, whether they continue on to college and/or university or not, will benefit from exposure to entrepreneurial thinking. As discussed earlier in this document, we believe that the meta skills that underpin an entrepreneurial mindset are core skills (ideation, creating thinking, collaboration, confidence, problem solving etc) that will support learning whatever the destination of the student.

Theme 9 – Talent Pipeline
Action 53 (Government)

Create a talent pipeline of young people who are engaged, inspired and embrace an entrepreneurial mindset through their primary and secondary education

We propose several interventions in support of the above:

- **Embed into existing lessons/curriculum initiatives involving social and impact-led entrepreneurship and STEM related capabilities**. By doing this, we will encourage more young people to adopt an entrepreneurial and/or computer science focus as they progress through education. In terms of impact-led initiatives, the work of Fuel Change's **Challenge for Education** in schools and Founders4Schools' **Sustainable Futures Project** brings in these elements. In STEM we see initiatives in several areas including the work of Founders4Schools: **Maths for Girls** and **Effini** who are creating a library of **free to access data science learning materials** in both excel and python on a "not for profit" basis thus removing existing barriers for educators in providing ready to use knowledge, exercises and datasets aligned to the SQA's data science qualifications
- **Provide extra-curricular support to engage young people in an entrepreneurial mindset development** through programmes such as **Young Enterprise Scotland**.

Theme 10: Establish a framework for change and a robust quality assurance approach

Achieving the above will require a change framework to support its implementation. Many changes of this scale are complex and difficult to achieve. However, with a framework that helps address the barriers to the change that we see in a "multi-organisational" change, we believe that there is a better chance of a successful implementation. We outline a high-level framework below.

Theme 10 – Framework for Change
Action 54 (Government)

Adopt a framework/accreditation system to help individual institutions gauge their level of entrepreneurial maturity as a simple start point for future activity

We propose a three-tiered accreditation system:

Bronze: Demonstrates significant progress and achievement in at least 5 of the attributes listed above (with at least one from Section 3 Theme 3: **Establish institutional policies that support the development of an entrepreneurial mindset in students and staff)**

Silver: Demonstrates significant progress and achievement in at least 10 of the attributes listed above (with at least three from Section 3 Theme 3: **Establish institutional policies that support the development of an entrepreneurial mindset in students and staff)**

Gold: Demonstrates significant progress and achievement in at least 15 of the attributes listed above (with at least five from Section 3 Theme 3: **Establish institutional policies that support the development of an entrepreneurial mindset in students and staff).** In addition, plays a significant role in leading the development of Entrepreneurial Campuses both regionally **and** nationally.

As the Scottish National Innovation Strategy emerges, we fully expect our accreditation scheme to dovetail with any proposed accreditation schemes for clusters etc. to ensure a coordinated approach to support and funding.

Theme 10 – Framework for Change Action 55 (Government)

Establish a guiding framework for the change

To facilitate the overall change from the institution's **present state** to its **desired state** we need to establish a framework that we can work to. This change is complex and involves multiple organisations and stakeholders. It is therefore imperative that we adopt a systematic approach that covers each aspect of the change.

Change covers all elements of how we operate including strategy, people, processes, systems, resources, culture, and organisation structures. For each of the above elements of the change we will need to establish where we are starting from, where we would like to end up and the gap we need to bridge (and therefore the interventions that we need to deploy).

Initially we will need to identify the stakeholders and the various roles that they play within the change. These include:

Sponsor - The individual or group who can authorise the change without seeking approval
Target - The individuals or groups who must change (note: all sponsors, agents & advocates are also targets)
Advocate - The individual or group who propose/support the change seeking authorisation from a sponsor
Agent - The individual or group responsible for developing & carrying out the implementation plans.

For each stage and part of the change we need to understand the commitment to and readiness for the change across each of the stakeholder groups as well as the culture and belief sets that make up the environment on each campus/organisation. It is critical that we have commitment and drive from the leadership teams of each of our campuses and governing organisations to ensure that the change is successful. All of the above needs to be supported by a robust and comprehensive communications plan that addresses the concerns and potential resistance to the change.

We recommend an approach that ensures that the change is:

Understood - i.e. diagnosed correctly
Designed - i.e. the solution developed is fit for purpose

Implemented - i.e. effectively and successfully deployed
Evaluated - i.e. measured in terms of achieving the goal it set out to achieve.

Theme 10 – Framework for Change Action 56 (Government/Agencies)

Develop and adopt measures and KPIs that will demonstrate success

We are conscious that universities have a set of KPIs that are currently used to measure their success. We are proposing developing new North Star KPIs that directly support the ambitions of an entrepreneurial campus. One such measure might be:

The number of start-ups/spin-outs reaching scale-up status (i.e. companies that have found product market fit, have grown their turnover by at least 20% per year for 3 years and have over 10+ employees)

Further measures should also be considered and should also be aligned with the metrics being adopted by the new Techscaler network.

We also propose an input-focused approach which measures and rewards institutions where certain inputs that we know are needed are implemented. See below.

Theme 10 – Framework for Change Action 57 (All Stakeholders)

Establish a strong quality assurance regime that ensures the quality of the inputs to the system

In addition to the above North Star metric approach, we advocate a **focus on quality control** which will help ensure that any lagging indicators are successfully achieved (see above).

We have identified a number of operational level inputs that, if present (and delivered with quality), would indicate that the institution is achieving a positive direction of travel in terms of developing as an EC. We recommend that funding is aligned with these inputs and closely linked to a robust quality assurance approach that enables the identification and sharing best practice. These might include:

- Does the institution have a student start-up incubator programme that provides undergrads, graduates and staff with high quality inputs and facilities:
  - Within the institution itself?
  - Shared between institutions?
  - In partnership with a private sector organisation?
  - In partnership with a local authority/enterprise agency?
- What is the ratio of staff focused on student entrepreneurial activity to the number of students, e.g. ICL has 20 staff dedicated to supporting student enterprise and entrepreneurship in a role of c. 21,000 students (includes post grads)?
- Number of mentors and advisors employed (paid and voluntary) as a ratio to number of students?
- Number of students engaging with entrepreneurial activities (e.g. responding to questionnaires/invitations, attending events/competitions etc etc)? In ICL the ratio is 1 in 8 students engaged by their Student Enterprise Team
- Does the institution conduct joint undergrad projects between different faculties and disciplines? e.g. Business School, Computer Science School, Psychology (Human Factors), Creative Arts etc).

- Are start-up entrepreneurial and internet-economy techniques embedded into Computing Science and engineering courses?
- Does the institution run a summer school/start-up competition, or similar?
- Does the university employ EIRs? If so, how many?
- Does the institution offer a number of credit-bearing entrepreneurial courses to undergraduates?
    - Number available as core vs optional?
    - Are computer science students routinely taught about start-up techniques?
    - Note: Stanford offers 165 courses. MIT offer 75 classes across 5 schools
- Number of alumni actively engaging in entrepreneurial curricular and extra-curricular activities forming an entrepreneurial alumni engagement index
- Number of start-up businesses entered into a national competition e.g. **Converge Challenge** or other cross sector competition.

Theme 10 – Framework for Change Action 58 (Government)

Establishing an umbrella function to oversee the change across our tertiary institutions

The above recommendations outline the actions that we believe are needed in order to create a series of entrepreneurial campuses across Scotland. In doing so we believe that we will dramatically increase the socio-economic impact of our tertiary institutions.

To achieve this, we will need to accelerate the level of collaboration and sharing of good-practice sharing across the sector. There is also a need to develop a monitoring and tracking capability that supports the overall development of our entrepreneurial campuses over an extended time period. This will require resources and support. This may be able to be absorbed by one of the current Innovation Centres currently funded by the Scottish Government. the governance of the above will also link into any oversight body proposed as part of the Scottish National Innovation Strategy.

This umbrella organisation would establish the change framework and the hierarchy of KPIs that will be required to measure success as well as establish/support a cross institution collaborative forum.

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