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Community Paper

Digitizing Entrepreneurship for Impact

Prepared by the Global Future Council on Entrepreneurship

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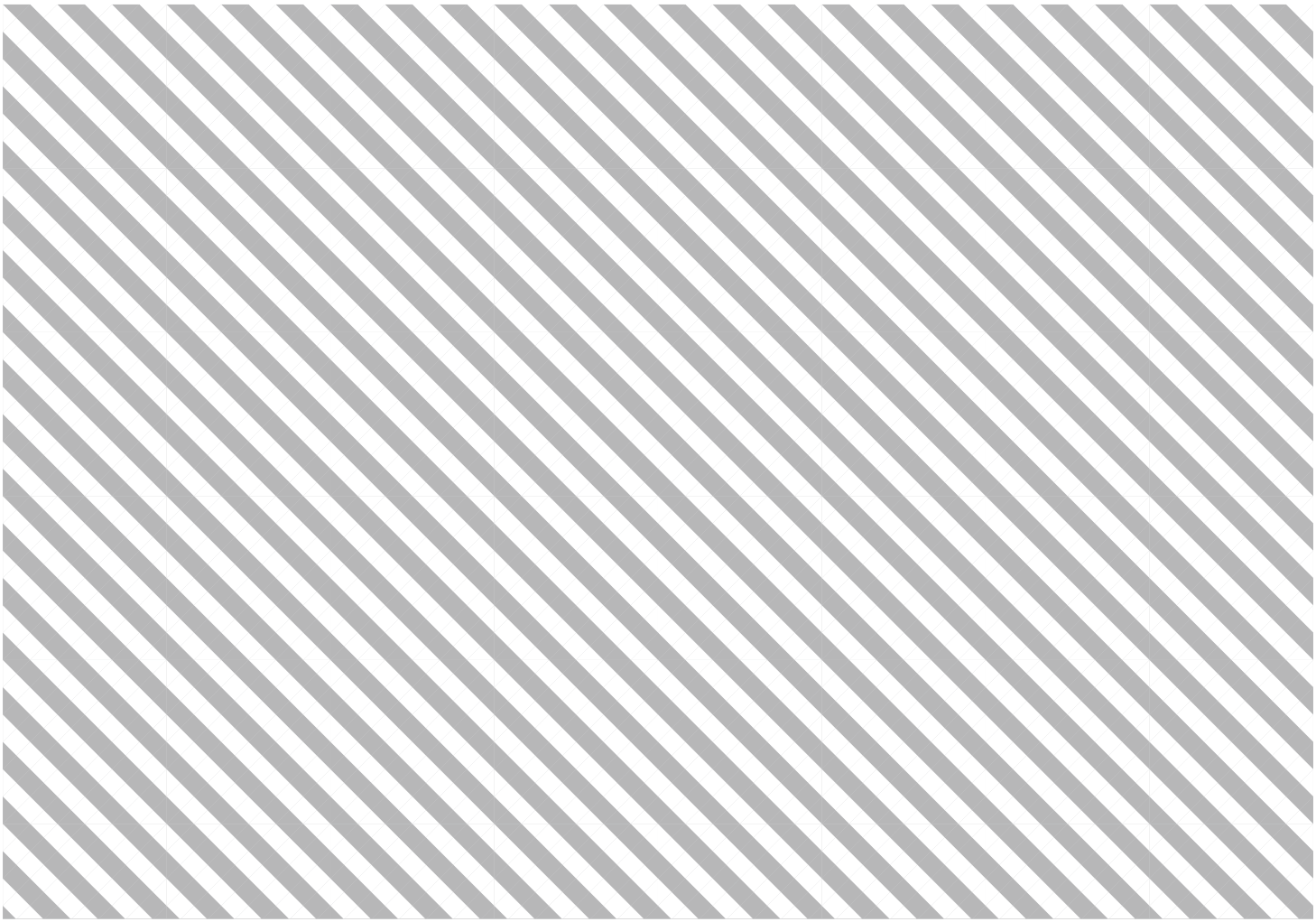

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Foreword

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Historically, entrepreneurship has been linked to new products, concepts or ways of working that revolutionized markets, and some of the most celebrated brands, ideas and products have developed almost iconic status. As such, entrepreneurship is often associated with stories of success and inspiration, promoting the desire to emulate these achievements. This has led a number of governments to invest in entrepreneurship ecosystems, with elements of Silicon Valley being translated in many countries, from *Silicon Savannah* in Kenya to *Medicon Valley* in Denmark and Sweden.

For years, establishing a specific geographical ecosystem to support local entrepreneurship has been a preferred strategy. However, digitalization is fundamentally changing the way entrepreneurs, firms, governments and academic institutions interact. For example, the role of the government is shifting; its support is needed through proper and transparent legislation related to data sharing rather than through physical backing. More broadly, while investing in such tangible assets as infrastructure and educational institutions remains important, digitalization is now enabling the rapid cross-border movement of both seed capital and the "intangibles" that previously were locally embedded: novel ideas, creative people and the culture of risk-taking. As a result, the need for a geographical anchor is shifting. An increasingly interconnected world is making the tools and support that foster entrepreneurship accessible and often more affordable.

Importantly, the blurring of previous boundaries is causing an actual geographic shift in the global spread of entrepreneurship, with the Global South positively entering the scene. This has led to greater awareness of the role of entrepreneurship in solving the world's greatest challenges and its influence in bringing about social, economic, climatic and political change while enabling new markets to be developed and new wealth to be created.

This paper is a practitioners' guide for how to enable greater entrepreneurial activity where it is most needed but where institutional resources may still be constrained. It is a product of the Global Future Council on Entrepreneurship, a council whose members have worked all over the world and launched successful ventures in places as diverse as China, Denmark, India, Japan, South Africa, Venezuela and, of course, San Francisco, and whose members include as many women as men who have been founders, policy-makers and corporate leaders.

The World Economic Forum provides an unparalleled platform for addressing digital opportunities and challenges in the Fourth Industrial Revolution as well as the urgent need for sustainable solutions and impact. For example, the Digital Europe initiative actively promotes the pan-European approach to strengthening the innovation ecosystem and regional competitiveness. As presented by the Global Future Council on Entrepreneurship in this paper, enabling entrepreneurs to connect and supporting their quest to build vibrant, sustainable ecosystems are paramount to leading the way on multistakeholder collaboration and ushering in the next generation of problem-solvers unrestrained by previous limitations.

Executive summary

Since the rise of Silicon Valley, national and regional governments have directed their attention towards entrepreneurial ecosystems, praising them as both key to promoting competitiveness and to achieving the innovation needed to meet the UN Sustainable Development Goals (SDGs). However, whereas it took 40 years for the auspicious mix of academics, corporates, investors and liberal governance to ignite in northern California, today's entrepreneurs have a well-known blueprint. But to be successful, the next wave of entrepreneurs and their enablers must consider new factors that influence their ambitions. First, entrepreneurs are no longer limited by the physical constraints of local hubs; they are able to easily reach counterparts across the globe, plug into digital platforms and use open data. Second, the growing focus on sustainability and the desire for impact must be inclusive of those outside major cities, as global issues, such as the SDGs, know no local limits.

"Digitizing Entrepreneurship for Impact" means the opportunity for all entrepreneurs, no matter where they are located, to contribute to solving global challenges. Whereas the gravitational pull of national and regional innovation hubs cannot be denied, the entrepreneurial spirit can awaken anywhere that a true challenge and creative idea collide, no longer limited by physical constraints. Digital connectivity (in many places once isolated but no less affected by problems facing the planet) now allows entrepreneurs working outside traditional hubs to make a difference by developing technological solutions that are relevant not only locally but globally.

There are many dimensions to empowering digital entrepreneurship for impact. This paper focuses on three:

1. Effective entrepreneurial education – going beyond skills to include both an internal mindset and external ecosystems

2. Responsible and resourceful data use – leveraging the importance of data to serve as both a motivator and catalyst of new solutions

3. Inclusive digital platforms – filling gaps in budding physical hubs, whose entrepreneurs gain value from sharing insights and resources.

Within each of these dimensions, this paper aims to clarify the changing role of the entrepreneur, identify the resources needed for success, and provide practical case studies, recommendations and metrics that serve as food for thought to anyone whose objective is fomenting entrepreneurial activity with impact.

Digitizing entrepreneurship for impact

Entrepreneurship comes in various shapes and forms across the world. It can be described in many ways: the Organisation for Economic Co-operation and Development (OECD) defines it as "enterprising human action in pursuit of the generation of value, through the creation or expansion of economic activity, by identifying and exploiting new products, processes or markets".[1] In essence, it is about solving problems and addressing gaps in society or markets with a for-profit, customer-driven model.

This paper is for entrepreneurs, policy-makers, corporate leaders and educators interested in using digital resources and ecosystems to foster entrepreneurship and enhance its impact. It is about entrepreneurship broadly and, in particular, *technology entrepreneurship* – ventures built around new technologies. In recent years, through innovative business models and network effects, technology entrepreneurship has demonstrated its potential to transform industries, solve global challenges and create exponential economic impact.

The barriers to entry to participate in technology entrepreneurship are decreasing constantly, as access to financial services and real-time information continues to rise. And, as individuals with passion and purpose choose entrepreneurship as their instrument of change in sectors as diverse as education, healthcare, renewable energy, agriculture and art, technology entrepreneurship increasingly serves the public interest.

Entrepreneurship is a collective exercise. Entrepreneurs cannot thrive in isolation: they need a functioning ecosystem that offers access to capital, talent, networks and other resources. Historically, access to these functioning ecosystems has depended on geographical location. It is increasingly possible for technology entrepreneurs to transcend physical barriers by using digitized ecosystems to access these resources.

However, more work is needed to fully unleash the transformative potential of technology entrepreneurship. How can digitization most effectively support entrepreneurship? And what are the key aspects that contribute to the development and success of a digital ecosystem that enables entrepreneurs to set up scalable and successful technology ventures? Exploring these questions is the purpose of this paper.

The changing role of entrepreneurs

The role of the entrepreneur needs rethinking in a world being transformed by digital technologies. For many in the next generation of entrepreneurs, business is not focused narrowly on maximizing individual economic utility. New technology entrepreneurs want to balance generating profits with addressing social and environmental concerns and improving society.

From climate change to inequality and poverty, novel digital solutions present opportunities for start-ups to mitigate both the causes and effects of today's biggest cross-border challenges. However, for entrepreneurship to be geared towards global problem-solving, some assumptions underlying current systems need to be re-examined. For example, innovations should not just spread from North to North or North to South, but also from South to South and South to North.

The technological and ideological context of entrepreneurship

The term "disruption" has become synonymous with a view of digital entrepreneurship associated with the culture of Silicon Valley: broadly speaking, that technology can save the world, new technologies are superior to old and ethical consequences – from digital privacy to energy profligacy – need not be fully thought through in advance but can be worked out as and when needed.

Such a culture risks sidelining human purpose and meaning. And it is not the only option. When the world was geopolitically more multipolar, technological innovation was more diverse and not always driven primarily by the desire to add incremental value for consumers and shareholders. The USSR, for example, devised Sputniks, ekranoplans and jet trains, while Gaullist France pioneered big, centralized systems, such as the TGV (still the fastest wheeled train in the world) and Minitel (the precursor to the internet).

As communism and French philosophy declined, so did the influence of the technologies they helped to inspire. Some ideological divergence in entrepreneurial contexts still exists today, evident most notably in Scandinavia, Japan and some emerging powers. However, the tech industry in China is largely emulating the Western model, and other nations lack the hard power to back up any alternative visions.

One result is that many start-ups are caught up in a form of track dependence. Smartphone companies emulate Apple. Drone makers assume that their designs should replicate helicopters or planes, rather than airships or ekranoplans. Car manufacturers make electric vehicles look like vehicles with internal combustion engines. These shackles on entrepreneurs often go unnoticed even by the entrepreneurs themselves, who are the people best placed to break them.

It bears reminding that entrepreneurship ultimately depends on creativity and design thinking. In a digital and globally interconnected age, entrepreneurship must be shaped by democratic institutions to serve societal needs and a greater purpose. Entrepreneurs should be agnostic regarding tech ideologies and should take a leadership role for the greater good.

Digitizing entrepreneurship

In today's fast-changing environment, an important question is how best to harness entrepreneurial resources, networks and experiences. In most regions, only a small number of companies are successful. The issues start-ups face are more or less similar around the world. Yet the potential to create synergy exists, by connecting local settings, sharpening awareness of global market potential and widening access to networks of thought leaders.

It is necessary to learn, share and link capabilities, markets and resources across geographies. And it is necessary to reconsider how best to accelerate start-ups towards maturity and scale. Global connectivity provides scope for digitized entrepreneurial ecosystems in which financing, markets, knowledge, experience and mentorship are independent of physical location.

Digital tools can help entrepreneurs to develop skills needed to think about creating change in ways that are attractive for other stakeholders, including funders, customers, employees and governments. Digitizing entrepreneurship can stimulate new models that address global challenges first in a local context and that can then be upscaled and sustained, using digital linkages to leverage knowledge, resources and skills in new localities.

Governments can help to stimulate innovation and harness the power of entrepreneurship by reducing red tape in procurement and tendering processes, and putting more effort into partnering with start-ups. In many places, government procurement spend on start-ups is still extremely low – less than 3% in the United Kingdom, for example (see Nesta, "A hard sell – why does less than 3% of government procurement spend go to startups?", available at https://www.nesta.org.uk/blog/a-hard-sell-why-does-less-than-3-of-government-procurement-spend-go-to-startups/).

The public sector also needs to work with the private sector to mitigate the risks of using digital tools, which are increasingly well understood and vary from potentially amplifying inequality to restricting privacy and perpetuating biases. All stakeholders need to work collaboratively to create an open, safe and trustworthy digital environment for entrepreneurs.

A digitized entrepreneurial ecosystem

The resources entrepreneurs need include financial support, skills, mentoring, networks, supportive government policies and support from society; a nurturing environment for entrepreneurship needs many parts and stakeholders. Digital technology can help to catalyse the initiatives of governments and the private sector to create a holistic global entrepreneurial ecosystem that enables sharing, learning and access to resources at a mass scale and at low cost.

In this paper, three key aspects for a digitized entrepreneurial ecosystem are examined: (1) developing entrepreneurial talent by spreading best practices in educational and entrepreneurial programmes around the world; (2) ensuring access to data and an understanding of the role of data; and (3) promoting platforms to help entrepreneurs connect to global networks. These three elements are interconnected and together form a solid basis to digitize entrepreneurship.

Entrepreneurship: Is it taught or developed?

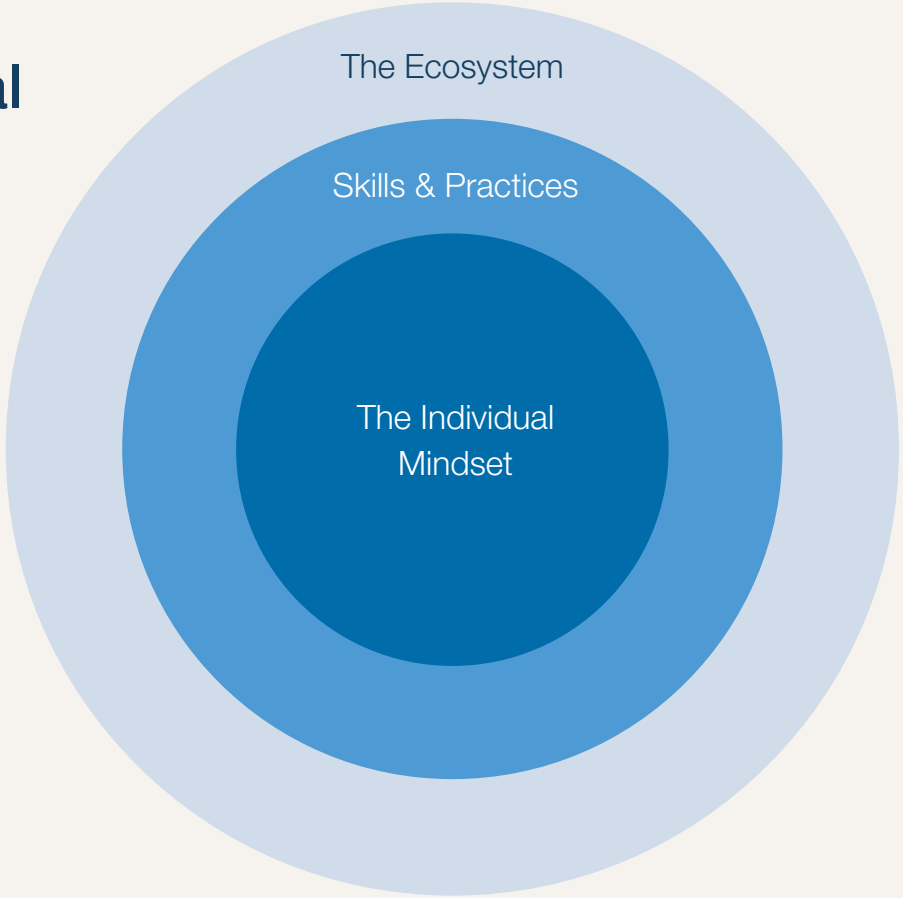
Sluggish economic growth, escalating inequality and a burgeoning youth population have spurred many nations to push for greater entrepreneurial activity. Education is widely recognized as key to democratizing access to entrepreneurship and creating the next generation of entrepreneurs. However, educational programmes to drive entrepreneurial activity differ vastly in approach, quality and impact. Historically, they have focused on textbook-driven theoretical training, business planning and ideate-and-pitch programmes.

Innovative programmes around the world – how they are structured, how they operate, who and what they focus on, and their intended outcomes – offer best practices in the three spheres illustrated in Figure 1.

At the centre is the *individual mindset* – the personal psychological and transformative journey an individual must travel to form the conviction to pursue an entrepreneurial life path. The mindset needs to be actualized through *skills* and *practices* stimulated in a controlled environment that provides the budding entrepreneur with an immersive learning experience. Finally, new entrepreneurs need an *ecosystem* that supports their ongoing growth, upskilling and access to the tools and resources they need to develop their ventures.

Within each of these spheres, this paper outlines the critical principles entrepreneurial programmes follow, and describes cases that exemplify how they are applied in practice.

Drivers of entrepreneurial activity



The individual mindset

The guiding principles in this sphere are:

- Providing relatable role models: they should be as similar to the students as possible, with essential representation of women and minority groups.
- Raising the level of consciousness: students must be encouraged to question deeply held beliefs and assumptions.
- Starting young: entrepreneurial mindsets can take years to develop.
- Reframing risk: the focus should be on navigating uncertainty rather than on dealing with failure, embedding experiences where students encounter setbacks so they build resilience, learn to change course and believe in themselves as opportunists-in-waiting.
- Focusing on embedding the mindset and not trying to make every student an entrepreneur: even students who pursue other paths in life will benefit from some type of entrepreneurial experience.

CASE STUDY – Global Problem-Solvers: The Series

Global Problem-Solvers: The Series (GPS: The Series) is an educational tool created within Cisco's Corporate Social Responsibility programme that promotes an entrepreneurial mindset. An animated web series for students exploring entrepreneurship, 21st-century skills and ways to use technology for social good, the programme focuses on shaping individual mindsets. Its mission is to inspire students to become global problem-solvers – citizens ready to thrive in an increasingly connected and digital future.

GPS: The Series was designed for students aged 9-14, a critical adolescent developmental period and a inflection point in the commitment to science, technology, engineering and mathematics as educational priorities. Students join diverse teams from around the world to use technology and an entrepreneurial process to solve real-world problems. Through a combination of animated stories and activities, the programme helps educators to introduce students to such skills as complex problem-solving, critical thinking, creativity, people management and coordinating with others.

The programme emphasizes social consciousness and the potential of technology to bring positive change. Students focus on real-world social, economic and environmental challenges. They learn that coming up with ideas is just the first step in problem-solving, and discover the stages of turning ideas into reality: design, manufacturing, deployment, maintenance and funding. They are challenged to find solutions that are scalable and sustainable.

GPS: The Series is free and currently available in English, Spanish, French and Hindi.

CASE STUDY – African Leadership Group

The African Leadership Group (ALG) is led by the African Leadership Academy together with the African Leadership University. The programme currently has campuses in South Africa, Mauritius, Rwanda and Kenya, and aims to develop 3 million African leaders by 2035. The ALG focuses on training young entrepreneurs by teaching them the most effective tools to develop entrepreneurial mindsets, skills and practices. It is built around two core pillars:

I. Shaping the World Within: Creating entrepreneurial confidence
Ideation, financing and expansion are bread-and-butter concepts within entrepreneurship education, but what good are they without the confidence and agency to use them?

ALG's curriculum begins by shaping students' beliefs, mindset and overall disposition through a framework called Human-Centred Entrepreneurship: BUILD (Believe, Understand, Invent, Listen and Deliver). Through group discussions and reflective exercises, BUILD unpacks students' beliefs about whether they can dream up a solution to an important problem, raise an angel round and ultimately make a living as an entrepreneur. ALG takes students through a personal transformation journey during which they interrogate assumptions, perceptions of risk and beliefs about how the world works and their role in it. They are guided to an awareness that they can take charge and define their purpose.

ALG showcases role models who are just a few steps ahead of the students on their journey, as they are more relatable than "celebrity entrepreneurs" who are a thousand steps ahead.

II. Shaping the World Around: Creating an environment to develop skills and practices
ALG's programmes are experiential and based on "project-based" learning. The Student Enterprise Programme simulates the creation, management and exit cycle of an entrepreneurial venture in an on-campus economy in which all students are required to participate. Real money is injected through small investments (debt, equity, grants) to kick-start the learning economy each year. Students work in teams, as this is a key skill in entrepreneurship and beyond.

Skills and practices

The guiding principles in this sphere are:

- Driving action learning: venture creation is simulated by starting real businesses in a controlled environment and dedicating academic time to practical exercises, with the participation of real professionals, business leaders and other entrepreneurs.
- Using real money: students are provided a small amount of money to test out their business.
- Imparting digital skills: entrepreneurs must learn digital skills, systems and tools to be able to participate in the digital economy.
- Working in teams: teams help build the ability to lead organizations by working collaboratively.
- Aiming to coach, not teach: coaching means preparing students to stand on their own on the field of play.

CASE STUDY – Specialty programmes for entrepreneurial skills

Babson College

A private college in Massachusetts, USA, Babson College teaches undergraduates fundamental skills and practices to set up a business. The year-long Foundations of Management and Entrepreneurship (FME) course is mandatory for every first-year student. Based on the belief that the best way to teach business is to have students run a business, the first semester is spent iterating business ideas, and the second concentrates on running the new business, which can be product- or service-based. The students must produce or source, develop supplier and customer relationships, and sell for four months.

FME builds students' resilience by exposing them to uncertainty and risk. As they experience inevitable setbacks and failures, students learn to adapt and change course. The goal is not to teach students to accept failure but to be comfortable navigating uncertainty, to never think about risk without also considering returns, and to become excited about high-potential ventures.

Babson College provides students with seed funding of up to $9,000 for each business in the form of a loan. At the end of the course, the businesses are liquidated, loans are paid back and most profits are donated to non-profit organizations – half a million dollars in the last 20 years. The overall success rate of the student businesses has sustained the FME course over many decades.

Arizona State University

At Arizona State University (ASU), Entrepreneurship + Innovation provides inclusive opportunities for emerging entrepreneurs. Over half (53%) of ASU first-year students are from underrepresented populations, and the proportion of students who are the first in their family to attend university has doubled over the last decade.

ASU's objective is for all students to have an entrepreneurial experience, even if they do not major in entrepreneurship. The university provides multiple programmes, resources and activities, from cohort-based venture development programmes to the use of makerspaces and fabrication labs, and helps students to partner with the community and find investment.

Programmes offered through Entrepreneurship + Innovation include Poder, a five-week course offered at no cost to Maricopa Community College students that teaches them to apply entrepreneurship skills to solve community issues and to use technology to maximize positive effects in the world and personal success strategies; and SparXX, a series of programmes and activities that help women to start and grow businesses through interactive workshops led by faculty and industry experts.

ASU Entrepreneurship + Innovation is one of the original 12 organizations to win the Kauffman Inclusion Challenge to continue supporting diverse entrepreneurs to help their communities reach their full potential. ASU works with community partners that offer entrepreneurship experiences, such as Seed Spot, a local incubator programme for socially-focused businesses.

The ecosystem

The guiding principles in this sphere are:

- Coordinating activities across stakeholders: fragmentation dilutes the impact and returns of interventions – efforts to link universities, investors and funders, mentors, policy-makers and entrepreneurs are essential.

- Driving inclusive entrepreneurship: programmes are designed for the wide participation of demographic groups, including women and minorities.

- Preparing start-ups for expansion: start-ups need systematic help to assess their readiness and close any gaps identified.

- Supporting early-stage businesses: access is provided to legal, accounting and strategic consulting services, as well as to digital tools for cloud hosting, productivity and online accounting.

- Providing diverse funding options: from grants to competition prizes, venture capital, asset financing, bridge financing and flexible loans, different types of funding are required for product development and the proof of concept, pilot, launch, early stage traction, scale up and growth stages.

- Providing access to markets: the best funding is revenue from customers – transparent and friendly procurement policies are as important as funding.

CASE STUDY – Building the entrepreneurial ecosystem in Africa

Harambe Entrepreneur Alliance
Derived from "Harambee" (which connotes working together towards a common purpose in Swahili), the Harambe Entrepreneur Alliance (Harambe) identifies promising young African entrepreneurs spearheading high-impact business and social ventures and provides them with access to knowledge and training, mentors, capital and markets, and a network of advisers, stakeholders and potential investors.

Each year, 20 Harambeans are selected from over 3,000 applications. So far, 284 Harambeans from 34 countries have collectively launched enterprises valued at more than $1 billion, raised over $400 million in capital and created more than 3,000 jobs, benefiting their communities and countries.

Harambe targets its support to African entrepreneurs who want to build Africa's future from within, and builds a common set of values and spirit within the Harambe community to encourage mutual support. It organizes global and regional workshops to share knowledge, events to connect with advisers, investors, other stakeholders and markets, and informal gatherings to promote networking, advice and mentoring.

Harambe offers three programmes, varied by entrepreneurial stage. The Ecosystem Development Program is aimed at early stage, pre-revenue entrepreneurs, and targets emerging hubs in Nigeria, Kenya and South Africa. The Capacity Building Program provides emerging entrepreneurs at the proof-of-concept stage with access to knowledge, advisers, mentors, networks and events. The Global Access Program is aimed at established entrepreneurs with at least $500,000 in revenue who are at an inflection point in terms of scale.

Grindstone Accelerator
Cape Town's Grindstone Accelerator by Knife Capital was created to expand tech companies in South Africa, in response to statistics that indicated up to 80% of technology-based companies in the region never employ more than four people. In the words of James Cash Penney, founder of J. C. Penney department stores, "Growth is never by mere chance; it is the result of forces working together."

The Grindstone Accelerator is a structured entrepreneurship development programme that assists high-growth, innovation-driven companies to put the building blocks in place to grow quickly and sustainably. Currently in its fourth year, Grindstone selects 10 companies annually and provides them with the knowledge, networks and market access they need to be ready for funding.

Start-ups have regular one-on-one sessions with subject-matter experts to address growth inhibitors identified in a gap assessment process, and receive access to templates, tools and mentors to optimize key growth metrics. Specific interventions for each company include understanding its value system, building a digital go-to-market strategy and financial model, assessing intellectual property, applying strategic and financial valuation and populating a data room.

The case studies in this section show the importance of education to foster entrepreneurial mindsets and ecosystems and to democratize access to entrepreneurship, and the need for educational programmes to keep up with the digitization of entrepreneurship.

Moving beyond education, another increasingly important resource to which start-ups need access is data.

Data as a catalyst for entrepreneurship

Data is the bedrock on which digital entrepreneurship is built. It can act as a "digital public good" for entrepreneurs, in much the same way that railways, roads and ports were first created as public goods. Large platform companies such as Google, Amazon, Facebook and Apple derive their competitive advantage from data, but smaller players often struggle to access the data that would fuel their growth. This section explores innovative mechanisms to make more data available to start-ups, the potential applications of data and the safeguards to be put in place for privacy and security.

Balancing openness with privacy and security

For start-ups to discover innovative solutions in areas such as climate change, food supply and clean energy, access to data must be opened up. For example, interoperable data on energy demand across different countries could help start-ups devise new ideas in energy supply. While the technologies these start-ups can build on, such as artificial intelligence, the internet of things and robotics, are increasingly accessible, data to understand the nature of problems is not.

In some ways, data can substitute for funding for growing businesses in countries where capital markets are nascent. Were governments and large businesses to make data available, the costs involved in building a start-up, and hence its need for funding, would be reduced.

However, it is important to address concerns around privacy and security. The European Union's General Data Protection Regulation (GDPR) has set a benchmark for protecting citizens, though this must be balanced with the need to support innovation. How can a "design" approach be applied to bridging the gap between the extremes of completely restricting access and making all data open? The European Commission's draft Ethics Guidelines for Trustworthy Artificial Intelligence and India's National Urban Innovation Stack (a collection of open-source platforms and application programming interfaces [APIs]) highlight these recommendations:

- **Take a first-principles approach:** use existing constitutional frameworks, fundamental rights and ethical practices as a basis to evaluate the impacts of programmes and projects that aim to open up data access to start-ups.
- **Be ecosystem-driven and inclusive:** engage all critical stakeholders in programme design, making particular effort to ensure diversity and reach groups that are often underrepresented.
- **Distinguish different types of data:** depending on its sensitivity, some data can be open (made available without too many protections) while some must remain confidential (made available only after anonymization and through API calls).
- **Exercise constant vigilance:** ensure the traceability of data use and put safeguards in place to ensure it is transparent, auditable and accountable.

Data access to support entrepreneurship: Applications

Data can be used to support entrepreneurship in three main ways: (1) to discover start-ups; (2) to co-create solutions with start-ups; and (3) to support start-ups.

1. Using data to discover entrepreneurs

Governments should make greater efforts to partner with start-ups, but the number of potential partners is daunting: Beijing alone has 1,070 start-up companies in the area of artificial intelligence according to Startup Genome's *Global Startup Ecosystem Report 2019*. How can governments and large businesses identify the right partners for their specific needs? They can make data available, along with problem statements, in the form of a "challenge" or "competition", offering as the prize a work contract.

CASE STUDY – Opening access to utility data through a challenge to solve for load forecasting

In Japan, Tokyo Electric Power Company (TEPCO) held a contest to find innovative ways to forecast load, which attracted established enterprises, such as Toshiba, as well as entrepreneurs, research institutions and students. More than 100 entries were received. By using an online platform that functioned as a sandbox, the company was able to open its data for the competition without risking a cyberattack to its main operations.

For more information, see "TEPCO's first 'Electricity Load Forecasting Technology Contest' Initiative to encourage accurate electricity load forecasting" at https://www7.tepco.co.jp/newsroom/announcements/archives/2017/1440959_10494.html.

CASE STUDY – Communities for competition

Kaggle is a global community of data science and machine learning practitioners, owned by Google but open to anyone to host competitions. Corporations and civil society organizations post challenges that make data sets available and reward the best solvers with a cash prize or other form of recognition. At the time of writing, challenges with prize money worth $270,000 were live on the platform, to solve problems in areas including stock movement prediction, earthquake prediction and prominent landmark recognition in images.

For more information, see Kaggle Competitions at https://www.kaggle.com/competitions.

2. Using data to co-create solutions

Governments and corporations that would like to attract the right start-up partners may not be able to frame a sufficiently clear problem statement to issue a challenge. In such cases, data can be used as a tool to support co-creation. Case studies from Latin America and India show how this can work in practice, while a case study from Japan illustrates how this approach can also be used by regulators to balance protecting citizens with incentivizing innovation.

Agile procurement from start-ups through data access
Public agencies and large corporations often hesitate to procure directly from innovative start-ups because they may not meet compliance criteria for procurement, such as a specified number of years of operation or level of revenues. Although the start-ups' products or services seem attractive, traditional procurement models may simply not work well because of insufficient clarity on the exact problem-solution fit. In these cases, data can be a tool to innovate the procurement process itself.

CASE STUDY – São Paulo, Brazil

The city of São Paulo in Brazil runs a procurement programme, "Pitch Gov", for start-ups to pitch innovative solutions in sectors such as health, education and housing. After an initial application process, start-ups may be granted access to government data sets to co-build proposals in partnership with government. Out of 558 start-ups that applied to the programme in 2017, 22 are testing their solution with the government.

For more information, see "Have you thought about government and start-ups working together?" [in Portuguese] at http://www.pitchgov.sp.gov.br/.

CASE STUDY – Telangana, India

The Government Mentor Program in the southern Indian state of Telangana aims to improve the efficiency and citizen-friendliness of the state police. Start-ups submit an application detailing their skills and capacities, and a few are shortlisted for a three-month mentorship period during which government officials share context and data with them and co-create solutions that can culminate in a contract.

For more information, see the Telangana State Innovation Cell Government Mentor Program at https://www.governmentmentor.com/.

Gathering data to inform regulation of new technologies
New technologies need to be regulated to balance protecting citizens with incentivizing innovation, but regulations should ideally be based on data that shows how the technologies operate in real-world situations. Creating a sandbox or deregulated space can help to gather the necessary evidence.

CASE STUDY – Tokyo Self-Driving Technology Sandbox Subcommittee

The Tokyo Self-Driving Technology Sandbox Subcommittee of the National Strategic Special Zone Council facilitates the gathering of data to consider how self-driving technology should be implemented in the city. A special zone is set aside to provide opportunities to test technologies that would otherwise not be allowed by existing regulations. From the results of the tests, the subcommittee will review the city's regulations, systems and procedures.

For more information, see Cabinet Public Relations Office, Cabinet Secretariat, Japan, "Council on National Strategic Special Zones" at https://japan.kantei.go.jp/98_abe/actions/201712/15article3.html.

3. Using data to support entrepreneurs in innovative ways

Most approaches to support start-ups are inspired by the incubation model pioneered by Y-Combinator in 2005. Support typically involves physical office space, seed funding in the form of equity investments, and access to mentors, business service providers and investors who can make follow-on investments. This approach has worked well in Silicon Valley and other start-up hubs such as Bengaluru, Tel Aviv and Berlin.

However, this approach is not appropriate for all types of start-ups, especially those tackling social or environmental problems or working in countries where capital markets are underdeveloped. An alternative approach to reduce the barriers start-ups face is to provide open-source digital infrastructure, including access to data sets on which to base innovative solutions.

CASE STUDY – Societal Platforms, India

A practice being driven in India is the concept of Societal Platforms. The core philosophy of Societal Platforms is to make available open-source digital infrastructure, comprised of data, platforms and APIs. On this basis, the Government of India launched the National Digital Platform, DIKSHA, to reach 10 million teachers. Building on the Societal Platform concept, it leveraged SunBird, an open-source platform for learning and management designed to support a wide range of applications and solutions built by EkStep Foundation – an education-focused non-profit. DIKSHA was launched in 2017 and, by the end of 2018, Energised Textbooks, one of its flagship programmes, was scaled to a number of states. Since its launch, 1 million teachers have signed up to use it to deliver digital learning to students. These teachers are being reached through customized solutions built on the DIKSHA stack by over 30 state government agencies, large corporations and start-ups.

Other Societal Platforms are being designed for smart cities, public health and water security. Each platform makes available the building blocks of digital solutions – data, platform technology and APIs for integration with prevalent services – right from the first day of a start-up's journey. This drastically cuts costs and time for start-ups to deliver solutions and gives customers more choices and price advantages.

For more information on the overall concept and India's unveiling of a Societal Platform for education, see Societal Platform, Open Societal Development at https://societalplatform.org, and DIKSHA, Digital Infrastructure for Knowledge Sharing at https://diksha.gov.in/.

These case studies show that governments and businesses making data available for start-ups – with appropriate safeguards to protect security and privacy – can create win-win scenarios. The providers of the data get new ideas, and entrepreneurs get a vital resource that makes it quicker and easier to develop products and services and find a route to market.

After education and data, the third important resource for start-ups is the need for entrepreneurs to be embedded in a supportive ecosystem.

Platforms to support entrepreneurship

Access to capital, talent, networks and knowledge, combined with a forward-looking regulatory regime, are the essentials for an innovation ecosystem to offer the right support to entrepreneurs. Historically, such ecosystems have been tied to geographical locations, such as Silicon Valley, New York, Hong Kong SAR, Singapore, Shenzhen, London and Tel Aviv. Increasingly, however, digital platforms can support technology entrepreneurs who are working outside such ecosystems, democratizing access to the tools needed to turn great ideas into successful businesses.

What makes an entrepreneurial ecosystem successful?

Success breeds success in entrepreneurial ecosystems, as entrepreneurs become role models for others, offering mentorship and forming networks of support. Successful entrepreneurial ecosystems have healthy capital markets, including angel and venture capital, with investors who have the expertise to act as mentors and the networks to open doors. Again, success builds on success as the profitable sale of one start-up creates more capital to invest in others.

Successful entrepreneurial ecosystems offer access to the talent companies need to grow. Usually, this is associated with the presence of top universities that encourage students to be entrepreneurial. Ecosystems have forward-looking corporations that see start-ups as potential R&D hubs, partnering with them to support growth. Governments are open to innovation; they provide an enabling regulatory environment and may support accelerators, provide subsidies for innovation in specific sectors and invest in local start-ups.

Getting all these conditions in place in one city or country is complicated: it usually takes decades of work, with some luck or unique circumstances, as illustrated in Israel. However, it may also be possible to achieve online, as certain entities have the legitimacy and convening power to bring together many of the necessary elements. Online ecosystems can level the playing field for entrepreneurs, regardless of where they live or go to school.

The Israeli ecosystem

Although a small country with 9 million people, Israel is the source of many innovations. It ranks first in the world for R&D and venture capital investments as a percentage of GDP, and has attracted R&D investments from companies such as Microsoft, Motorola, Google, Apple and Facebook. It has over 6,000 active start-ups and an average of 600 new start-ups are established every year.

Government support has played a major role in Israel becoming known as the “Start-Up Nation”. The government programme Yozma (which means “initiative” in Hebrew) helped transform the country into a global R&D hub by leveraging public money to attract private investment. Between 1993 and 1998, the government offered to match 40% of the money offered by private investors in combined funds, supporting more than 40 companies. Yozma’s value increased from $100 million in 1993 to $250 million by 1996. The project is regarded as a rare example of government venture capital success.

Another explanation for the success of Israel’s innovation ecosystem is how the country’s overlapping social circles promote collaboration and the exchange of ideas. Many army units have strong alumni groups, notably “8200”, an Israeli Intelligence Corps unit that has a programme to support entrepreneurship and innovation. These overlap with similar groups based around schools, universities and neighbourhoods, which together help to combine social and professional connections.

The country has also successfully integrated waves of immigrants into its innovation ecosystem. A notable example was the influx of Soviet Jews in the 1990s, many of whom are highly skilled engineers.

Above all, Israel embodies the notion that necessity is the mother of invention. As a former president, Shimon Peres, famously said, “In Israel, a land lacking in natural resources, we learned to appreciate our greatest national advantage: our minds. Through creativity and innovation, we transformed barren deserts into flourishing fields and pioneered new frontiers in science and technology.”

Incubators in China

Economic reforms in China have helped more than 700 million people out of extreme poverty[2] and raised China to the position of the world's second-largest economy in 2010. The country's GDP reached $13.2 trillion in 2018.[3] Meanwhile, the quality of growth also improved, adhering to the innovation-driven and pro-business strategy of the Government of China, including actively boosting R&D investment in hi-tech innovation, benefitting universities and the private sector.

Based on the findings of the Global Innovation Index, China has achieved a leading position worldwide in terms of patent applications and the number of researchers as well as scientific and technical publications. For foreign investors, multinational companies and young technology entrepreneurs, China's attraction now goes beyond its huge domestic market and competitively priced labour. For example, as reported in the "Chinese Characteristics Space White Paper 2019",[4] the number of incubators has grown from 2 in 1987 to 11,808 hi-tech incubator/co-working spaces in 2018, with total annual income of $9.6 billion, serving more than 139,000 small and medium-sized enterprises and creating 124,818 patents and 3.95 million new jobs. These incubators have helped 6,512 start-ups, which in total attracted over $3.67 billion in investment.[5] However, although some incubators are already working with their key stakeholders to build both effective value chains and the enabling environments needed for their clients, many still need to improve their professional services and "soft power" to better satisfy the needs of start-ups and small and medium-sized enterprises.

How can platforms compensate for gaps in the ecosystem?

Digital platforms should not aim to replace local ecosystems for entrepreneurs but should rather fill gaps in the tools and resources available to them locally. Such gaps commonly include the absence of peer networks, knowledge tools, capital or talent, or weak processes for product development and client acquisition. Building platforms is a challenging task. Successful platforms characteristically:

- **Create network effects:** the more users a platform has, the more attractive it is to new users. Platforms that match diverse types of user, such as buyers and sellers, or investors and those seeking investment, appeal to a critical mass of users on both sides.
- **Fill the empty room:** to reach a critical mass, incentives other than network effects must be found to attract users initially. Often it is important to assure that an active base of first adaptors begin using the platform, who may need to be attracted by offline as well as online means.
- **Provide reasons for continued engagement:** once the platform has acquired users, it needs to ensure they return, for instance to interact with new content generated by other users or to seek out new users in pursuit of a specific goal.
- **Give reasons to invite others to join:** users will be motivated to invite their contacts to join the platform only if the mechanisms to do so are easy and the new platform offers clear improvement on the other ways in which they can already interact.

CASE STUDY – The IDB Lab's platform for entrepreneurs

An initiative of the Inter-American Development Bank (IDB), the IDB Lab is a digital meeting place for entrepreneurs in Latin America and the Caribbean. The platform aims to democratize access to opportunities, resources and connections in a region where these elements are often not available locally.

The IDB Lab's platform maps the Latin American and Caribbean entrepreneurial ecosystem and connects different actors, enabling stakeholders to access resources and entrepreneurial ventures without the limitations of geographical proximity. It offers a framework in which entrepreneurs can provide information on their ventures and demos of their solutions, and build their reputation through peer recommendations. Investors can find companies to support, and corporates can find start-ups to collaborate with.

The IDB is a source of long-term financing, research and technical assistance for the economic, social and institutional development of Latin America and the Caribbean.

For more information, see the IDB Lab at https://bidlab.org/en/about.

Platforms can track indicators in three main areas to understand their progress and impact: the relevance and accuracy of information about players in the entrepreneurial ecosystem, the extent to which participants in the platform are forming connections, and levels of user engagement.

Ecosystem players and information accuracy

Entrepreneurs who do not have access to physical ecosystems often lack information on other players and how they connect to one another. Digital platforms can resolve this information gap by mapping the ecosystem's stakeholders, ideally based on real-time data. Ensuring the accuracy and relevance of data requires constant interaction with the platform's users, which also helps to inform the development of the platform. Performance indicators include the:

- Number of platform participants under various categories (investor/funder, entrepreneur, start-up, government agency)
- Percentage of participants whose details are verified as accurate
- Average time since the records of each category were last updated
- Diversity of the user base, including the:
  - Population with access to financial services
  - Population with access to education
  - Population with access to skill training
  - Population with access to health services.

Community integration

Successful entrepreneurial ecosystems support entrepreneurs at every step of their journey, providing the connections needed for different types of problems. Platforms should aim to matchmake potential partners and recommend relevant sources of support. Indicators in this area include the number of:

- Partnerships and/or live connections with authoritative data sources
- Interregional platform connections
- Interregional users who have accessed the platform as a source of inspiration for their own region.

User engagement

Platforms can offer various ways for users to engage, from accessing curated knowledge tools to finding talent, raising funds, validating products and offering endorsements of other platform users. Indicators of user engagement include:

- Total active users per category
- Daily or monthly active users
- Total valuation of start-ups active on the platform
- Number of investments facilitated by the platform
- Number of investments avoided because of the platform
- Number of founders from underrepresented groups.

Conclusion

Technology entrepreneurship – and entrepreneurship more broadly – is a collective exercise that needs a functioning ecosystem offering access to capital, talent, networks and other resources. The ongoing digitization of entrepreneurship means such ecosystems can now thrive beyond the constraints of physical location. This paper has highlighted three elements that are important for digitizing entrepreneurship:

– The role of education in developing not only future entrepreneurial talent but also the entrepreneurial mindset, and in inspiring entrepreneurs to address pressing global issues
– The various ways in which data can be used as a catalyst for entrepreneurship
– The ability of digital platforms to compensate for the absence of physical and established entrepreneurial ecosystems.

These elements can and should reinforce each other. It is especially important for educational programmes to keep pace with the latest developments in data access and the use of digital platforms, and to avoid time lags in adapting their courses accordingly. By working together under the framework of these three elements, policy-makers, corporate leaders and educators can combine their strengths to expand the impact of entrepreneurship for the future.

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Endnotes

1. Organisation for Economic Co-operation and Development (OECD), *Entrepreneurship at a Glance 2017*, OECD Publishing, 2017, https://doi.org/10.1787/entrepreneur_aag-2017-en.
2. "In the past 40 years, 700 million people have been lifted out of poverty, and China has created a miracle", *Guangming Daily*, 14 December 2018, http://dy.163.com/v2/article/detail/E306S9C305128VKN.html [in Chinese], reported by the Poverty Alleviation Office of the State Council of China.
3. National Bureau of Statistics of China, http://www.stats.gov.cn.
4. "China's special space white paper 2019 released: Chonghu absorption investment reached 250 billion", *Sina Technology*, 13 June 2019; Cheah, Sarah and Yuen-Ping Ho, "Coworking and Sustainable Business Model Innovation in Young Firms", *Sustainability*, vol. 11, 2959, 2019, https://www.mdpi.com/2071-1050/11/10/2959/pdf.
5. "China's special space white paper 2019 released: Chonghu absorption investment reached 250 billion", *Sina Technology*, 13 June 2019, https://tech.sina.com.cn/it/2019-06-13/doc-ihvhiqay5507943.shtml [in Chinese].

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