

White Paper

Accelerating the Emergence and Development of Innovation Ecosystems through Procurement: A Toolkit

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Global Futures Council on Innovation Ecosystems

Accelerating innovation and shared prosperity requires effective collaboration between start-ups, companies, owners of private capital, governments and academia. The Global Futures Council on Innovation Ecosystems aims to understand how to enable successful interplay between these actors and assess what we can all do to ensure that innovators engage in solving the world's biggest challenges, rather than just focusing on maximizing profit.

The World Economic Forum's Global Futures Councils make up the world's foremost interdisciplinary knowledge network dedicated to promoting innovative thinking on shaping a sustainable and inclusive future for all. The network convenes more than 700 of the most relevant and knowledgeable thought leaders from academia, government, business and civil society, grouped in expertise-based, thematic councils.

In a global environment marked by short-term and isolated thinking, the Global Futures Councils encourage interdisciplinary and long-range approaches. They provide thought leadership on important global challenges, as well as the impact and governance of emerging technologies by: scoping and monitoring trends and developments; contextualizing global shifts; and highlighting the implications of these dynamics for decision-makers.

Executive summary

Innovation offers the potential to improve everyday life, grow regional economies and solve societal challenges. Governments, industry and communities around the world are delivering programmes that seek to encourage innovation and achieve a better future.

Innovation does not occur in isolation but within a network of various actors, from industry and government to research and private capital, each playing a role to generate new ideas and bring these to commercial reality. The more diverse the network and more collaborative the participants, the more likely it is that innovation will occur.

The World Economic Forum's Global Future Council on Innovation Ecosystems was created to understand the features of successful innovation ecosystems and the role of various actors in their growth, as well as to contribute new insights to support their acceleration.

Many of today's innovation programmes have delivered impact by focusing on the supply of innovation, inspiring new innovators and helping emerging innovators through targeted grants programmes. The Global Future Council on Innovation Ecosystems has identified improving the inclusiveness of innovation ecosystems as an important challenge to be addressed. There remain exciting opportunities to increase the inclusiveness of innovation by exploiting the buying power of governments and industry – opportunities made possible through procurement. This toolkit seeks to answer the question: How can procurement be used to accelerate innovation ecosystems in ways that will drive sustainable and inclusive growth?

Around the world, procurement processes are being redesigned and redeployed to create new demand for innovation and accelerate the emergence of inclusive innovation ecosystems by engaging and providing opportunities to underrepresented communities and people. There are many areas for action, and each is important in order to create the conditions required for inclusive and purposeful innovation to occur. However, procurement presents a unique opportunity to complement today's efforts at a scale much greater than existing budgets have allowed.

Drawing on the knowledge and experience of members of the council, this toolkit presents a framework to understand the opportunities available for using procurement to accelerate the creation of inclusive innovation ecosystems. The framework features three themes, each based on practical case studies, specifically:

- Seeding the emergence of inclusive innovation ecosystems – inspiring individuals to participate
- Scaling local capability to compete globally – identifying and cultivating local expertise
- Developing a global hub – opening the door to the world

Critical to the success of the initiatives presented under each theme are leadership, culture and systems. To successfully harness the opportunities made possible through procurement in order to accelerate inclusive innovation ecosystems, leaders across governments and businesses will need to set clear targets, cultivate an open and inclusive environment and look beyond existing structures. This toolkit presents a model for assessing the maturity of innovation ecosystems and offers a series of actions to assist in shifting the dial.

The framework is provided by the Global Future Council on Innovation Ecosystems to equip government policy-makers, industry and community leaders to harness the potential of procurement to accelerate the emergence of inclusive innovation ecosystems.

Key facts



Procurement represents 12% of gross domestic product (GDP) and 29% of total government spending across OECD countries.



Using the “power of the public purse” to drive innovation was identified as a **key opportunity** by NESTA in 2007.



The OECD reported in 2017 that **80%** of countries support innovation through procurement.



Procurement remains an area in which governments have taken the **least action** – reported by Startup Genome in 2018.

Introduction

Innovation ecosystems are a product of the participants, their methods of operating and the culture and sense of community this creates. To achieve better outcomes from innovation, including solutions to social and environmental challenges, innovation ecosystems need to be inclusive and represent a diverse community of participants that are focused on solving problems as opposed to being defined only by their potential commercial returns.

While much has been done around the world to encourage innovation – e.g. supporting innovators through grants programmes and addressing barriers to innovation – more can be done to drive the development of more inclusive and collaborative innovation ecosystems by exploiting government and industry buying power to create new demand for innovation.

In 2017, the OECD reported that 80% of jurisdictions support procurement for innovation.¹ However, in a recent survey of start-up ecosystems, procurement was identified as an area of the least policy action.²

There remains considerable potential to harness the purchasing power of governments and industry to increase the demand for innovation, inspire a new generation of innovators and encourage ever greater levels of collaboration by shaping the “rules of the game” that define innovation ecosystems around the world.

Drawing on the experience and knowledge of members of the Global Futures Council on Innovation Ecosystems, this toolkit provides a framework for accelerating the development of inclusive innovation ecosystems through procurement.

By using case studies collected from around the world, this toolkit demonstrates what procurement is and how it can be deployed by governments and industry to encourage more collaborative innovation ecosystems and achieve more inclusive innovation outcomes.

There exist many potential areas for action to accelerate innovation ecosystems. However, procurement remains an underused tool for which the council considers there to be significant potential.

The toolkit presents vital lessons, identified by the council members, for consideration by all participants in an innovation ecosystem, and concludes by providing a checklist for action.

Understanding innovation

Innovation is generally defined as the process of deriving value from new ideas, in the form of new products, services, business models or ways of doing things. Notably, innovation is a deceptively complex activity that goes beyond creativity and invention and includes many practical steps necessary for adoption.³

The OECD asserts that, “innovation enables countries to be more competitive, more adaptable to change and to support higher living standards. It provides the foundation for new industries and businesses – creating new jobs – and helps address pressing social and global challenges.”⁴

An ecosystems approach

Innovation rarely occurs in isolation and frequently involves multiple actors, such as start-ups, companies, owners of private capital, governments and academia – each participating in the innovation process from a diverse perspective and each contributing different resources towards the development and execution of a new idea.

Around the world, innovation hotspots have emerged, such as Silicon Valley in the US. They have become thriving communities of various actors involved in the innovation process. Originally described only by geography, these innovation ecosystems are now defined by the characteristics of their innovation community. For example, Silicon Valley is the premier destination for consumer-focused innovation, having created and successfully commercialized many early telecommunication technologies. Today Boston is well known for biotech, owing to the active participation of local universities and medical research institutes. London’s reputation as a global financial hub has positioned the city as an epicentre for fintech. It is the unique history of these locations that gives rise to the individual character of their innovation ecosystems.

Procurement as a tool

Around the world governments and industry are taking action to create and grow innovation ecosystems, implementing programmes that support innovators and creating an environment favourable to innovation.

Programmes vary widely as they target different barriers faced by innovators and aspects of the innovation ecosystem. These programmes generally address the supply of innovation by using traditional policy-making tools to support innovators and shape the conditions for innovation to occur. Some of the tools in use today include:

- Grants programmes and tax incentives
- Co-investment programmes and other support to increase private capital availability
- Research and development grants and other incentives
- Support to go global
- Education and skills training
- Regulatory reform initiatives
- Visa and immigration changes

With growing recognition that innovation frequently occurs in response to specific demand or stimulus, procurement (the process of obtaining goods and services from the market) is an increasingly common feature of support programmes.⁵

Notably, governments and industry face multiple strategic imperatives that procurement can address simultaneously. For example, the need for a particular product or service may continue long into the future – the emergence of a sustainable supplier would be a positive outcome of any procurement process and could be included as an objective in the initial procurement process.

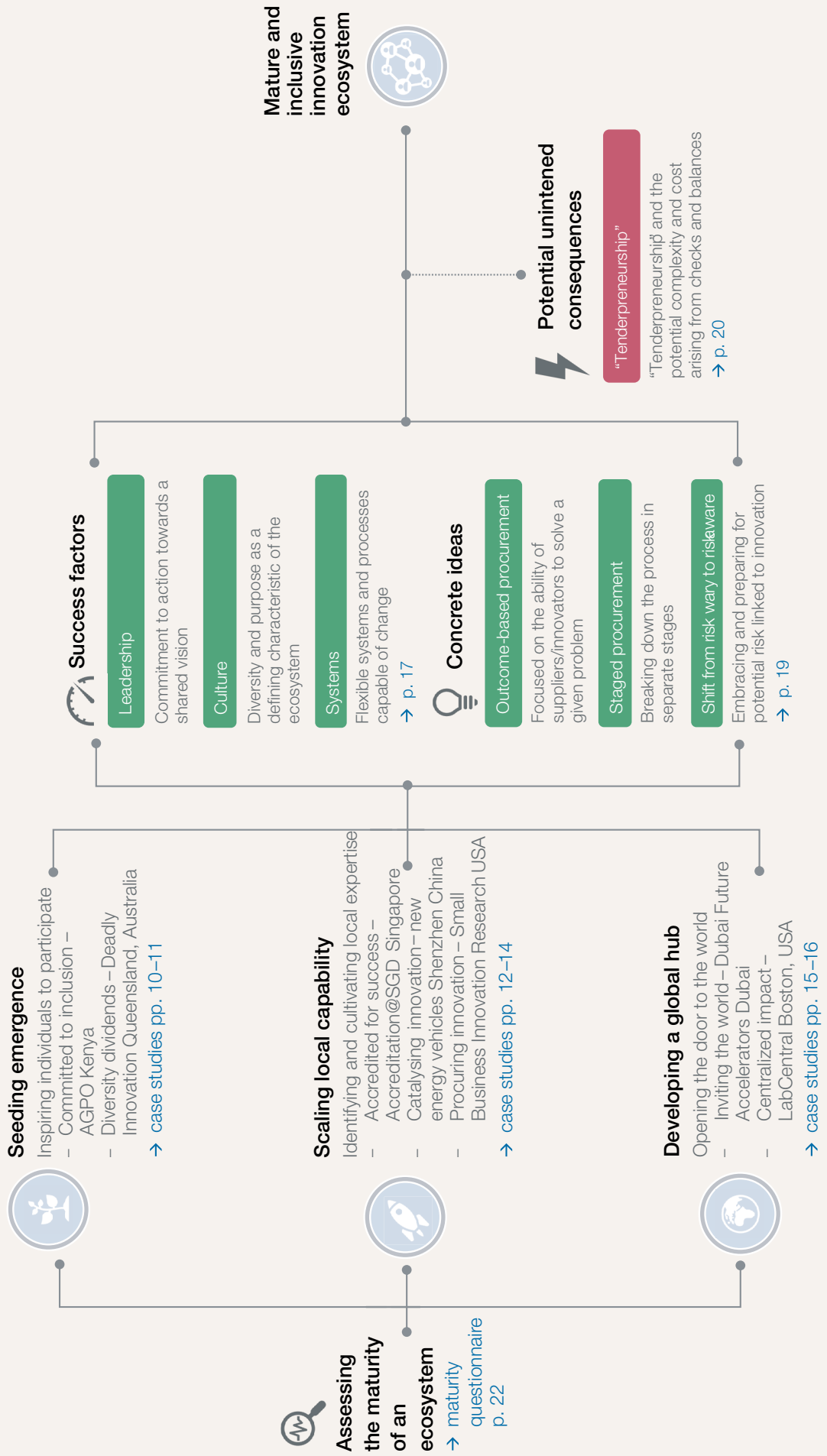
The overlap between policy objectives is more pronounced for governments as they seek to deliver efficient and effective public services and encourage industry development and economic growth.⁶ For example, “Buy Local” initiatives and modified assessment criteria have emerged to preference local suppliers in government procurement processes. Similar tools could also be used to encourage innovation or greater collaboration in the development of tenders.

Procurement and supply-chain management practices have adapted to meet the many strategic imperatives being pursued by governments and industry. However, further opportunities and new approaches exist, especially as innovation ecosystems aim to go beyond their local presence and have an impact on the global environment.

Drawing on the knowledge and experience of members of the council, this toolkit presents a framework to understand the opportunities available to use procurement to accelerate the creation of inclusive innovation ecosystems. The framework features three themes, each based on practical case studies, specifically:

- Seeding the emergence of inclusive innovation ecosystems – inspiring individuals to participate
- Scaling local capability to compete globally – identifying and cultivating local expertise
- Developing a global hub – opening the door to the world

Inclusive innovation ecosystems: How do we get there?



Case studies

Seed emergence

To seed the emergence of diverse innovation ecosystems that are capable of generating new ideas and producing benefits for a wider group of participants, it is necessary to modify the “rules of the game” and provide new opportunities for those currently unable to find a seat at the table. In one such example, the Kenyan government has committed to engage with disadvantaged groups, providing opportunities for them to participate and shape an inclusive local innovation ecosystem. In another, Queensland’s state government has set up a specific programme to create better pathways for Aboriginal and Torres Strait Islander innovators to turn their ideas into reality and participate in the local innovation ecosystem.

Committed to inclusion (Kenya)

Allowing fair and equitable access to the supply of goods and services is a long-standing feature of Kenya’s public procurement process. In 2013, the Kenyan government announced a legal requirement that women, youth and people with disabilities have access to 30% of the government’s procurement opportunities.⁷ This bold commitment to harnessing the spending power of the government has spurred the development of local capability, as well as the support required to realize the opportunities available.

The Access to Government Procurement Opportunities (AGPO) programme, established in 2015, was designed to facilitate the attainment of the 30% target. The programme aims to help enterprises owned by women, youth and people with disabilities to do business with government.

The AGPO simplifies the process for enterprises to become eligible. Criteria include business registration, tax compliance, certification from professional bodies (including the National Council for Persons with Disabilities) and a bank account. It provides step-by-step instructions on securing verification and uses government service centres to provide face-to-face support.

A vital feature of the AGPO is a register of procurement opportunities – a central list of available tenders provides a single searchable resource for women, youth and people with disabilities seeking to tender for government opportunities. The register also assists government agencies in their responsibility to contribute to the 30% target, by offering an avenue that enables them to directly promote their opportunities to verified enterprises.

In a recent review, the AGPO programme was found to offer a good foundation to develop further support for women, youth and people with disabilities. In relation to the youth-owned enterprises participating in the programme, it is reported that annual income increased by as much as 71%, and that 70% of additional job opportunities were created within these enterprises.⁸

However, the review also identified opportunities for improvement in the administration of the programme and potential ways in which the programme could be expanded to enhance its impact. Maintaining trust in all aspects of the programme is critical to inspiring women, youth and people with disabilities to participate as well as ensuring government departments engage. To improve the efficiency of the programme and boost trust in internal processes, the report recommended increasing transparency through more regular and comprehensive reporting (including verification processes and tender outcomes).⁹

While the programme simplified many aspects of the process involved in securing government work, many participants needed additional support to become competitive and successfully grow their business. The holding of capacity-building, coaching and mentorship forums was identified by the report as necessary to support young entrepreneurs, women and people with disabilities to grow their business skills.¹⁰ Finally, the review highlighted that additional procurement opportunities could be made available by involving larger corporations and extending the programme beyond the government.

The AGPO programme is a practical solution to meeting the Kenyan government’s legal requirement for women, youth and people with disabilities to access 30% of the government’s procurement opportunities. It recognizes that a target itself is not enough and that specific support is needed to ensure the availability of government contracts results in meaningful development opportunities.

Innovation ecosystems are a consequence of people connecting – a networked community allows information exchange and promotes cooperation. By modifying procurement processes and reconsidering the criteria used to assess proposals, it is possible to cast a wider net and engage more people in the innovation ecosystem. In one such example, the Queensland state government is reaching out to a new cohort of innovators.

Diversity dividends (Queensland, Australia)

In June 2018, the Queensland Government announced the *Deadly Innovation* programme to create better pathways for Aboriginal and Torres Strait Islander innovators to turn their ideas into reality and participate in the local innovation ecosystem.¹¹ The programme acknowledged that Aboriginal and Torres Strait Islander people have much to contribute to the state's innovation ecosystem, with a proud history of innovation and valuable local knowledge, particularly in regional and remote areas of the state.

The programme's design centred on engagement with Aboriginal and Torres Strait Islander representatives, which quickly redefined early ideas about the programme. Creating pathways for Aboriginal and Torres Strait Islander innovators could not be achieved by a single grants programme or support package; it would require a wholesale change in the way Aboriginal and Torres Strait Islander people are engaged, across all innovation and business development programmes offered by the state, including procurement.

The *Deadly Innovation* programme has become a strategy to inspire Aboriginal and Torres Strait Islander innovators and support their participation within the Queensland innovation ecosystem. The strategy features three themes, based on the principles of reconciliation:

- Relationships – sustained, respectful and inclusive engagement
- Respect – recognition, respect and valuing of First Nation cultures
- Opportunities – increasing the economic participation of First Nation peoples

Notably, the strategy sets aspirational targets that reflect the specific outcome being sought. The innovation department took a leadership position by committing to a 3% increase in procurement from Aboriginal and Torres Strait Islander businesses, by 2022.¹² This target has led to an Indigenous Procurement Policy and Procedure that guides officers within the department in considering Aboriginal and Torres Strait Islander businesses when procuring goods and services.

The strategy also commits to increasing the number of Aboriginal and Torres Strait Islander applicants that are successful under the Queensland government's various innovation programmes to 3% of all funding recipients. This target reflects engagement with Aboriginal and Torres Strait Islander representatives and the desire to increase their participation across the Queensland innovation ecosystem.

With input from those tasked with implementing various Queensland government innovation programmes, and oversight by the Aboriginal and Torres Strait Islander Business and Innovation Reference Group, the strategy is now shaping changes to the promotion, selection criteria and management of innovation programmes. These changes range from more culturally appropriate and targeted communication material to the revision of selection criteria, elevating the importance of Aboriginal and Torres Strait Islander knowledge and experience.

“

For us, the Deadly Innovation programme is not about offering another grant programme, it's about rethinking how we reflect the needs of Aboriginal and Torres Strait Islander people and realize opportunities already available through our innovation programmes.

”

Damien Walker, Director-General, Department of Innovation

In an interim progress report, the Department of Innovation is on track to meet its targets under the strategy, and the active participation of Aboriginal and Torres Strait Islander innovators has become a more visible feature of the state's innovation ecosystem.

Scale local capability

Innovation is a competitive activity, with the capability to execute an idea critical to long-term success. Successful innovation ecosystems cultivate competitive tension and inspire companies to continuously improve. By looking beyond the objective of procuring goods and services through a tender process, and towards the development of local supply chains, it is possible to enhance the competitiveness of local suppliers. In an example from Singapore, an accreditation scheme designed to pre-qualify local companies for government contracts has raised the standard of Singapore's start-ups, preparing them well for international success. In China, the government injected approximately \$60 billion into the nascent new energy vehicle industry through public procurement. In the USA, the government established the Small Business Innovation Research (SBIR) programme, an outcomes-based approach to procuring novel solutions to government missions.

Accredited for success (Singapore)

With the aim of growing and nurturing innovative local technology companies, the Singapore government launched the Accreditation@SGD programme in July 2014. This "green lane" programme provides an independent third-party evaluation of a company's products and its capacity to deliver, thus pre-qualifying successful companies for access to government and corporate buyers.

To achieve accreditation, companies are evaluated on the technical, financial and operational aspects of their product and company. Companies that have achieved accreditation describe the process as "rigorous", but add that it helps to identify weaknesses and validate products.

Once the companies are accredited, the Singapore government helps them win contracts. This involves the Infocom Media Development Authority (IMDA) reaching out to important decision-makers in government agencies and leading companies, co-creating new strategic projects and assisting accredited companies to expand through the programme's strategic partners and worldwide network.

The Singapore government has stated that "the Accreditation@SGD levels the playing field and helps the accredited companies win projects, grow and compete globally".¹³ In the first three years, it has created a project pipeline worth more than \$200 million for accredited companies, comprising more than 1,500 government and corporate opportunities.¹⁴

Using the credibility of the programme and accredited companies, the Singapore government has expanded the project pipeline to partnerships with multinational companies. The programme acts as a platform to connect Singapore's emerging technology companies with enterprise-scale customers. Several Singapore companies accredited through the programme have successfully exited, including through successful initial public offerings (IPO).¹⁵

Notwithstanding the value of the project pipeline, the accreditation programme operates in parallel with the Singapore government's procurement processes. The programme allows government departments to bypass traditional tender processes by engaging accredited companies directly. However, this is more often the exception than the rule. Government procurement managed through the GeBIZ e-procurement platform is done independently of Accreditation@SGD, and this can undermine the preferred supplier treatment afforded to accredited companies.

While the Singapore government has taken positive steps towards opening up procurement opportunities and assisting local companies to be successful, the systems used by government departments sometimes fall short of this vision. This disconnect can also spur inventive solutions and help to engage new participants in the innovation ecosystem. For example, Singapore start-up TenderBoard was founded in 2015 to offer a combined e-procurement and business-to-business marketplace platform that increases the visibility of opportunities for local companies and streamlines the procurement process.¹⁶ TenderBoard is a private-sector alternative to the Singapore government's own efforts.

The Accreditation@SGD programme illustrates the important role of government in setting a direction to support local innovators, and the opportunity for others within the innovation ecosystem to be involved in delivering on the government's vision.

Catalysing innovation (Shenzhen, China)

China included new energy vehicles (NEVs) as an emerging strategic industry and consequently included it in its “made in China 2025” high-tech development plan.¹⁷ The country sees NEVs as an opportunity to take the lead in the automotive sector globally, to reduce its dependence on imported oil and to curb pollution.¹⁸

The government has taken a central role in making this a reality, mobilizing a wide range of policy instruments. On the supply side, it has focused on science and technology, intellectual property and infrastructure. It has also tackled the demand side, with generous consumer subsidies as well as public procurement.¹⁹ From 2009 to 2017, the Chinese government has injected approximately \$60 billion into the industry through public procurement, more specifically through fleet procurement at the local government level, including buses, taxis, sanitation trucks etc.²⁰ In 2014, a national target was set and also adopted by some city and local governments, stipulating that 30% of government vehicles should be electric. In 2016, this was revised to 50%.²¹

In that context, Shenzhen was identified by Beijing as one of the main cities to pilot the development of NEV technologies and infrastructure. This shows the importance of government support at the national level and commitment at the local and municipal level. In addition, Shenzhen highlights the importance of public authorities engaging relevant stakeholders in achieving these objectives – in this case, automotive manufacturers, grid companies, bus and taxi operators, policy research institutes and citizens.²² As stated by C40, a global coalition of cities committed to addressing climate change, “Shenzhen provides an open platform to encourage communication between companies and organizations in related industries, spurring better relationships between public and private partners on new energy vehicles.”²³

It is also important to note that Shenzhen, as an existing dynamic innovation hub, already represented a fertile ground for developing the latest NEV technologies and bringing them to market. One of the prime enablers of the transformation of Shenzhen from a manufacturing town to a high-tech innovation cluster was innovative governance and targeted development initiatives.²⁴

However, the strength and sustainability of China, and Shenzhen in particular, as a global hub in the NEV industry have been widely questioned. Some are pointing out that a potential bubble could be created by government procurements and consumer subsidies. That said, recent cuts in such subsidies have been accompanied by a more general growth in passenger car numbers, showing signs that the NEV industry – and the domestic market for such vehicles – is maturing, therefore allowing us to reasonably predict additional growth potential, even with a reduced government role.²⁵

Today, China, Europe and the USA represent three poles in the global NEV industry. However, compared to its Western competitors, China has now achieved a strong competitive advantage as a result of its end-to-end industrial chain, spanning from battery manufacturing and development, car design and manufacturing to charging services and recycling. While European carmakers have an edge in engineering and car manufacturing, they still rely on the import of batteries from Chinese producers.²⁶

Procuring innovation (USA)

There exists a long history, within advanced economies, of using public investment in R&D to spur on scientific and technological breakthroughs. Large research institutions and private corporations traditionally dominated this space. However, the 1970s saw a growing role for small businesses in generating and commercializing new ideas.

In 1982, the USA established the Small Business Innovation Research (SBIR) programme, an outcomes-based approach to procuring novel solutions to government missions. This approach features several stages: government departments identify challenges; they then run an open competition to identify potential solutions; potential solutions are then selected and tested; and the winning solution enters the open market.²⁷ In an environment of increasing international competition, the SBIR programme was developed to harness the potential of small businesses to conduct R&D, and more rapidly translate R&D into commercial success.

Critical to the programme's success was the mandate for all federal departments with R&D budgets over \$100 million to put 2.5% of their R&D budgets towards R&D developed by small businesses.²⁸ To date, the SBIR programme has resulted in more than 70,000 issued patents, close to 700 public companies and approximately \$42 billion in venture capital investment.²⁹

The SBIR programme offers an alternative avenue for procuring innovation and creates demand for innovative firms to form and compete. The programme has now been replicated around the world, including in the United Kingdom, where the Small Business Research Initiative (SBRI) creates a more innovative public sector, supports local innovators and produces ground-breaking solutions to challenges in both a national and global context.³⁰

Notably, in early 2018, the Australian government, particularly Queensland's state government, began exploring ways to identify innovative solutions to improve the long-term health of the Great Barrier Reef – the world's largest and most complex coral reef system.³¹ Aware of the success of SBIR and similar programmes around the world, they chose to apply an outcomes-based procurement process to inspire new and innovative ways to deal with the problems the reef was facing.

The challenge was about identifying a “step change” or “breakthrough” technology or technique that could make the reef more resilient and quickly restore its ecological functions through cost-effective methods, ultimately protecting coral and encouraging the reversal of damage.

Promoted around the world, the challenge was circulated among traditional stakeholders, such as academic institutions and conservation organizations, as well as unconventional audiences, including entrepreneurs. Successful applicants were required to demonstrate scientific rigour, commercial viability and the capability of working with partner organizations to put solutions into practice.

As has been the case in SBIR programmes around the world, the challenge has provided a catalyst for collaboration between diverse stakeholders. Not only has the challenge stimulated the creation of new and innovative solutions, it has also resulted in the local innovation ecosystem being more globally connected and capable, particularly in the fields of marine science and remote sensing.

Developing a global hub

Successful innovation ecosystems provide the critical connections needed for local innovators to scale globally. Procurement processes that extend beyond borders and require the participation of international partners can elevate the global relevance of innovation ecosystems. In the example of Dubai, this global hub for travel and logistics is using the needs of local government entities to attract international innovators and raising the region's profile as a hotspot for ground-breaking innovation. In Boston, initial government funding allowed the creation of LabCentral, a bio-innovation community's central hub for networking and collaboration, illustrating the potential for governments and industry to use new models.

Inviting the world (Dubai)

Recognizing the potential of emerging technologies to leapfrog how government entities provide services to citizens, residents and tourists was a challenge. The leading stakeholders behind these emerging technologies are start-ups and scale-ups that are often difficult for governments to access through regular procurement methods.

Hence, Dubai Future Accelerators was set up in 2016. The programme facilitates the co-creation of innovative solutions and shapes the future of emerging industries. Guided by an ambitious mission to imagine, design and co-create the future, the programme has positioned Dubai as a testbed for emerging technologies.

The programme is run by the Dubai Future Foundation, whose vision it is to make Dubai a leading city of the future. Dubai Future Accelerators is based on specific demands set by public- and private-sector entities ("challenge owners"). These demands ("challenges") are published by Dubai Future Accelerators through its network of start-ups, investors, business councils and university networks around the world.

Start-ups, scale-ups and SMEs from all around the world are invited to apply to Dubai Future Accelerators if they have an existing solution or if they can develop a solution that fits these challenges. All applicants follow an evaluation process set up and executed by Dubai Future Accelerators. The final selection of the participants is made by the challenge owners.

Selected companies ("solution providers") are invited to Dubai to an in-residence programme. In contrast to traditional accelerator initiatives, this programme does not take any equity in the participating companies.

The programme focuses on creating a collaborative working relationship between the challenge owners and solution providers to discuss ideas, exchange data, conduct market research and test potential solutions (proof-of-concepts). If both parties see fit to continue their collaboration to solve the set challenge (execute the project), a formal agreement is set up to deliver a pilot.

With, on average, half of the participants visiting Dubai for the first time, the programme also includes workshops and activities relevant to understanding the local business culture and the Dubai government's vision for the future. Furthermore, participants are provided with information on how to set up an office in the UAE.

The Dubai Future Accelerators programme provides a vehicle for Dubai's government entities to work with innovative foreign companies, primarily start-ups and scale-ups – a practice that is currently restricted due to procurement guidelines. In the fourth edition of the Dubai Future Accelerators programme, 12 government entities and 37 local and international companies designed and agreed on 27 pilot projects. These projects responded to a range of future challenges facing sectors such as occupational safety, security, infrastructure, health, transportation and communication.

As a result of the programme, Dubai's police force is testing the use of artificial intelligence (AI) to support decision-making and improve emergency response times. And a challenge to find ways to make drinkable water from sea water using solar power has a potential solution, with a UK start-up now testing a prototype in Dubai.

Collaboration between public and private partners, both large and small, is critical to the success of the programme. Not only are partners needed to identify challenges to which participants respond, but others are needed to help along the way. Notably, the Dubai Future Accelerators programme operates within the context of the UAE's wider innovation strategy. The UAE's National Innovation Strategy specifically champions innovation in government and sets a target for all government entities to direct 1% of their budgets to innovative initiatives and projects.³² This target creates a clear imperative for action.

Centralized impact (Boston, USA)

Opening in November 2013, LabCentral is a unique innovation hub in the heart of Kendall Square, Boston. LabCentral was funded in part by two \$5 million grants from the Massachusetts Life Sciences Center (MLSC), a quasi-public agency of the Commonwealth of Massachusetts with support from its real-estate partner, the Massachusetts Institute of Technology (MIT), and founding sponsors Johnson & Johnson, Triumvirate, Roche and Eppendorf. This not-for-profit organization is providing shared laboratory space and services to speed the growth of high-potential biotech start-ups.

Biotech start-ups require more than the desk and high-speed internet connection offered by co-working spaces. They require high-tech laboratory space and a network of support to stock and operate effectively. This infrastructure is costly, and the investment needed to establish it is prohibitive for early-stage biotech start-ups. LabCentral solves this problem by providing a shared laboratory for use by resident companies.

LabCentral offers laboratory and office space for more than 660 start-ups comprising approximately 300 scientists and entrepreneurs.³⁴ Over the past five years, 132 companies have taken part as residents, 70 of which have now graduated as alumni.³⁵

LabCentral is a one-of-kind innovation hub, not only because of its biotech focus and premier location but also due to its distinctive “user-pays” operating model. It does not require residents to give up equity to join, but instead to pay below-market rates for the laboratory space and services they use. This model aligns with LabCentral's not-for-profit governance structure and a mission to create a bio-innovation ecosystem that encourages collegial interactions.³⁶

Notably, the potential to become a powerhouse biotech company is the primary criterion for selection to LabCentral. The selection committee reviews applications and interviews companies to confirm that they have not raised more than \$7.5 million of capital and do not have a 12-month revenue of more than \$3 million. Next, they conduct a review to ensure that applicants not only meet the standards for high-impact science with promising execution, but that they also have the potential to be valued contributors to the LabCentral community.³⁷

What started as an initiative to lower the cost of entry for high-potential biotech start-ups has in fact become a vital feature of the bio-innovation community in Kendall Square, Boston. Working closely with governments, industry, owners of private capital and academia, LabCentral has established itself as the bio-innovation community's central hub for networking and collaboration in the Boston area.³⁸ From 2013 to 2018, LabCentral hosted more than 25,000 guests.³⁹

In 2018, LabCentral resident and alumni companies raised \$2 billion in total funding, bringing the total raised since the innovation hub's opening in late 2013 to \$4.1 billion.⁴⁰ The Series A funding (\$430 million) secured by LabCentral resident and alumni companies in 2018 represents 10% of all USA Series A biopharma investment and 40% of the total Series A funding raised in the state of Massachusetts.⁴¹ Resident and alumni company growth has spurred the addition of 1,922 new jobs and billions of dollars invested in the Massachusetts economy.

The impact of LabCentral on the local bio-innovation ecosystem is profound and illustrates the potential for governments and industry to use new models to achieve growth. In effect, MLSC has procured a unique co-working space, one that exploits the state's already established strengths but fills a critical gap in the infrastructure needs of early biotech start-ups.

To accommodate a growing demand for space, LabCentral, with the support of Pfizer, opened LabCentral 610 in December 2017. With this additional capacity, LabCentral can now service more than 450 scientists and entrepreneurs from about 70 companies across its two-building campus.⁴²

In the summer of 2019, LabCentral, again in partnership with the MLSC and MIT, broke ground for an additional 100,000 square feet (9,300 sq. metres) of space less than 1 mile (1.6 kilometres) from its original location. Thanks to a \$5 million recoverable grant, this new space will be a fully functional life sciences laboratory designed with a focus on scale-up for bio-manufacturing. This will facilitate company transitions from R&D bench-scale science into process development and scalable production of material for pre-clinical, clinical and GMP manufacturing.

Success factors

The case studies share several success factors important to encouraging the emergence of innovation ecosystems through procurement. Together, these factors offer pathways to increase the maturity of innovation ecosystems through deliberate action. They include:

Leadership – commitment to action towards a shared vision

Building successful innovation ecosystems requires a commitment to action by a diverse set of participants, both as individuals committed to acting within their areas of influence and as a group working collectively towards a shared vision. This may involve setting or adopting targets and committing resources to achieve a particular vision. Targets, such as bold and specific commitments (for example, to achieve a level of investment in innovation), offer a clear signal to stakeholders and innovation ecosystem participants. A shared vision is the product of collaboration and meaningful engagement between participants to identify a vision and strategy to achieve it.

Culture – diversity as a defining characteristic of the ecosystem

Diversity is an important characteristic of successful innovation ecosystems and the outcome of an inclusive culture. The culture of an innovation ecosystem is the sum of the culture of each participant. The behaviours, values and norms practised by participants define the culture of the innovation ecosystem and set the conditions for collaboration, new ideas and openness.

Systems – flexible systems and processes capable of change

The “rules of the game”, or the systems and processes participants use to operate, define the way business is conducted within an innovation ecosystem. The more open these systems are to diversity and change, the more likely they will adapt to support inclusive innovation. Collaboration frequently demands new ways of working with external partners, challenging existing systems and processes.

The systems and processes created by organizations to manage procurement are frequently designed to limit risk. New perspectives of “value for money” need to be considered in order to redesign procurement processes in ways that support innovators and contribute to the growth of innovation ecosystems.

To support leaders in government and industry, the Global Future Council has created the following toolkit as a model for assessing the maturity of innovation ecosystems based on these success factors. The assessing innovation ecosystem maturity table, provided below, offers a practical description of the innovation ecosystem and the status of each success factor at various stage of maturity.

The maturity model

Moving from one stage of maturity to the next

The following table is provided to assist government and industry leaders to identify opportunities to develop their local innovation ecosystem, enabling a movement from isolated and uncoordinated implementation of good practices to a uniform implementation across the entire ecosystem.

Stages of maturity

	Seeding emergence		Scaling local capability	Developing a global hub
	Seeding	Emerging	Scaling	Maturing
Leadership	Restricted – ecosystem participants are pursuing individual priorities	Uncoordinated – the vision for the innovation ecosystem is inconsistent among participants and efforts to expand the local community are unaligned	Focused – ecosystem participants are actively engaged in activities that contribute towards a shared vision	Determined – ecosystem participants are focused on achieving a shared vision and inspire engagement by new participants
Culture	Narrow – diversity among ecosystem participants is limited and unrepresentative of the wider community	Early – diversity is valued, but not yet lived. There exists a growing interest in experimentation and seeking out new ways of operating	Diverse – diversity is a common characteristic of ecosystem participants and success is readily shared by all people	Defined – diversity is a defining characteristic of the innovation ecosystem, with participants highly representative of the local community
Systems	Ad hoc – systems are ad hoc and are not consistently applied across actors and time frames	Organized – there exists a willingness to coordinate and manage existing systems and to provide consistency in application across actors and time frames	Interconnected – a high degree of flexibility is afforded to systems to facilitate new ways of operating and partnering with a diverse set of collaborators	Continuously improving – systems evolve to serve the changing needs of the ecosystem participants, redefining how organizations operate and collaborate with others

Three concrete ideas to explore

The following ideas represent powerful ways of creating new opportunities to work with non-traditional suppliers such as start-ups and small entrepreneurs.

Outcome-based procurement

Procurement processes tend to be detailed and restrictive, often stifling the very dynamic of innovation, but outcome-based procurement takes a very different approach in that regard. In this case, suppliers are selected and rewarded based on their capability to deliver against a defined outcome or on their capacity to effectively solve a given problem. This enables innovators to consider any possible ways of solving that problem, whether through a product, service or regulatory change.⁴³ This approach also has the benefit of enabling purposeful and impactful innovation.

Staged procurement

One of the vital aspects of this approach is the integration of the qualification process for suppliers into the overall procurement process, making it more inclusive. Staging the procurement process also tends to be useful in cases of large and complex projects or where there is room for, or a deliberate choice has been made to promote, innovative solutions. The initial stages enable the bidders to present initial proposals and to comment and react on the request itself.⁴⁴ The procuring organization then engages in discussions with bidders, ensuring the proposed solutions are aligned to the needs before submitting a final proposal. Despite making the process longer, more complex to manage and more expensive, staging makes it more inclusive and less risky and enables exchanges and co-creation between the main participants.⁴⁵

Moving from risk-wary to risk-aware procurement

Risk aversion is one of the most common impediments to the implementation of effective procurement for innovation. According to the OECD, this aversion to risk is often due to capacity issues as well as organizational culture.⁴⁶ Sound risk management can help create a higher risk tolerance in procurement for innovation cases, including clear guidelines on how to deal with specific risky situations, and a clear and open reporting structure to enable early responses to risks that materialize.⁴⁷ In addition, a risk-based portfolio approach also represents an opportunity to absorb risk, shifting the lens from individual contracts to an overall portfolio built in order to maximize the overall expected return for a given level of risk.⁴⁸

Potential unintended consequence of inclusive procurements

The best of intentions can sometimes lead to unwanted consequences. These case studies offer lessons in the possible consequences of growing innovation ecosystems through procurement. Importantly, these lessons offer solutions to respond and adapt to changing circumstances.

The development of ‘tenderpreneurs’

While supporting innovation and creating a more inclusive ecosystem, decision-makers must support entrepreneurs and businesses with the right product-market fit. The tender represents an opportunity for those businesses to validate their product, acquire another reference point, pay their providers and so achieve an important milestone in their journey to scale and profitability.

However, in some cases inclusive procurement can encourage opportunistic, short-term behaviour. Businesses and innovators may be tempted to pursue tenders and procurement that are not in line with their product or core business. For instance, what if an entrepreneur specializing in virtual reality (VR), driven by the lucrative potential of a tender, offers services to develop a citizen registry system? In this example, inclusive procurement is, in the medium term, detrimental to the entrepreneur and the potential innovation in VR.

Therefore, there is a risk that some entrepreneurs and businesses might lose focus and derail as a result of easy access to funded projects. At an aggregated level, this can very quickly become a threat to developing a robust innovation ecosystem.

A similar phenomenon is also possible if particular entrepreneurs or businesses – such as youth, people with disabilities or First Nation peoples – are given preferential treatment. This can inspire ventures driven primarily by the eligibility to participate, regardless of commercial viability. In some cases, dishonest behaviour can arise, requiring additional checks and balances, adding further steps, greater complexity and higher costs to the initiative and its application.

Finding the right balance between initiatives that deliver benefits and the processes needed for them to operate effectively is vital. Customers and stakeholders need to clearly understand the objective and rules of the initiative and be compelled, through trust in the system and mutual interest, to participate in line with these. Flexibility is required as governments and organizations implementing initiatives monitor their impact and adjust their delivery.

Governments can take measures to ensure that inclusive procurement can be used to supercharge an innovation ecosystem by undertaking due diligence, examining products developed by the interested businesses, and determining whether those are in line with their roadmap or whether this opportunity represents only a convenient lucrative detour.

Conclusion

The Global Future Council on Innovation Ecosystems has identified improving the inclusiveness of innovation ecosystems as an important challenge that needs to be addressed.

Drawing on the knowledge and experience of its members, the council has created the following three-stage framework for using procurement to accelerate the creation of inclusive innovation ecosystems.

- Seeding the emergence of inclusive innovation ecosystems – inspiring individuals to participate
- Scaling local capability to compete globally – identifying and cultivating local expertise
- Developing a global hub – opening the door to the world

Critical to the success of the initiatives presented under the above framework are leadership, culture and systems. There exists a major opportunity to increase the demand for innovation and accelerate the growth of inclusive innovation ecosystems through procurement initiatives. The Global Future Council has created a toolkit for understanding these opportunities and acting on them. From inspiring individuals to participate in the innovation ecosystem, to cultivating the competitiveness of innovators and smoothing their entry into new markets, procurement plays an important role.

The World Economic Forum's Global Futures Council on Accelerating Innovation Ecosystems commends this toolkit to policy-makers, industry and community leaders around the world. By applying this toolkit, and learning from its associated lessons, it is possible to create successful innovation ecosystems that are more capable of providing economic, social and environmental benefits.

Annex

Assessment questionnaire

The following questionnaire is provided to assist government and industry leaders to assess the maturity of their local innovation ecosystem. Indicate your agreement with the following statements on a scale of 1 to 4, where 1 is limited and 4 is complete.

Responses 1, 2, 3 and 4 correspond with the four stages of maturity – seeding, emerging, scaling and maturing.

	1	2	3	4
Leadership				
There is a shared vision and ambition among government leaders for creating an inclusive innovation ecosystem				
A diverse set of ecosystem participants are committed to building a recognizable and connected community				
Leaders from the public and private sectors have publicly committed to measurable targets				
Culture				
The innovation ecosystem is inclusive of diverse groups of actors				
The government is open to working with all players in the innovation ecosystem				
A culture of collaboration and integrity is present among all ecosystem participants				
Systems				
The ecosystem has agile processes to support effective collaboration to meet changing needs				
Laws and regulations are conducive to encouraging innovation				
Local content requirements are embedded in public and private procurement contracts				
Appropriate technologies are deployed to encourage mass participation of ecosystem actors				

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Endnotes

1. OECD, 2017, Public Procurement for Innovation: <https://www.oecd.org/gov/public-procurement-for-innovation-9789264265820-en.htm> (link as of 18/9/19).
2. Startup Genome, 2019, Global Startup Ecosystem Report 2019.
3. World Economic Forum, Strategic Intelligence: Innovation Global Issue: <https://intelligence.weforum.org/topics/a1G0000000LrSOEA0?tab=publications> (link as of 18/9/19).
4. OECD, 2018, Science, Technology and Innovation Outlook 2018: <https://www.oecd.org/sti/oecd-science-technology-and-innovation-outlook-25186167.htm> (link as of 18/9/19).
5. OECD, 2017, Public Procurement for Innovation: <https://www.oecd.org/gov/public-procurement-for-innovation-9789264265820-en.htm> (link as of 18/9/19).
6. NESTA, 2007, Driving Innovation through Public Procurement: https://media.nesta.org.uk/documents/public_procurement.pdf (link as of 18/9/19).
7. Access to Government Procurement Opportunities, 2019, About: <https://www.openupcontracting.org/assets/2018/04/Agpo-Report-Web-version-Full-Report.pdf> (link as of 19/9/19).
8. Hivos, 2018, Kenya's Efforts to Empower Women, Youth and Persons with a Disability through Public Procurement.
9. Ibid.
10. Ibid.
11. Minister for Innovation and Tourism Industry Development and Minister for the Commonwealth Games, the Honourable Kate Jones, 2018, Regions and Industry Winners in \$50M Advance Queensland Budget Boost: <http://statements.qld.gov.au/Statement/2018/6/12/regions-and-industry-winners-in-50m-advance-queensland-budget-boost> (link as of 18/9/19).
12. Department of Innovation, Tourism Industry Development and the Commonwealth Games, 2018, DITID Indigenous Participation Plan: https://www.ditid.qld.gov.au/_data/assets/pdf_file/0003/1428204/indigenous-participation-plan.pdf (link as of 18/9/19).
13. Infocomm Media Development Authority (Singapore government), 2019, Accreditation@SCD: <https://www.imda.gov.sg/accreditation> (link as of 18/9/19).
14. Infocomm Media Development Authority (Singapore government), 2018, Digital Economy Framework for Action: <https://www.imda.gov.sg/-/media/imda/files/sg-digital/sgd-framework-for-action.pdf?la=en> (link as of 18/9/19).
15. Infocomm Media Development Authority (Singapore government), 2018, Digital Economy Framework for Action: <https://www.imda.gov.sg/-/media/imda/files/sg-digital/sgd-framework-for-action.pdf?la=en> (link as of 18/9/19).
16. TenderBoard, 2019, About Us: Company Information: <https://www.tenderboard.biz/about> (link as of 18/9/19).
17. Kennedy, S. and Qiu, M., 2018, China's Expensive Gamble on New-Energy Vehicles: <https://www.csis.org/analysis/chinas-expensive-gamble-new-energy-vehicles> (link as of 18/9/19).
18. Ibid.
19. Zhang, L. and Liu, Y., 2016, Analysis of New Energy Vehicles Industry Policy in China's Cities from the Perspective of Policy Instruments: <https://www.sciencedirect.com/science/article/pii/S1876610216316320> (link as of 18/9/19).
20. Huang, E., 2019, Beijing Gave Its Biggest Electric-Vehicle Maker \$1 Billion in Help Towards a Single Year of Sales: <https://qz.com/1579568/how-much-financial-help-does-china-give-ev-maker-byd/> (link as of 18/9/19).
21. Lu, J., 2018, Comparing US and Chinese Electric Vehicle Policies: <https://www.eesi.org/articles/view/comparing-u.s.-and-chinese-electric-vehicle-policies> (link as of 18/9/19).
22. C40 Cities, 2016, C40 Good Practice Guides: Shenzhen – New Energy Vehicles: https://www.c40.org/case_studies/c40-good-practice-guides-shenzhen-new-energy-vehicles-including-electric-buses (link as of 18/9/19).
23. Ibid.
24. Chen, X. and Lynch Ocan, T., 2017, China's Emerging Silicon Valley: How and Why Has Shenzhen Become a Global Innovation Centre: <https://www.trincoll.edu/UrbanGlobal/CUGS/about/Documents/Chen%20and%20Ogan-Shenzhen%20as%20China%27s%20Silicon%20Valley-Dec-Jan%202017.pdf> (link as of 18/9/19).

25. Huang, E., 2019, China's Growing Electric-Vehicle Market Is No Longer Relying on Government Purchases: <https://qz.com/1592291/chinas-growing-ev-market-no-longer-relying-on-government-buying/> (link as of 18/9/19).
26. Li, X. and Zhang, H., 2019, China Builds Bulwark With Rise in New-Energy Vehicles: <http://www.globaltimes.cn/content/1156545.shtml> (link as of 18/9/19).
27. Bond, K. and Puttick, R., 2010, Buying Power? Is the Small Business Innovation Research Initiative for Procuring R&D Driving Innovation in the UK?: https://media.nesta.org.uk/documents/buying_power_report.pdf (link as of 18/9/19).
28. Ibid.
29. United States government, 2019, Birth and History of the SBIR Program: <https://www.sbir.gov/birth-and-history-of-the-sbir-program> (link as of 18/9/19).
30. Technology Strategy Board, 2019, Success Stories: <https://www.gov.uk/government/collections/sbri-the-small-business-research-initiative> (link as of 19/9/19).
31. Department of Innovation, Tourism Industry Development and the Commonwealth Games, 2018, Small Business Innovation Research: Information Exchange Day: <https://advance.qld.gov.au/sites/default/files/sbir-boosting-coral-abundance-gbr-information-session.pdf> (link as of 18/9/19).
32. Prime Minister's Office (United Arab Emirates), 2015, UAE National Innovation Strategy: <https://government.ae/-/media/About-UAE/Strategies/Innovation-Strategy/En-national-innovation-strategy.ashx?la=en> (link as of 18/9/19).
33. LabCentral, 2019, What is LabCentral: <https://labcentral.org/about/what-is-labcentral/> (link as of 18/9/19).
34. Ibid.
35. LabCentral, 2018, 2018 Impact Report: https://labcentral.org/uploads/assets/impact_report_final_web_5.14.pdf (link as of 18/9/19).
36. LabCentral, 2019, What Is LabCentral: <https://labcentral.org/about/what-is-labcentral/> (link as of 18/9/19).
37. LabCentral, 2019, Process & Criteria: <https://labcentral.org/apply/process-criteria/> (link as of 18/9/19).
38. LabCentral, 2018, 2018 Impact Report: https://labcentral.org/uploads/assets/impact_report_final_web_5.14.pdf (link as of 18/9/19).
39. Ibid.
40. LabCentral, 2019, Process & Criteria: <https://labcentral.org/apply/process-criteria/> (link as of 18/9/19).
41. Ibid.
42. Ibid.
43. Swope, C., 2014, How Barcelona and Philadelphia Are Turning Procurement Upside Down: <https://www.citylab.com/life/2014/07/how-barcelona-and-philadelphia-are-turning-procurement-upside-down/374676/> (link as of 18/9/19).
44. Chen, W. et al., 2019, Optimal Procurement Auctions under Multistage Supplier Qualification: <https://pubsonline.informs.org/doi/abs/10.1287/msom.2017.0664> (link as of 18/9/19).
45. Reed, M., 2018, Governments Are Finding New Ways to Work With Entrepreneurs – Is Yours?: <https://medium.com/coprocure/governments-are-finding-new-ways-to-work-with-entrepreneurs-is-yours-75ee2b4564f6> (link as of 18/9/19).
46. European Commission Research Area, 2010, Risk Management in the Procurement of Innovation: Concepts and Empirical Evidence in the European Union: https://ec.europa.eu/invest-in-research/pdf/download_en/risk_management.pdf (link as of 18/9/19).
47. OECD, 2017, Public Procurement for Innovation, Good Practices and Strategies: https://www.oecd-ilibrary.org/governance/public-procurement-for-innovation_9789264265820-en;jsessionid=bdOjbVxpjssKgMKo-NcaCfKF.ip-10-240-5-190 (link as of 18/9/19).
48. Fouhal, S. et al., 2012, Procurement: Managing Risk and Volatility: <https://www.mckinsey.com/practice-clients/operations/agile-procurement-managing-risk-and-volatility> (link as of 18/9/19).



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