

NSW Innovation and Productivity Council

NSW Innovation Precincts

Lessons from
international experience

September 2018



The evolution of innovation precincts

- 1.1 What are innovation precincts? 13 >
- 1.2 Emergence of innovation precincts 13 >
- 1.3 Types of innovation precincts 14 >

Cited benefits of successful innovation precincts

- 2.1 Innovation precincts enhance collaboration and commercialisation 22 >
- 2.2 Superior products and services 23 >
- 2.3 Financial benefits, growth and resilience 23 >
- 2.4 Greater productivity 24 >
- 2.5 Export growth 24 >
- 2.6 Jobs growth and higher wages 24 >
- 2.7 Social, environmental and cultural benefits 25 >

Factors for success

Lessons from international precincts

- 3.1 Market drivers 29 >
- 3.2 Competitive advantage 31 >
- 3.3 Collaboration 33 >
- 3.4 Infrastructure 34 >
- 3.5 Amenity 36 >
- 3.6 Enterprise culture 38 >
- 3.7 Leadership 40 >

Barriers to success

Risks and factors inhibiting innovation precincts

- 4.1 Weak market demand 44 >
- 4.2 Barriers to investment and commercialisation 45 >
- 4.3 Lack of entrepreneurial culture 46 >
- 4.4 Poor access to capital 46 >
- 4.5 Poor access to skills 47 >
- 4.6 Poor place-making and connectivity 47 >
- 4.7 Lack of policy and coordination 48 >

NSW innovation precincts

- 5.1 Health and education innovation precincts 51 >
- 5.2 Innovation precincts around universities 56 >
- 5.3 Innovation precincts around a major asset 60 >
- 5.4 Inner city innovation locations 64 >

Role of government and other stakeholders

- 6.1 Institutions 70 >
- 6.2 Businesses 71 >
- 6.3 Entrepreneurs 72 >
- 6.4 Investors 73 >
- 6.5 Incubators and accelerators 75 >
- 6.6 Real estate partners 77 >
- 6.7 Government 78 >

Foreword from the NSW Deputy Premier

As NSW transitions to a services and innovation-driven economy, we want to make the most of every opportunity to build on our world-class research and science organisations, leading industries and highly skilled workforce to support the growth of globally competitive sectors.

This new 'innovation economy' is emerging rapidly as new technologies transform established industries. While technology platforms enable work to be done remotely, innovation is helped by collaboration – something which is often easier in person. The benefits of collaboration – the sharing of knowledge, services and infrastructure – have led many businesses and institutions to co-locate in specific hubs or clusters. When such places start to gain economic momentum they come to be known as innovation precincts.

Internationally recognised innovation precincts – such as California's Silicon Valley, London's Silicon Roundabout and Tel Aviv's innovation ecosystem – are just a few that have achieved global reach and impact. As a result they have made a significant contribution to their local and national economies.

NSW is well-positioned to learn from this international experience and build on our industry strengths – from med-tech and healthcare, finance and business services, to IT, defence, science and engineering and creative industries. A number of locations in NSW cities and regions already host innovation ecosystems that are creating and commercialising new products and services. I encourage the businesses, universities, start-ups and local councils that are making these places happen to work together to strengthen our growing innovation precincts.

The NSW Innovation and Productivity Council developed the report *NSW Innovation Precincts* to inform the decision-making of organisations involved in developing innovation precincts in NSW. It examines the international literature and case studies from the viewpoint of NSW to better understand why some innovation precincts are more successful than others and to identify the different roles that stakeholders and governments can play.

The report complements the State's overarching planning, place-making and innovation policies, including the work of the Greater Sydney Commission, the NSW State Infrastructure Strategy, Future Transport Strategy, NSW Innovation Strategy, and the work of Jobs for NSW.

I congratulate the NSW Innovation and Productivity Council on this important research. It will be a valuable resource for NSW Government agencies, other public sector organisations such as local councils, universities and hospitals, and our diverse business community. This important resource will also be used for future government policy making. Together, we can support NSW innovation precincts to fulfil their potential and bring economic benefit to NSW and its residents.



The Hon. John Barilaro MP
NSW Deputy Premier
Minister for Regional New South Wales
Minister for Skills
Minister for Small Business

Foreword from the Chair, NSW Innovation and Productivity Council

Innovation precincts have the potential to provide significant benefits to the NSW economy. These place-based concentrations of businesses, knowledge-intensive institutions and entrepreneurs are an important component of the innovation economy, helping to attract talent, and building on the opportunities of their sectors and locations.

The NSW Innovation and Productivity Council (IPC) developed the report *NSW Innovation Precincts* to provide a clear, evidence-based view of what makes different types of innovation precincts succeed, explain the different stakeholder roles in precinct development, and identify the common risks and failures.

Innovation precincts are diverse and develop in different ways. In NSW, many are only just developing, and will need coordinated support from multiple stakeholders and a long term view to succeed. It is important we understand the factors for success so that decision makers – both in government and the private sector – can provide the right support to help them grow.

We hope the insights in this report will serve as a useful guide for organisations that provide support to precincts and help foster further collaboration across government and between precinct stakeholders.

This work follows on from the IPC's report, *The Innovation Economy: Implications and Imperatives for States and Regions*, which identified areas that can make a difference in transitioning to an innovation economy.

On behalf of the NSW Innovation and Productivity Council, I would like to thank the numerous people that were involved in developing this report, including all those that provided feedback throughout its development.



Mr. Neville Stevens AO
Chair, NSW Innovation and Productivity Council

Executive summary

Innovation is at the heart of competitive advantage for firms and economies. It takes many forms – from improvements in products and processes through to new services, products and ways of doing business. It underlies productivity at the firm level and the creation of jobs throughout the economy. In many cases it can lead to success in global markets.

Innovative firms can be anywhere, from city to regional areas. Often they may cluster together, perhaps sharing common services or forming part of a supply chain for a larger firm or industry. Wherever they are located, they underpin the economic prosperity of NSW.

Over the last few decades, a new generation of technologies and increased connectivity has driven an unprecedented change in the scale, depth, speed and spread of innovation across industries. This has been described as the emergence of a globalised innovation economy. One feature of this innovation economy has been the increasing importance of agglomeration – where businesses concentrate in specific geographic areas to match skills, to collaborate, or to share knowledge and resources in a cost-effective way.

Concentrated place-based innovation activity, often referred to as an ‘innovation precinct’, is increasingly seen as key to offering economic and productivity advantages to businesses, investors, and workers. They create market visibility and identity for industry and research clusters and build on the opportunities and characteristics of their location. The proximity between firms, institutions and investors enhances collaboration, attracts skilled workers and provides the spaces and infrastructure that suit the various participants – anchor tenants, businesses, research organisations, investors, entrepreneurs, incubators and accelerators.

Unsurprisingly, there is global interest by governments, businesses and research institutions in developing and fostering innovation precincts.

In NSW, innovation precincts are emerging in cities, in regions and in greenfield and brownfield developments.

Locations across NSW have strengths in a range of sectors including healthcare, scientific instruments, financial and business services, biopharmaceuticals, defence, software and communications, ag-tech, engineering and creative industries. These precincts are frequently centred around universities, research-intensive local health districts with large hospitals such as Westmead Hospital, major infrastructure or significant research facilities, such as the Australian Nuclear Science and Technology Organisation (ANSTO) facility.

Their opportunities are anchored to their unique place-based characteristics and innovation ecosystem, including NSW's strong research sector and skilled workforce. Globally, significant innovation precincts take years to develop, and strong market drivers are critical to their success. The NSW Government, the Greater Sydney Commission and other organisations including universities and major hospitals, are supporting emerging precincts to become more competitive, to grow and to drive economic activity and create high-value jobs. This support needs to involve multiple stakeholders and be coordinated and long-term in its approach.

Side by side with innovation precincts, other place-based innovation activities, clusters and collaboration areas are emerging and adding to the range of innovation location sizes, types and sectors that are needed to create a diverse innovation ecosystem in NSW. These activities benefit the broader economy as they provide important multipliers, spillovers and agglomeration advantages.

Lessons from international experience

This report has been developed by the NSW Innovation and Productivity Council as a resource for local, state and federal government agencies, universities, local health districts, and the wide range of actors in the innovation ecosystem – from large businesses, property developers and real estate providers, through to small to medium-sized enterprises (SMEs), startups and accelerators.

Drawing on case studies and international examples, the report provides stakeholders with a clear view of what makes innovation precincts succeed or falter and builds upon previous work by the NSW Innovation and Productivity Council on the innovation economy.

It aims to educate and encourage innovation precinct stakeholders to draw on the lessons from international experience in assessing the strengths, weaknesses, opportunities and priority actions for their individual precincts.

The complex mix of stakeholders, economic drivers and local factors needed for innovation precincts to succeed makes them particularly vulnerable to the market failures that hinder innovation more generally. The tendency for firms to under-invest in innovation, the information gaps between investors and startups, or between business and knowledge institutions, and the governance and coordination failures within and between the different stakeholders in the innovation ecosystem can all keep a precinct from reaching its potential. This report encourages better coordination between stakeholders.

Innovation locations vary in size, scale and stage of development, but only a few will grow to become high-profile, international innovation precincts. Whether the innovation precincts emerging in NSW will achieve global recognition depends on multiple factors, including the size of the market opportunity, the competitiveness of the local research and industry strengths, and the capacity of research, business and entrepreneurial stakeholders to work together to maximise the opportunity in collaboration with government.

The potential benefits of innovation precincts

Successful innovation precincts deliver benefits to local and national economies – from higher wages and quality jobs for workers to superior products for consumers and higher tax revenues for government. There are many examples of innovation precincts demonstrating higher than average productivity and firm growth, and firms located in a precinct experiencing higher than average export growth.

Successful innovation precincts make an outsized contribution to the economy and are more resilient to economic downturns. The clustering of industries in precincts facilitates collaboration, knowledge flows and knowledge spillovers between industry, researchers and entrepreneurs, which plays a critical role in increased levels of innovation, particularly for new ventures. Higher rates of innovation also mean an increased capacity to deliver products and services at reduced cost to the consumer.

Successful precincts make productive use of land and buildings and capture more returns on sunk public investments in infrastructure facilities, government funding for research and development and the education of workers. Precincts can offer a means for NSW to better leverage investments in major assets such as hospitals, universities and airports and to accelerate an economic transition to a more diversified economy.

What does success look like?

Some precincts emerge organically, others are catalysed by targeted investment, and a small number are shaped by government programs. Irrespective of their beginnings, the experience of globally significant innovation precincts suggests seven broad factors for success:



1 Market drivers

Strong market demand for the goods or services; competitive pressure in the sector to innovate; access to markets, skills and investors; reliability of the jurisdictional legal and intellectual property (IP) protections and the competitive regulatory environment needed for a well-functioning innovation economy.



2 Competitive advantage

Clearly defined market advantage or sector specialisation that is communicated through strong branding to attract and retain talented workers and financial investment, supported by pro-productivity regulatory settings.



3 Collaboration

Facilities and programs to support collaboration between diverse organisations – from spaces for informal social ‘collisions’ through to commercial frameworks for joint ventures.



4 Infrastructure

Physical, transport and digital infrastructure that supports research, innovation activity and business connectivity within and outside of the precinct.



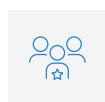
5 Amenity

A vibrant and liveable location that attracts people to work, play and live there. It offers a sense of place for participants in the innovation ecosystem and the workers that provide ancillary services to the precinct and is underpinned by flexible and adaptive land use planning regulations and the provision of well-designed local cultural infrastructure.



6 Enterprise culture

Strong entrepreneurial culture of risk-taking, collaboration and sharing ideas. This culture is supported by mentoring programs and a diversity of organisations and workers, and is influenced by the culture of the anchor institution.



7 Leadership

Robust governance, strong leadership, political commitment and a shared vision.

Barriers to success

Efforts to establish and grow innovation precincts are not always successful. As locations for the creation of new-to-market and new-to-firm innovations, precincts are affected by the same types of risks and barriers that hinder innovation more generally. International research suggests a number of factors are at play in precincts that falter:

Weak market demand

Precincts may not have the factors needed for them to be economically viable, or there may be little evidence of new economic activity or innovation from businesses locating there. There are also risks when precincts are established primarily because of political will rather than market demand.

Barriers to investment and commercialisation

Factors that impact the investment in and commercialisation of research and development (R&D) will slow innovation activity and the success of precincts. These can include restrictive intellectual property controls, a closed academic culture and a tendency for industry to under-invest in research.

Lack of entrepreneurial culture

The precinct may not provide quality incubator and accelerator programs or other support needed for precinct participants to interact collaboratively with startups and smaller firms.

Poor access to capital

Firms in startup and growth phases may not be able to access enough capital from angel and venture capital investors, standard investment groups or public funding.

Poor access to skills

Local skills shortages can hinder the capacity of the precinct to innovate and scale.

Poor place-making and connectivity

Insufficient amenity, inadequate public transport and poor tenant infrastructure will reduce the attractiveness of the precinct to employers, workers and startups.

Restrictive regulation and a lack of policy support and coordination

Policies and long-term funding decisions of stakeholders may not support the new technologies, emerging business models and changing demand for skills that are central to successful precincts. Planning regulations can create financial or bureaucratic impediments to zoning land to support mixed uses, while poor IP regulations can restrict knowledge sharing and have a negative impact on innovation activity in the economy.

NSW innovation precincts

A broad-range of place-based innovation activity is occurring across NSW in a range of sectors including healthcare, scientific instruments, financial and business services, biopharmaceuticals, defence, software and communications, agtech, engineering and creative industries. These innovation locations span different scales – from a single building to a cluster of affiliated locations to an innovation corridor defined by the opportunities and characteristics of the location. A number of them are developing into innovation precincts where research and business collaborations are attracting capital and fostering further innovation.

Drawing on international research, precincts developing in NSW can be broadly categorised under four typologies:

- 1 Health and education innovation precincts
- 2 Innovation precincts around universities
- 3 Innovation precincts around a major asset
- 4 Inner city innovation locations.

In NSW, health and education innovation precincts are developing around some of the major research hospitals and universities, including the Randwick Health and Education Precincts, the Westmead Health and Education Precinct and the Camperdown Ultimo Health and Education Precinct. These have built an active network of medical research institutions, ancillary facilities and a mix of complementary industry tenants. The Greater Sydney Commission's *A Metropolis of Three Cities* also identified additional health and education precincts for future expansion.

Innovation precincts are developing around universities in NSW, including regional precincts around the University of New England in Armidale and the Charles Sturt University campuses in Bathurst and Wagga Wagga. These innovation precincts are leveraging their research strengths and assets to attract business and investment across a range of disciplines that include digital technology, biotechnology, agricultural technology, and creative industries.

Specialist precincts are emerging in NSW around major assets to leverage the large public investment and access to supply chains. These include the Australian Nuclear Science and Technology Organisation (ANSTO) precinct in applied nuclear science and technology, the emerging precinct around the Williamstown Aerospace Centre near Newcastle for aerospace and defence, and the GATE in Orange that is designed to develop agtech ideas and fast-track the adoption of agricultural R&D.

Innovation precincts are developing in inner city locations around the Sydney CBD including the Sydney Startup Hub, Central to Eveleigh and in North Sydney to take advantage of the growing entrepreneurial and innovation activity in digital and financial technology. The large mix of creative talent has also created a dense innovation corridor of creative industries across Surry Hills, Redfern (including Australian Technology Park) and Moore Park.

Two innovation precincts are also proposed close to the future Western Sydney Airport to leverage its links to global supply chains and access to new export partners: the Western Sydney Aerospace and Defence Industries Precinct; and Luddenham Science Park, with a focus on advanced science, technology, engineering and maths (STEM) research and development.

The role of stakeholders

Precinct development is driven primarily by market forces and the preferences of workers and businesses, and relies on effective governance and collaboration between institutions, industry, entrepreneurs, investors and land owners. Pro-innovation government policies, regulations and planning settings are also needed to create the right environment.

Institutions, businesses and entrepreneurs

Institutions such as universities, research-intensive hospitals and defence facilities are often the catalyst and coordinator of precincts as they provide the scale and appetite to catalyse innovation activity and act as anchors to attract and retain talent and capital.

Innovation businesses provide important network and knowledge sharing opportunities and can further connect the precinct to the broader supply chain of connected businesses, while entrepreneurs provide the vision, enthusiasm and risk-taking appetite that are important ingredients in an innovation precinct.

Investors, accelerators and incubators and real estate partners

Investors provide the capital and expertise needed to finance ventures that commercialise product and process innovations. Accelerator and incubator programs also support early stage firm development and are critical to the success of an innovation precinct and the innovation ecosystem more broadly. Real estate developers are increasingly acting to facilitate and foster innovation precincts.

The role of government

The activity of a precinct and its level of success and sustainability will ultimately be driven by the businesses, institutions, entrepreneurs and researchers working there. Governments provide the microeconomic and tax policies to support business development, and policies that facilitate the attraction of skilled workers and protect IP. As the major funder of universities, the Australian Government can also provide incentives for universities to collaborate more effectively with industry and the community. Local government can play a role in community leadership and land use planning and regulation. It can help promote and brand a precinct and, where appropriate, co-locate staff and facilities within a precinct.

State governments are instrumental in creating a regulatory and business climate that supports firm growth and economic activity. They also control planning, infrastructure and program levers that can shape and foster precinct development, particularly when well-coordinated across portfolios. They can also assist in bringing stakeholders together to assess opportunities and foster collaboration.

State governments have a leadership role in precinct development at the point of making catalytic public investments that have the potential to change the innovation landscape. These can include the development of major facilities, such as the significant infrastructure investment to support the Randwick Health and Education Precinct, Westmead Health and Education Precinct and the Western Sydney Airport. A proactive approach to identifying key success factors and priority actions, coordinating government programs and working with stakeholders helps such efforts to drive the development of a successful innovation precinct.

Next steps

This report provides a basis for understanding the success factors for globally recognised precincts that could be used to support successful precinct development in NSW. It is not a government strategy, nor an assessment of the potential of existing or planned innovation precincts in NSW.

The NSW Innovation and Productivity Council encourages stakeholders to use the information in this report as a starting point for their own assessments of the strengths, weaknesses and opportunities for individual innovation precincts in NSW.

Public or private support for innovation precincts ought to be assessed on a case-by-case basis, proportional to the market opportunity, sustained over the longer term and coordinated with the activities of other major stakeholders and the wider innovation economy.

Introduction

This report provides a review of the drivers, benefits and common barriers to successful innovation precincts. It is based on a review of international experience and informed by local stakeholder consultations. It builds on work already published by the NSW Innovation and Productivity Council on the innovation economy.

The innovation economy and innovation precincts

The speed of technological change together with growing global integration and competition has significantly increased innovation activity. An 'innovation economy' is emerging rapidly as a new generation of technologies, combined with smart enterprise models and investment capital, transform both established and emerging industries. This economy depends on a strong and connected 'innovation ecosystem' of firms, institutions, customers, infrastructure, supply chains, labour markets and investment systems to drive business creation, capitalisation, and growth.

A new generation of technology-powered industries and firms that rely on proximity to markets as well as a talent pool that prefers urban locations and lifestyles is leading to a concentration of innovation activity in geographic areas.

Although technology increasingly enables work to be done remotely, innovation is supported by face-to-face collaborations. This has led businesses and institutions to co-locate to share knowledge, services and infrastructure. When such locations start to gain economic momentum they come to be known as innovation hubs, clusters, or districts. In Australia, these large innovation locations are generally referred to as 'innovation precincts' (Chapter 1).

Growing interest in innovation precincts

Firms are attracted to innovation precincts because they offer access to skilled workers and knowledge-sharing opportunities. Businesses, workers, entrepreneurs, researchers, students, and investors gain advantages from the proximity and interaction that precincts make possible. Collaborators such as universities, hospitals and other anchor institutions help to create dynamic working environments that are attractive to investors and skilled workers.

Governments seek to foster precincts because they can support industries, firms, workers and places to embrace economic transition and enterprise opportunity, and deliver economic benefits through new knowledge-intensive jobs and improved economic resilience.

Precincts can play a key role in increasing the visibility of the local innovation economy, supporting the branding of specific clusters of expertise and signalling investment or trade opportunities to markets.

The international experience

Studies of globally recognised precincts show that successful precincts can have a positive impact on local and national economies. Globally recognised precincts are distinguished from smaller clusters of innovating businesses by the degree of this impact. The most significant innovation precincts translate science and discovery into leading patents, new processes or products for multiple industries and increase internationally-traded IP and new innovations that disrupt whole industries.

Precincts seem to offer a means to accelerate economic transition to advanced sectors and support a diversified economy to deliver multiplier and spillover benefits (Chapter 2) – including increased disposable income, deepening of supply chains, talent development and retention, urban restructuring and more optimal use of land and buildings. They can also support education and skill development through the co-location of universities and research institutes, industry and startups that include student internships, collaborative research projects and student startups.

Not all precincts are successful or deliver such tangible benefits. Review of the international literature shows that there are multiple factors needed to drive success (Chapter 3), and that work to inhibit the precinct (Chapter 4) shows the importance of understanding how these factors might shape the opportunities and commercial potential of NSW precincts.

The NSW context

There is a significant body of government-supported innovation activity across NSW, and a number of innovation precincts developing in key locations (Chapter 5), but there is no single agency responsible for precinct development and support. NSW Government support for innovation precincts is shaped by a range of policy drivers and a suite of targeted actions delivered by multiple agencies under related strategies such as its whole-of-government Innovation Strategy, Jobs for NSW, *A Metropolis of Three Cities*, Future Transport 2056 and the NSW State Infrastructure Strategy. A range of NSW Government programs and services also support key participants within the broader innovation ecosystem where there is a net benefit to the NSW community, including support for SMEs, startups and entrepreneurs.

This report aims to provide a shared understanding of the success factors of globally recognised precincts to guide the efforts of government, industry, research, and other stakeholders (Chapter 6) in developing the emerging innovation locations in NSW.

Report overview

Chapter 1 provides global context on the phenomenon of innovation precincts, their multiple types and formats, and their different stages of evolution and maturity.

Chapter 2 details the potential benefits from successful precincts across a range of indicators.

Chapter 3 examines the ingredients of globally recognised precincts, and identifies seven distinct factors for success.

Chapter 4 looks at the common reasons for the failure of precinct projects, and illustrates some of the factors that can impede precinct development.

Chapter 5 observes four broad types of innovation precinct that are emerging in NSW, and maps the developing and proposed innovation precincts across NSW.

Chapter 6 identifies the key stakeholders that are essential to the success of precincts and their capacity to maintain their competitiveness through multiple economic and political cycles.

Chapter 1

The evolution of innovation precincts



1.1 What are innovation precincts?

Large innovation locations that offer quality facilities and host productive collaborations between firms, researchers, investors and entrepreneurs have been identified since the late 1990s.

Innovation precincts can take a variety of forms – from an agglomeration of innovative activity around a significant research-intensive hospital or university to a single building that hosts a density of startups, entrepreneurs and investors. These geographic concentrations of economic and innovative activity can go by different names. The term ‘innovation precinct’ is widely used in Australia, while ‘innovation district’, ‘hub’, or ‘cluster’ are more commonly used internationally, but the underlying concept and rationale is the same. The Brookings Institution defines these locations as:

‘[geographic areas] where leading-edge anchor institutions and companies cluster and connect with start-ups, business incubators, and accelerators. They are also physically compact, transit-accessible, and technically-wired and offer mixed use housing, office, and retail.’¹

An innovation precinct is distinguished from other innovation locations by the intensity and scale of its on-site collaboration, productivity and positioning in the global market, and the brand visibility it gives its economic activities. A precinct is not simply a small group of companies in the same location, a place that policy makers designate as innovative, or a speculative real estate ‘play’, although these sites may later develop into innovation precincts with the right conditions.

Varied use of the terms ‘innovation’ and ‘precinct’ is widespread in Australian policy, planning and place-making literature. ‘Innovation precinct’ is sometimes interchanged with related terms to refer to the same or similar concepts. Jobs for NSW refers to ‘innovation clusters’,² while the Greater Sydney Commission refers to ‘Health and Education Precincts’ and ‘Collaboration Areas’³. Some terms are used to refer to particular initiatives or highlight a specific place for focus, such as ‘priority precinct’.⁴

A full range of innovation activities and locations is economically critical – whether in the form of a single company improving its products and services, a group of businesses collaborating to commercialise a new invention or a larger cluster of complementary services located in proximity to each other that are collectively advancing an industry.

Some place-based innovation terms refer to these different types of economically important innovation locations that are not in themselves innovation precincts. These include startup ‘hubs’, ‘collaboration areas’, ‘creative, arts and cultural precincts’, ‘research and science zones’ and ‘advanced industry areas’. While such locations may naturally seek to expand their activities, not every innovation location will grow to become an innovation precinct, and not every precinct will achieve economic significance.

1.2 Emergence of innovation precincts

The re-urbanisation of innovation is a phenomenon that has been observed in many countries around the world.

Over the last 25 years, many companies that participated in earlier cycles of innovation that were located in suburban or out-of-town locations such as science and technology parks have begun the process of re-locating some, or all, of their functions in more accessible, dense and amenity-rich urban environments. At the same time most new companies operating in global sectors, and the talent that they depend on, prefer the proximity, connectivity, profile and market access that is available near urban centres.

Innovation precincts have emerged where businesses and entrepreneurs are responding to market pressures to be more competitive by making links with local research organisations and venture capital to pursue market opportunities. These links usually require proximity and collaboration between multiple firms and knowledge institutions as well as enabling regulatory environment and an entrepreneurial working culture.

1.2 Emergence of innovation precincts continued

The genesis and development of precincts varies between locations. Many emerge organically in low-cost or under-utilised locations that further develop to improve the amenities and quality of the place, or from commercial activity associated with research efforts in universities and medical institutions. Precincts can also be deliberately developed through government support and investment, particularly when a catalytic government investment creates a new market opportunity for large-scale, place-based agglomeration, collaboration and innovation.

Most economically successful cities will usually have several types of innovation precincts at different stages of development and maturity, supported by a strong innovation economy.

1.3 Types of innovation precincts

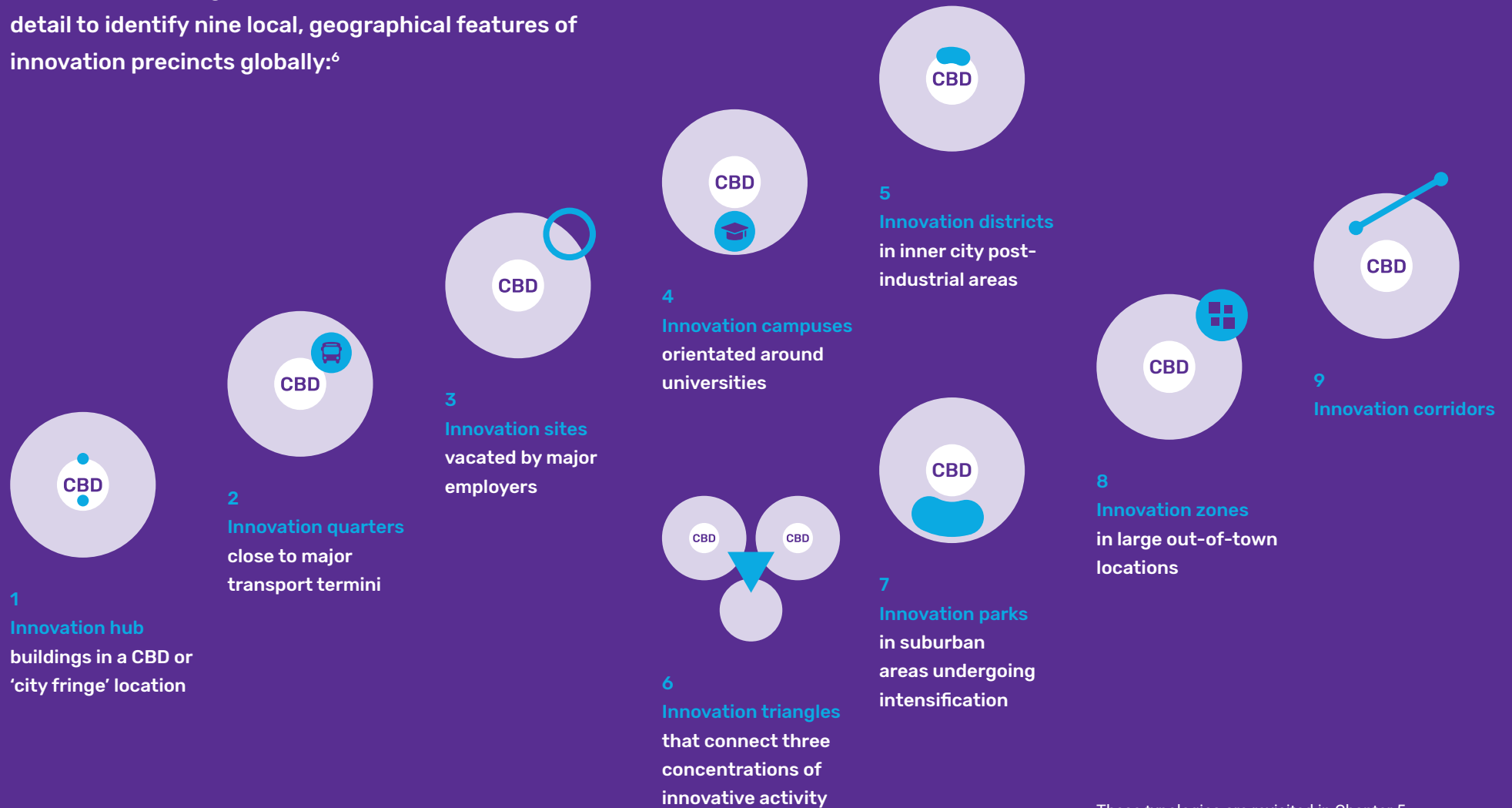
While the locations, types, scales and formats of innovation precincts vary, precincts can still be sensibly classified to reflect their emergence and key features. Such classifications are helpful for understanding how a particular innovation precinct emerged and what might be the best way to support its future development.

The Brookings Institution is a globally well-regarded knowledge source on innovation precincts that describes three broad models for innovation precincts:⁵

- 1 Anchor Plus** – innovation precincts centred around major anchor institutions, such as universities, hospitals and large corporates that catalyses and attracts a rich base of related firms, entrepreneurs and spin-off companies involved in the commercialisation of innovation.
- 2 Reimagined Urban Areas** – existing urban areas are undergoing a physical and/or economic change to become more innovative. These areas are typically well served by transport, have an element of heritage building stock and are in close proximity to a high-rent CBD.
- 3 Urbanised Science Park** – innovation precincts in suburban and outer-metro contexts where traditionally isolated, sprawling development is incorporating more urban activities and characteristics. This is often occurring through increased density and new activities that are mixed, as opposed to separated (e.g. adding retail, hospitality, services, housing).

1.3 Types of innovation precincts *continued*

The Business of Cities Ltd, an urban intelligence group at University College London, adds another layer of detail to identify nine local, geographical features of innovation precincts globally:⁶



These typologies are revisited in [Chapter 5](#) as a basis for presenting the range of NSW innovation precincts.

1.3.1

Maturity pathways

As precincts progress along a maturity pathway, their scale, productivity, innovation outputs and economic impact will substantially increase. However, innovation precincts develop, grow and change in various ways and at different rates. Some may even become less prominent over time and their innovation activity and economic outputs may diminish.

Although a precinct's maturity pathway is not always linear, considering where a precinct might sit along that pathway can be a useful way for stakeholders to think about the priority factors to focus on at different stages of development.

The Greater Sydney Commission's *A Metropolis of Three Cities* maps the typical maturity pathway for health and education precincts, which becomes progressively more complex as the hospitals, medical research institutes and universities in the precinct scale up their commercialisation activity, attract startups and venture capital and diversify to establish an active innovation ecosystem.⁷

The varying levels of precinct development can also be understood in terms of the different features of proposed, emerging, active and globally significant precincts.

1.3.2

Proposed precincts

Proposed precincts are those that are supported and committed to by a range of stakeholders including government, private and non-government sectors. They have been publicly announced but are in the early planning stages.

In Sydney, the Bays Precinct has been proposed by the NSW Government as an innovation precinct that makes productive use of the historic White Bay power station and leverages its proximity to the CBD. In Western Sydney, the Western Sydney Aerospace and Defence Industries Precinct has been proposed as a greenfield precinct development, with investment from local, state and federal governments linked to the planned Western Sydney Airport and associated aerospace and defence industries.

These precincts have strong government support and land, but will need the right mix of appropriate infrastructure, participating businesses, research strengths and market drivers to secure wider stakeholder commitment. This includes conducive zoning and planning controls to support mixed-uses, securing investment for the required infrastructure, and attracting anchor institutions and business that will help draw others needed to build a place-based innovation ecosystem.



Rotterdam Innovation District

Rotterdam Innovation District is an international precinct that has been planned by leading stakeholders in a joint development between the city and the Port Authority. Together they launched the district just west of the city centre and designated it along with Rotterdam Central District as the two strategic locations to explore the opportunities of the next economy. Subsequently, the City and Port have looked to develop the districts through attracting international incubators, relocating education institutions and activating public spaces and cultural infrastructure* while strengthening the wider ecosystem.⁸

*Cultural infrastructure includes permanent buildings and spaces that accommodate or support one or more of the cultural disciplines of visual arts, crafts, media arts, performing arts, heritage, museum, archives, libraries, publishing, sound recording, film, audio visual, radio and television.

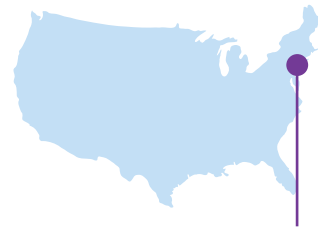
1.3.3

Emerging precincts

An emerging precinct is a working innovation location that is starting to scale up. It has made progress in building local networks and collaborative ventures and has support and commitment from key stakeholders for expansion.

In NSW, the emerging Global Ag-Tech Ecosystem (GATE) in Orange is a NSW Department of Primary Industries (DPI) initiative to fast-track adoption of agricultural research and development. GATE is a collaborative partnership between research and technology providers, universities and ag-tech accelerator Sparklabs Cultiv8. Agricultural technology developers can access others' expertise or bring their own to collaborate with technology providers, business services and investors in creating commercialised products for the NSW agricultural sector.

A focus for emerging precincts is establishing appropriate governance to bring together key stakeholders to support the precinct's development. Precinct stakeholders can work together to increase the diversity of its participants, make the precinct more liveable, attract investment to boost its market advantage and establish a recognisable brand and market identity.



University City Center City

The University City Center City in Philadelphia is a two-square-kilometre precinct that is home to Penn University, Children's Hospital of Philadelphia, Drexel, and Comcast. It has great promise in gene therapy, digital health, energy, chemicals, and new materials. The next challenge is to organise and grow the clusters, connect startups more effectively with customers, and use procurement to drive local development and inclusion. Unlike more mature precincts, the largest institutions, corporates, and civic bodies have yet to fully organise themselves and build shared leadership in order to address place-making and skills in the precinct and wider area.⁹

1.3.4

Active precincts

An active innovation precinct has a recognised identity, a strong culture of collaboration and entrepreneurialism, access to venture capital investment and actively undertakes research and development to commercialise new products and services. It has good enabling infrastructure and a vibrant, mixed-use environment that attracts skilled workers and visitors. In NSW, the Randwick Health and Education Precinct and Westmead Health and Education Precinct are often cited as examples of active precincts.

A focus for active precincts is to build on the existing brand and identity of the precinct to increase its scale and tap into global markets. The precinct is likely to have a formalised governance structure that coordinates efforts to attract new investment and partnerships, takes advantage of opportunities as they arise, and addresses any emerging challenges.



Proposed precincts

- identified site
- early planning stages
- securing investment
- attracting anchor institutions and business
- commitments from stakeholders

Globally significant precincts

- significant economic contribution
- sophisticated infrastructure
- substantial investments from diverse sources
- large number of jobs and firms hosted
- established governance and active leadership

- strong culture of collaboration and international partnerships
- respected international brand and reputation
- significant commercialisation of R&D
- attracts and retains talented workers and businesses
- sustained international market presence

Active precincts

- increasing its scale and reach
- good enabling infrastructure
- accessing venture capital investment
- attracting new partnerships
- formalised governance structure
- culture of collaboration and entrepreneurialism
- strengthening brand and identity
- commercialisation of R&D
- vibrant location attracts workers and visitors
- tapping into global markets

Emerging precincts

- starting to scale up
- improving amenities and infrastructure
- increasing investment
- diversifying participants
- forming appropriate governance
- undertaking collaborative ventures
- establishing identity and brand

1.3 Types of innovation precincts continued

1.3.5

Globally recognised precincts

Significant innovation precincts take years to develop and only a small number will develop into globally recognised centres of innovation.

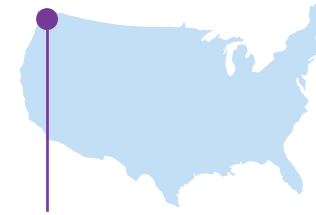
A globally recognised precinct has a clearly defined market advantage or sector specialisation that is in high demand internationally. Through their success in international markets, they make a substantial contribution to their local economies and are larger in scale than precincts that primarily service domestic or regional markets. This scale can also help foster further international connections and collaborations.

The precinct is supported by strong governance and leadership with a respected brand and connected location that attracts and retains talented workers, businesses and financial investment. It offers sophisticated infrastructure and a strong entrepreneurial culture that supports the commercialisation of research and development. These features are discussed in more detail in [Chapter 3](#).

A given regional economy can only reasonably support a small number of these globally recognised centres. There are natural local constraints to the size of a sector and its related research capacity.

There are also market conditions that can impact a region's capability to innovate and grow. These are addressed by building (and leveraging) the preconditions of a strong innovation ecosystem – economic, physical and networking assets and a risk-taking enterprise culture that facilitates idea generation and accelerates commercialisation.

This report makes reference to 16 different globally recognised innovation precincts ([Map 1](#)) that are the most commonly cited and assessed in the literature.

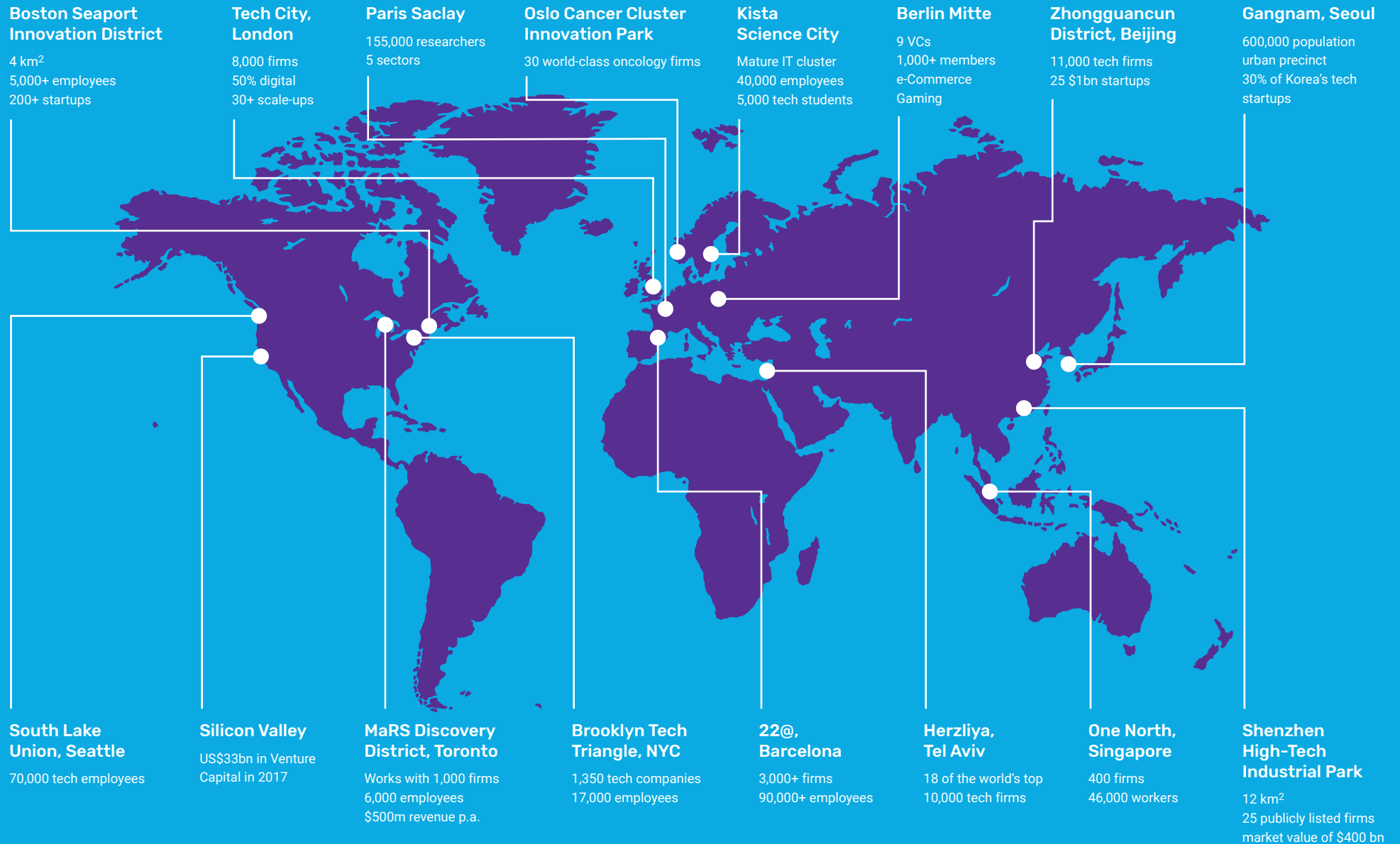


South Lake Union

The South Lake Union in Seattle is a globally recognised precinct that is now in its third cycle of development since its formation in the late 1990s. The precinct has been managed principally by Vulcan Real Estate, which purchased the majority of the land and convened a shared vision for a 'walkable' mixed-use neighbourhood in an urban infill location. In its first development cycle, the project was successfully re-zoned and public investment flowed into the tram network and a new power sub-station, helping to attract high-profile tenants in life sciences. In the second development cycle, the district diversified into IT and e-commerce, and the arrival of Microsoft and Amazon increased the demand for commercial and hotel space. Today the precinct is a diversified technology precinct with magnetic appeal to highly skilled workers, and flexible spaces for firms of different sizes.¹⁰

Map 1: Examples of globally recognised innovation precincts

Source: Developed by The Business of Cities using sources including Bay Area Innovation, Brooklyn Tech Triangle, China Daily, Crunchbase, GeekWire, John H Lo, MarsDD, Tech Map London.



Chapter 2

Cited benefits of successful innovation precincts

Globally recognised precincts are shown in international research to deliver significant benefits. These precincts are part of their broader innovation ecosystem, so a strong local innovation economy may also be driving many of the economic and social benefits attributed to precincts in the literature. Not all precincts will grow to become internationally significant, and different precincts will provide varying levels of return, so any proposal for investment in innovation precincts ought to be assessed on a case-by-case basis and include consideration of the overall net benefit to the community and the likelihood of success.

2.1 Innovation precincts enhance collaboration and commercialisation

Innovating businesses that locate close to one another can build collaborative relationships that can lead to the development of new ideas, new businesses and new jobs.¹¹ In the US and Canada, firms in the biotechnology industry are eight times more innovative when located together.^{12,13} The World Bank's research on scale economies and agglomeration found that proximity is important for entrepreneurs and workers in advanced industrial and service-oriented production to share knowledge and new ideas.¹⁴

Precincts are learning environments within which firms can collaboratively benefit from each other.¹⁵ In Australia, this collaboration is associated with a 70% increase in the likelihood of new-to-world innovation and a 32% increase in the likelihood of new-to-Australia innovation.¹⁶ The clustering of industries facilitates the exchange of ideas and information (knowledge spill overs) between businesses, which is shown to play a critical role in increasing levels of innovation, particularly for new ventures.¹⁷



Collaboration is associated with a 70% increase in the likelihood of new-to-world innovation.

2.2 Superior products and services

Successful precincts deliver innovations through new and improved products and services and operational practices. Higher rates of innovation mean an increased capacity to deliver products and services to market at a reduced cost, which amplifies improvements to consumer experiences and living standards.

High-value, research-oriented sectors such as the applied sciences, creative fields such as industrial design and graphic arts, and specialised, small-batch production such as artisan-oriented manufacturing are among the leaders in the innovation economy for delivering superior services and products.¹⁸ These have included the internet, smart phones, medical treatments and other ubiquitous innovations that have a direct, day-to-day impact on consumer and community wellbeing.



High-value, research-oriented sectors are among the leaders for delivering superior services and products.

2.3 Financial benefits, growth and resilience

The benefits of innovation more broadly include increased job creation, productivity and higher wages, which flow through to governments in the form of increased tax revenue.¹⁹ The South Lake Union precinct in Seattle, which was developed from a post-industrial site into a high-tech precinct, increased permanent jobs by 63% from 1995 to 2012.²⁰ Research in Sweden found that startups embedded in innovation precincts generate higher tax payments.²¹

Successful innovation precincts appear to 'punch above their weight' economically. The top 31 economically significant areas in the UK contributed 20% of the country's Gross Value Add (GVA), but made up only 8% of businesses.²² They are also more resilient to economic downturns. During the 2007-08 recession, 40 international high-tech manufacturing clusters achieved an 11.2% average employment growth rate and 40 knowledge-intensive services clusters achieved a 14.3% average employment growth rate.²³

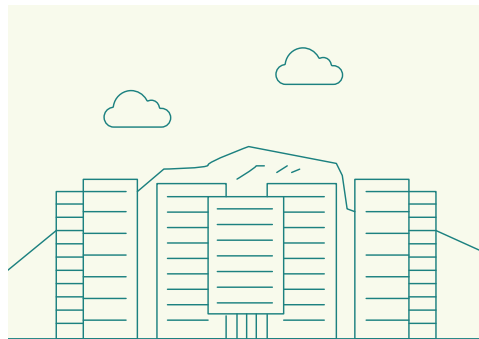


Benefits of innovation

- Increased job creation
- Productivity
- Higher wages
- Increased tax revenue for governments

2.4 Greater productivity

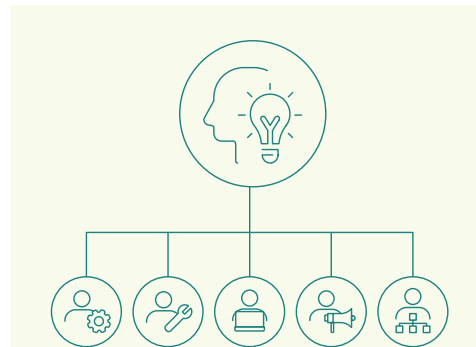
Innovation precincts can maintain higher than average productivity and firm growth. In the US, firm-level productivity is shown to increase in high-tech businesses located in close proximity to other firms.²⁴ Clustering is also positively and significantly associated with higher firm productivity in the UK, Japan and Canada.^{25,26} In 2015, worker productivity in Silicon Valley was 1.7 times the US average, and had increased 15% from 2005.²⁷ The cumulative GDP output of innovation-intensive sectors in Silicon Valley rose almost 150% from 2010 to 2015.²⁸



In 2015, worker productivity in Silicon Valley was 1.7 times the US average.

2.5 Export growth

Successful innovation precincts typically experience higher than average export growth. In Wichita USA, the 40,500 workers employed by the 120 organisations in their aircraft cluster helped the region export nearly 28% of the city's gross metropolitan product to foreign countries in 2008, a figure more than two-and-a-half times higher than the national average.²⁹



Every job in the innovation precinct created five additional jobs elsewhere.

2.6 Jobs growth and higher wages

The average employment growth rate in 80 precincts across OECD member countries was 13.5% in advanced manufacturing precincts and 19.4% in knowledge-intensive services precincts over a four-year period. This exceeded all European country averages.³⁰

From 2009 to 2015, employment grew 87% in the US Brooklyn Tech Triangle, compared with a 29% growth in the surrounding Brooklyn area.³¹ The Brooklyn Tech Triangle's overall contribution to the economy in 2015 was estimated to be \$5.3 billion.³²

In the US, each technology-based job has been shown to create five jobs in other sectors.³³ With this multiplier effect on the economy, the technology industry in the US has grown at a rate 25 times greater than other industry sectors.³⁴

One in seven of the working population in the UK are employed by firms located in the top 31 economically significant precincts.³⁵ These precincts collectively offer average salaries that are typically higher than those in the surrounding region.³⁶ A similar experience is reported in Canada³⁷ and Sweden.³⁸

2.7 Social, environmental and cultural benefits

Innovation precincts can be affected by similar social and environmental issues faced by highly urban environments, so adequate planning, good design and infrastructure development are needed to protect against reductions in the local availability of affordable housing and decreases in amenity. Silicon Valley is an example of a globally significant precinct with much higher median home values, rental prices and travel times than surrounding areas.³⁹

Innovation precincts that connect local residents to employers that are located near low or moderate income areas can offer expanding employment and educational opportunities for local disadvantaged communities. The Brookings Institution estimate that 50% of jobs in STEM-intensive industries found in innovation precincts do not require a bachelor's degree and offer average wages 10% higher than non-STEM jobs in high-growth occupations such as health care and IT.⁴⁰

However active efforts are needed to engage local residents and build this strong and diverse talent pipeline. Philadelphia's innovation district has a high number of well-paying, middle-skill occupations and a concentration of institutions with strong hiring power, but only 5% of this workforce comes from the surrounding disadvantaged areas, despite a quarter of adults in these communities having vocational training qualifications.⁴¹

Well-planned precincts can help curtail urban sprawl by increasing residential and employment densities in well-connected and accessible spaces with good public transport and high-quality open space.⁴² New innovation precincts provide opportunities to set ambitious built environment performance standards and 'good design' objectives, an area of focus in recent NSW planning reforms.⁴³

22@ Barcelona in Catalonia, Spain developed from an old industrial area to create a dynamic business area, incorporating social housing, cultural infrastructure and green spaces in a highly urbanised, densified environment.⁴⁴ This included planning for the ultimate creation of 4,000 subsidised housing units and 114,000 m² of public open space areas to create a high level of urban and environmental amenity to foster a high-value cultural sector.⁴⁵

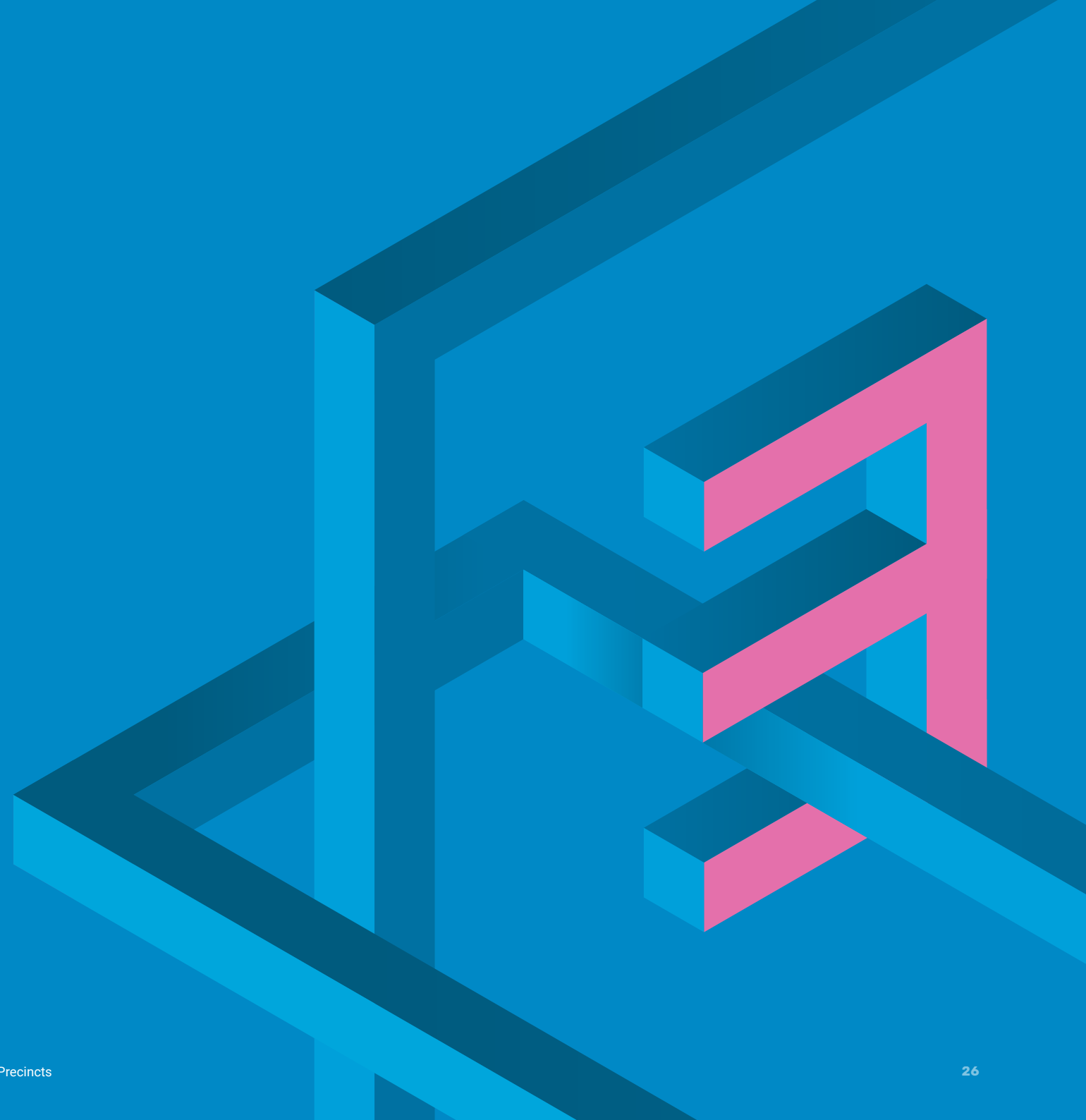
Precincts located in refurbished, underused brownfield sites and old industrial buildings in urban settings that foster cultural infrastructure can bring local benefits. The Boston Waterfront innovation district resulted from the Big Dig project to tear down and bury key highways. This re-connected the Boston waterfront to the broader city and metropolis to create a vibrant creative precinct, improving the workability, liveability and built environment for the local area.⁴⁶ Active support of the local artist community through cultural programming such as exhibitions, events and workshops created a vibrant, creative centre.⁴⁷

Cities and communities that foster strong creative industries and a vibrant cultural sector have been shown to provide diverse and wide-ranging benefits from positive health impacts, to cognitive and behaviour gains.⁴⁸

Chapter 3

Factors for success

Lessons from international precincts



Innovation precincts take time to develop and need to be situated within a well-functioning innovation ecosystem, which relies on an open, competitive regulatory environment and good government.

Analysis of the global literature and review of individual case studies finds seven distinct features of successful precincts that have emerged in strong innovation economies, each made up of a set of fundamental characteristics.

Some of these ‘success factors’ are more relevant to particular sectors or precinct types – for instance, life sciences or advanced manufacturing precincts will have different spatial, infrastructure and intellectual property needs to digital media or fintech hubs. The importance of each success factor to a specific precinct will also depend on its unique place-based characteristics, scale, sector, typology and level of development.⁴⁹

Seven factors for globally significant precincts



1 Market drivers

Strong market demand for the goods or services; competitive pressure in the sector to innovate; access to markets, skills and investors; reliability of the jurisdictional legal and IP protections and the competitive regulatory environment needed for a well-functioning innovation economy.



2 Competitive advantage

Clearly defined market advantage or sector specialisation that is communicated through strong branding to attract and retain talented workers and financial investment, supported by pro-productivity regulatory settings.

Characteristics

Macro-economic factors

Supportive legal and IP framework

Strong industry and investment base

Access to funding and finance

Access to knowledge and research institutions

Defined market advantage

Clusters of skills and talent

Talent attraction and retention

Branding and positioning

Seven factors for globally significant precincts



3 Collaboration

Facilities and programs to support collaboration between diverse organisations – from spaces for informal social ‘collisions’ through to commercial frameworks for joint ventures.



4 Infrastructure

Physical, transport and digital infrastructure that supports research, innovation activity and business connectivity within and outside of the precinct.



5 Amenity

A vibrant and liveable location that attracts people to work, play and live there. It offers a sense of place for participants in the innovation ecosystem and the workers that provide ancillary services and is underpinned by flexible and adaptive land use planning regulations and well-designed local cultural infrastructure.



6 Enterprise culture

Strong entrepreneurial culture of risk-taking, collaboration and sharing ideas. This culture is supported by mentoring programs and a diversity of organisations and workers, and is influenced by the culture of the anchor institution.



7 Leadership

Robust governance, strong leadership, political commitment and a shared vision.

Characteristics

Active networking

Commercial partnerships

Collaboration

Digital and specialist infrastructure

Transport infrastructure

Flexible facilities, services and amenities

Maintenance of affordable commercial rents

Liveability and sense of place

Social interaction and inclusion

Housing choice

Vibrant mix of uses

Sustainability

Culture of entrepreneurship and risk-taking

Mentorship and support

Different businesses and people

Anchor institution

Supportive governance

Precinct leadership

Shared vision

Political commitment and support

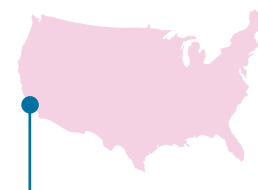


3.1 Market drivers

The market drivers for precincts are the competitive pressures to innovate, the proximity of the precinct to important markets, the presence of a talented local workforce and access to mobile international talent, a base of investors, a supportive legal and IP framework, and access to collaborative knowledge and research institutions.

A successful precinct has:

- strong market demand for the products or services that the precinct provides, and this enables the precinct to achieve scale, or even dominance, in a specific set of technology
- good access to markets, sizeable institutional buyers of innovative products and a public sector market willing to embrace innovative technologies
- an available skilled local workforce pool
- access to legal counsel and patent attorneys with an understanding of the specific needs of innovative businesses who can work in collaboration with venture capital firms
- access to a local base of investors with an appetite for higher risk investments
- innovative finance streams are available that support growth without straining existing operations
- strong networks with universities and research institutions that have an embedded culture of collaboration, ongoing investment in research and strengths in commercialising research
- pro-enterprise and pro-productivity policies that support a culture of entrepreneurship and trusted partnerships between government, businesses and research.



Silicon Valley

Silicon Valley in the US is an innovation precinct with very strong demand drivers. The cluster benefited from the proximity to large federal customers creating demand for electronic products, a highly open labour market, unique pools of specialised graduate and entrepreneurial talent, a supportive immigration policy, a critical mass of angel investors and venture capitalists, a culture of cooperation and informality, and access to top-class facilities.⁵⁰

3.1.1

Supportive legal and IP framework

Regulations and policies that protect intellectual property (IP) can support entrepreneurship, creativity and risk taking.⁵¹ Successful precincts also have access to legal counsel and patent attorneys with an understanding of the specific needs of innovative businesses and who can work in collaboration with venture capital firms, for example 'open innovation'* where businesses work flexibly with external partners.⁵²

*Open innovation refers to the flow of ideas and knowledge across business boundaries.

3.1 Market drivers continued

3.1.2

Strong industry and investment base

A precinct relies on critical market pre-conditions to become successful. Its predominant industry sectors need established value chains, clear opportunities for growth and competitive pressures that drive innovation.⁵³ Businesses within the precinct need proximity to a range of markets, including end consumers, institutional buyers of innovation products, a public sector willing to embrace innovative technologies and solutions and a developed volunteer base of test markets and clinical trials.⁵⁴ Particular sectors may also need proximity to downstream manufacturing processes for critical products.⁵⁵

The right businesses must see a clear advantage in locating in the precinct. Locational strategies of employers are complex and include consideration of cost, space, existing labour market concentrations, inward investment strategies⁵⁶ and proximity to complementary businesses and services. An influential factor is often the size of the supplier and consumer markets within the city and the region more broadly.⁵⁷ Precincts can also become attractive locations when they are outside of an established high-rent central business district. Startups in particular are drawn to locations with lower cost floor space, and may find the higher rental costs of more premium innovation precincts to be cost prohibitive.⁵⁸

3.1.3

Access to funding and finance

Access to seed and venture capital and commercial lending, and a local base of investors with the desire to invest in higher risk activities, is needed to support the creation and expansion of innovative firms and promising startups in the precinct.⁵⁹ Lack of high-risk capital can limit the formation of new startups. Australia lags internationally on this type of investment, with approximately \$12 of angel funding per capita, compared to \$100 in the US, \$46 in South Korea, \$33 in Sweden, and \$26 in the UK, Canada, and New Zealand.⁶⁰

Most innovation precincts need finance streams that help their businesses to grow without putting a strain on existing and limited resources.⁶¹ Creative financing tools, such as leveraging city-owned assets, can support the growth of innovation precincts, particularly in the absence of other direct government funding.⁶² Cities can provide their land to the types of tenants that strengthen innovation ecosystems but are not placed to pay market rents, for example to create maker spaces, public innovation centres, training and meeting spaces.⁶³

In the US, New Market Tax Credits to incentivise revitalisation of low-income and disadvantaged communities provide credit against federal income taxes for qualified investments in community developments. They have been used to renovate and repurpose land and buildings in the Cortex technology district in St Louis, which was founded in 2002 as an innovation hub of bioscience and technology research, development and commercialisation.⁶⁴ The tax credits helped to develop the area into a thriving innovation precinct.

3.1.4

Access to knowledge and research institutions

Knowledge and research institutions such as universities and private and public R&D organisations are sources of talent, knowledge and ideas. There are many successful precincts that do not host universities, and many locations with universities that are not precincts. However, linking businesses with these institutions (within the precinct or through other networks) can stimulate innovation as long as there is a genuine culture of collaboration, continual investment in research, a financial incentive to commercialise and an overarching system of entrepreneurship.⁶⁵

3.1.5

Macro-economic factors

Consistent, long-term, pro-enterprise and pro-productivity regulation can foster a culture of entrepreneurship that incentivises research institutions to actively pursue commercialisation. It can also reduce the compliance time and cost burden on innovative businesses.

Policies that attract and retain talent in the context of global competition between markets for high value firms and skilled workers ensure innovation precincts have access to the skills needed to succeed.



3.2 Competitive advantage

The competitive advantage for precincts is anchored to their unique place-based characteristics that are driven by market and institutional strengths. This is communicated through effective branding and positioning, and other market signals.

A successful precinct has:

- leveraged their unique place-based characteristics and opportunities
- leveraged the core regional economic and institutional strengths
- businesses and individuals who see it as a profitable and desirable place to work
- mechanisms for attracting and retaining talent and a continued flow of skilled labour and upskilling of existing workers
- a compelling brand identity that conveys the precinct's defined competitive advantage and shared vision.

Tech City

London's Tech City is an innovation precinct that has established a position as a highly competitive hub for technology that builds on the city's strengths in finance, IT, media, advertising, fashion, architecture, engineering, and software. The precinct grew organically and fed off London's large artistic and digitally literate workforce – subsequently it has been successfully promoted by City Hall and the national government, with the support of an investment promotion agency that works to grow both the local and national ecosystem.⁶⁶



3.2.1

Defined market advantage

Market advantages of successful precincts are varied and can range from onsite specialised infrastructure (e.g. high-tech, unique and expensive medical equipment) to climatic conditions conducive to specific sector innovation (e.g. solar power, agriculture) to an established legacy of local innovation (post-industrial locations). The definable market advantage of the precinct is front and centre in business decision-making by successful innovation precincts.

3.2.2

Cluster of skills and talent

Close proximity of businesses, relevant institutions such as universities and research-intensive hospitals and people within a defined area in ways that support collaboration and networks is central to the very definition of innovation precincts. It is the underlying principle by which co-working spaces and startup hubs such as Sydney's Fishburners and Tank Stream Labs operate. High startup density is a feature of successful innovation precincts⁶⁷, but this approach also applies to research outputs – an analysis of over 35,000 research articles found that researchers that are located closer to one another cited each other's works more frequently.⁶⁸

Clustering of like businesses and jobs may emerge organically over a long period, but it can happen relatively quickly: the Brooklyn Tech Triangle hosted a 22% increase in the number of innovation companies and a 45% increase in the number of innovation-related employees in just three years.⁶⁹

3.2 Competitive advantage *continued*

Access to a skilled workforce and emerging talent (students, graduates, post-graduates and startups) that can perform the jobs within the precinct is fundamental⁷⁰ and should be supported by policies for skilled migration and work visas to address local skill gaps.

3.2.3

Talent attraction and retention

Successful precincts make efforts to establish and maintain a talented workforce through the attraction, retention and professional development of skilled workers and businesses. These activities are what can differentiate successful from unsuccessful precincts in seemingly identical locations within the same city, region or country.⁷¹

Campaigns to entice businesses and individuals with specific specialisations can give precincts a critical competitive edge.⁷² The US South Lake Union precinct attracted anchor giant Amazon to move to the area through a concentrated strategy, which further attracted other businesses and people: 'We love being next to Amazon. They are to South Lake Union and Seattle what Microsoft was to Redmond and the Eastside in the 1990s. They attract a lot of talent. Talent begets talent.'⁷³

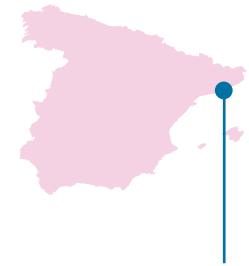
Retention of key businesses, skilled workers and university graduates that supply a renewable source of human capital is equally important. Long periods of growing a strong pool of talent can be reversed if key businesses or individuals are lost.⁷⁴

Developing talent in situ is critical to the core mission, sustained growth and competitive positioning of an innovation precinct.⁷⁵ This includes increasing people's entrepreneurial capacity as well as catalysing spin-offs and startups that are dedicated to the commercialisation of ideas⁷⁶ and can create a feeder system of STEM workers with skills needed in other innovative sectors.

3.2.4

Branding and positioning

Branding and market positioning gives the precinct 'visibility' and provides 'market signalling' benefits to precinct enterprises, investors and workers. A strong precinct brand can communicate a new and exciting model of economic activity, attracting talent to consider new areas that may have otherwise been off the radar, and motivating companies and investors from inside and outside the region to participate.



22@ Barcelona

22@ Barcelona in Spain has a strong brand and articulated vision and is one of the most well-known innovation precincts in the world, with a competitive advantage in digital and mobile communication technologies. The city was selected as the 'Mobile World Capital', beating a number of other competing cities, and hosts the Mobile World Congress which brought more than 110,000 visitors to the city in 2017.⁷⁷

A compelling brand that draws on the precinct's shared vision for growth and defined competitive advantage is particularly valuable for suburban innovation park typologies whose location may not appear as attractive as 'downtown' or urban locations.⁷⁸



3.3 Collaboration

Successful precincts have the right facilities and programs to encourage collaboration between diverse people and organisations – from spaces for informal social ‘collisions’ through to commercial frameworks that support joint ventures.

A successful precinct has:

- resource-sharing arrangements and shared physical spaces that provide opportunity for both competing and complementary firms to interact in the precinct
- frequent informal and formal networking and collaboration initiatives that encourage precinct participants to build relationships
- strong partnerships between industry and academia creating shared IP and commercialised research
- robust culture of collaboration, openness and idea-sharing that delivers commercialisation outcomes.

3.3.1

Active networking

Interpersonal interactions and relationships are the basis of idea exchanges and formal collaborations. Successful precincts provide shared spaces that encourage informal meet-ups and ad hoc networking as well as programmed initiatives and events.

Mentoring programs can also be used to great effect: 33% of top-performing startup companies in New York were created by founders that had mentoring from a highly successful entrepreneur.⁷⁹

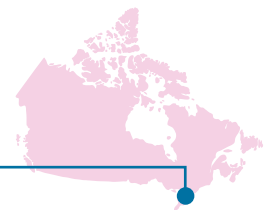
3.3.2

Commercial partnerships

Research, health and education institutions are major sources of talent, knowledge and technical and subject matter expertise for the precinct business community to draw on. Connecting business workers to research and education staff through formal partnerships can drive collaborative innovations where there is a strong focus on IP management and research commercialisation.

Institutions can also provide training programs to build the innovative capital within the precinct and the wider innovation ecosystem.

MaRS Discovery District



In Toronto, MaRS Discovery District's success over the past 15 years owes itself to the collaboration between medical institutions that have deliberately opted to participate in a dense clustering process that has involved tactical relocations of R&D functions, reconfiguring real estate assets, and increasing interaction with research and entrepreneurship. A non-profit corporation established in 2000 has acted as a partnership vehicle to engage multiple tiers of government, capital providers and other stakeholders across multiple political cycles to commercialise publicly funded medical research and other technologies.⁸⁰

3.3.3

Culture

Successful innovation precincts support a culture of collaboration by encouraging the sharing of ideas and capabilities. The success of Silicon Valley has been attributed to its ‘freewheeling’, networked-based economic system, supported by more open labour markets, a high degree of informal communications, a strong culture of cooperation rather than secrecy, and greater commercial flexibility.

A culture of ‘collaborate to compete’ amongst aspiring and successful entrepreneurs can deliver major benefits to startups and their host precinct.



3.4 Infrastructure

Whether innovation precincts are in dense urban centres hosting digital media and software companies, or in space-hungry greenfield locations specialising in clean tech and pharmaceuticals, quality physical and digital infrastructure is essential to precinct success. They have good transport to/from and within the precinct, digital or specialist infrastructure and other high-quality amenities that support connectivity.

A successful precinct has:

- high-quality transport infrastructure for public and active transport
- fast, reliable, secure and high-bandwidth digital infrastructure
- access to advanced technology and equipment
- flexible building design with adaptable spaces, open floor plans and accessible ground floor spaces where the precinct activities can be visible to the public
- access to affordable commercial rents to attract and retain startups, incubators and accelerators
- specialist infrastructure where needed, such as specific energy provisions for large tech companies or unique water provisions for manufacturing purposes
- high-quality civic, community and cultural spaces
- flexible and adaptive land use planning.

Södermalm



The emergence of Stockholm's large innovation and lifestyle precinct, Södermalm, has benefited from multiple kinds of physical infrastructure investment. A municipally owned, dark fibre infrastructure provider, Stokab helped to lower network costs, expand superfast access to SMEs and create opportunities for smart interventions in the urban environment. In addition, the precinct has witnessed rapid roll-out of bicycle infrastructure and public spaces, while the metro stop at the innovative epicentre is just four stops from Central Station and three from most government offices.⁸¹

3.4.1

Digital and specialist infrastructure

The high rate of technological change in the market makes investment in technologically enhanced facilities critical for successful place-based innovation.

High-quality telecommunications, IT platforms, wifi infrastructure and advanced technologies provide a platform for R&D, innovation, product development and prototyping. They can also connect individuals and businesses within a precinct, serving as 'networking assets'⁸² for cross-pollination of ideas across different sectors.

3.4 Infrastructure *continued*

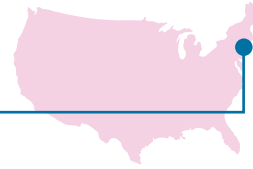
Some precincts need specialist infrastructure and set up systems to leverage onsite infrastructure, to reduce startup or experimentation costs.⁸³ Cost-prohibitive specialist technologies can be accessed by multiple parties through workspaces, shared laboratories, and technology centres. London's Crick Institute has 14 different analytical and diagnostic platforms that can be used by members, ranging from genomic analysis to spectrometry.⁸⁴ Other precincts have specific utility needs that need to be built in, for example, special energy provisions to support large tech companies or unique water provisions for manufacturing purposes.

3.4.2

Transport infrastructure

Infrastructure for public transport (heavy rail, light rail, buses and ferries) and active transport (pedestrian-friendly streets, connected footpaths and bike paths) connects a precinct internally and out to the region. Transport connectivity is fundamental to making the precinct an attractive location for people to work. It can also facilitate better and more productive interactions between people and firms inside and outside the precinct.

Brooklyn Tech Triangle



The Brooklyn Tech Triangle covers the commercial and office-dominated Downtown Brooklyn, industrial park Brooklyn Navy Yard, and technology-focused DUMBO and serves as a mega-cluster of multi-agency, multi-sector collaboration. It actively improved transit, pedestrian and bicycle facilities to improve liveability and connections within the precinct. These improvements saw the bus service and bike connections expanded within the triangle and the introduction of a new citywide ferry service to link to other emerging innovation hubs.⁸⁵

3.4.3

Flexible facilities, services and amenities

Flexible, open and networked spaces – both within offices and more broadly in the public areas of a precinct – all support collaboration.⁸⁶ Both Facebook and Google work in 'hackable buildings' with open floor plans that are easily reconfigured to create dense, collaborative spaces as required for teams and projects.⁸⁷

Real estate providers that act as a service provider, as opposed to simply asset owners, can support the precinct development by offering support services such as networking, funding and coaching. They can be flexible to accommodate changing tenant needs and changing building layout and access.⁸⁸ International experience has seen a shift in real estate provider to a culture of transparency, partnerships and mutual incentives with tenants and a total-place approach to attract and sustain startups.⁸⁹

3.4.4

Affordable commercial rents

Startup ecosystems can thrive in basic, relatively low-quality office space with cheap rents. As those locations become more popular, rents tend to increase, pushing out the tenants that made it popular in the first place. London's 'Silicon Roundabout' began around a major traffic interchange but the subsequent upgrade and marketing of the area increased rents, driving many firms out.⁹⁰ Precincts that maintain affordable commercial rents as they grow do better at retaining diverse startup and entrepreneurial tenants.

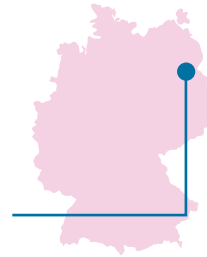


3.5 Amenity

Flexible land-use and zoning regulations are important elements of the regulatory framework needed to support place-based innovation. Efforts to improve the liveability and amenity of a precinct, including investments in a vibrant local cultural sector, can attract and retain startups, established businesses, skilled workers, academics and researchers.

A successful precinct has:

- a unique sense of place and offers well-designed, safe and accessible public spaces
- a range of concentrated 'hot spots' for social interaction and a high level of informality and 'trendiness'
- access to affordable, diverse housing for workers and students
- vibrant public and private spaces used from early in the morning to late in the evening and over weekends
- a balanced mix of commercial, research, education, childcare, community, civic, cultural, retail, entertainment and potentially residential uses
- easy access for people to move through and within it
- flexible land-use regulations to allow high-quality public space repurposing, artistic events, a mix of innovative activities and help to meet the shifting infrastructure needs of fast-growing smaller firms and specific sectors.



Factory Campus

The **Factory Campus in Berlin** is home to SoundCloud's global headquarters and anchors an innovation precinct that has excelled for its range and quality of amenity. At its heart is a former warehouse brewery re-designed from scratch to create a collaborative space to suit small and large firms ('stage agnostic'), spanning more than five sectors. High-quality audio visual equipment, recording studios, meeting and event spaces, fitness centres and art galleries are all integrated, along with options for six months on-site accommodation. The precinct has benefited from its management's experience in entrepreneurship, community management and event management.⁹¹

3.5.1

Liveability and sense of place

A sense of place and good liveability are key attractors for precinct members and influence the overall culture of the precinct.

Successful innovation precincts can be master-planned as new developments or by repurposing existing buildings or ex-industrial land that has fallen vacant. New York's Cornell Technion (hospital buildings) and Boston's Waterfront District (shipyards) are good examples of 'adaptive reuse' of heritage buildings, integrated with new purpose-built facilities. This kind of 'total place' perspective is being taken by precinct developers to attract startups.^{92, 93}

3.5 Amenity *continued*

Well-designed public spaces can encourage a sense of community within the precinct and improve the amenity of surrounding land uses including residential and retail.⁹⁴ Good coordination between developers, tenants, institutions and local authorities is needed for these types of precinct property development efforts to be successful.

Liveability enables workers to live near to the precinct, or in some cases actually in it. This includes formal infrastructures and public services such as affordable housing and transport, social services, education, and health care. It also includes privately provided amenities such as shops, restaurants, cafés, bars and other entertainment venues.

3.5.2

Social interaction and inclusion

Precincts that allow people to easily move and connect to each other and the surrounding spaces are more active and vibrant.

To support social interactions between employees, some successful precincts provide concentrated ‘hot spots’ such as bars and cafés to foster collaboration⁹⁵, which can also deliver good returns on investment.⁹⁶

Place-making efforts, along with staff training, recruitment and business development, can cultivate local talent, encourage more diverse ownership structures, and turn the tide on disinvestment in surrounding communities.⁹⁷ The flow-on benefits include a strong local skills pool, reduced conflict with residents of the local area and a more vibrant on-site innovation ecosystem.

3.5.3

Housing choice

Where affordable, diverse housing is offered within precincts it can play an important role in attracting and retaining businesses and workers. Real estate prices can increase in the areas around a successful innovation precinct, changing the demographic mix of employers, employees and local residents.^{98,99} Policies and strategic projects that preserve local housing affordability shore up the long-term growth, diversity and sustainability of an innovation precinct and mitigate negative impacts to surrounding communities.¹⁰⁰

3.5.4

Vibrant mix of uses

Consumer and worker preferences are shifting toward more urban-oriented environments and more people are placing a high priority on walkability and shorter commutes, proximity to health care, entertainment facilities, cultural infrastructure, schools and social contacts.¹⁰¹

For the ‘Millennial’ demographic who are central to the innovation workforce, quality of life is more closely associated with proximity to urban amenities such as eateries, retail, cultural, and social venues.¹⁰²

Successful mixed-use precincts are a co-location of commercial, residential, services, childcare, schools and other cultural facilities within the precinct area. High-quality public space repurposing for artistic events, enabled through flexible, adaptive regulations, has been very important in the development of the IDEA district in San Diego.¹⁰³

3.5.5

Sustainability

Ambitious sustainability goals for the precinct environment can give innovation precincts a point of difference¹⁰⁴ that attracts major corporations, especially those with high corporate sustainability standards.¹⁰⁵ Some successful precincts use onsite renewable energy as their main power source, and are transforming their buildings and surrounding areas to ‘living labs’ to test environmental technologies and demonstrate new products and services.¹⁰⁶ The precinct topography can also achieve higher sustainability outcomes simply by driving denser residential and employment patterns.



3.6 Enterprise culture

The culture of successful precincts is characterised by entrepreneurship, risk-taking, mentorship, and the sharing of ideas. This is a drawcard and a competitive advantage for the precinct, and makes it a place with which companies and individuals seek to be associated.

A successful precinct has:

- a community that sees it as a desirable place to work
- a diversity of businesses and individuals within the precinct that regularly and openly collaborate, resulting in commercial ventures
- strong education and skill development aimed at providing future talent and entrepreneurship
- successful connections between young firms, entrepreneurs, researchers, students, mentors and specialised advisors, increasing business survival rates and the generation of new ideas
- a well-defined identity and is recognised as a place for the creation and implementation of ideas
- a community that accepts some ideas will fail
- anchor institutions with collaborative cultures that are well integrated with the surrounding precinct.



Herzliya

An embedded culture of risk appetite, acceptance of failure and inter-generational mentorship has underpinned the success of Tel Aviv's main innovation precinct, Herzliya. The technical skillsets of the region's military graduates, the diverse origins of immigrant entrepreneurs and the commitment of American venture capital, all cultivated a pro-innovation mindset and a symbiosis between nimble startups and established firms. In the same vein, the precinct's IDC university engages students as active partners in the education process, and helps to supply innovative solutions to local companies.¹⁰⁷

3.6.1

Culture of entrepreneurship and risk-taking

The culture of a productive innovation precinct is distinct from a traditional corporate company in that it encourages risk-taking and accepts a level of failure rather than seeking to avoid it.¹⁰⁸

Successful precincts are supported by mentorship and other programs such as free services (e.g. seminars, legal support, expert advice), accessible and simplified systems for businesses to navigate, and education programs that build up the skills base within the precinct.¹⁰⁹

Connecting young firms and entrepreneurs to mentors and advisors with specialised expertise can increase firm survival rates.¹¹⁰ Pittsburgh USA recovered from the collapse of the local steel industry in the 1980s by developing successful technology clusters around biotech, pharmaceuticals and information technology. The city's GDP was \$139 billion in 2015.¹¹¹ A state government-established regional technology centre that provides mentoring and support for startups dealing with regulatory barriers is cited as a key reason for this successful transition.¹¹²

3.6.2

Diverse businesses and people

The culture of a precinct and its occupants can be crucial to attracting the best talent from diverse backgrounds. Precincts with a diverse mix of companies, institutions, startups, not-for-profit organisations, creative enterprise and people of various ages, genders, backgrounds and education, bring new thinking and ideas into the innovation ecosystem. The majority (61%) of Australia's most successful tech startups founded since 2003 were first-generation Australians with migrant parents¹¹³, and 60% of the highly successful startups in the US were founded by first or second-generation Americans.¹¹⁴ Social diversity and cultural infrastructure also adds to the vibrancy of a place.

The Tonsley Innovation District in Adelaide was master planned around the cross-pollination between diverse institutions and firms – the Flinders University and TAFE SA campuses, major established industries including Siemens and Mitsubishi, and startups and small businesses.

3.6.3

Anchor institutions

Anchors are enduring, high-performing organisations that tend to remain in their geographical settings irrespective of changing conditions around them.¹¹⁵ Quality anchors can be key to the success of some innovation precincts, exemplified in 'anchor plus' model precincts.¹¹⁶ They may be institutions (such as universities and hospitals), large companies or government agencies, and in successful cases provide a strong, stable base that can be leveraged to grow a robust innovation precinct.

Anchors can assist in forming cohesive precinct communities in lower-profile suburban precincts and can also lend credibility and knowledge to spin-off enterprises.¹¹⁷ The anchor institutions need to be well integrated within the broader precinct, though this can be challenging where the anchor has market drivers that keep it nearly exclusively focused on its own operation, for example, a university that is primarily concerned with what is taking place within their own campus.¹¹⁸

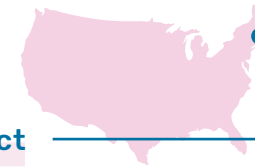


3.7 Leadership

Innovation precincts are made up of multiple stakeholders with varying resources, priorities and influence. Strong governance and leadership can help establish, shape and drive the precinct and guide interactions between government, the private sector and education institutions. Political leadership also comes in the form of political commitment and support for the precinct. Business leadership comes not just in the businesses that are hosted within the precinct but in the way that they are serviced and how the precinct itself is led.

A successful precinct has:

- a coordinated governance structure and leadership group that meets regularly
- an adaptable governance structure to allow the precinct to grow and change at key stages of development
- a collaborative leadership group that actively builds partnerships between industry, research, education and government stakeholders
- a vision statement that sets out short, medium and long-term economic, physical and social goals, which is used to position the precinct in the market
- transparent, regular and ongoing community and stakeholder engagement
- cross-government commitment to innovation generally and to the innovation precinct specifically
- a demonstrated political commitment with supportive policy, incentives, regulation and programming that signals a long-term view to success.



Boston Seaport Innovation District

The Boston Seaport Innovation District was a planned initiative that was a direct result of the vision and leadership of former Mayor Thomas Menino. Menino's team proposed the creation of the district, attracted major tenants and anchors such as accelerator MassChallenge and global firm Vertex, engaged the community, promoted the project, created a wider mix of housing options, and mobilised resources for waterfront infrastructure improvements.¹¹⁹

3.7.1 Supportive governance framework

A flexible and resilient governance framework guides interactions between precinct members and helps precincts respond and adapt to market opportunities and challenges as they occur. It also provides independence from individual agendas. This is important as there are many dimensions to innovation precincts that require coordination, both within the industry clusters and across the ecosystem of talent and capital, around the shared narrative, and the harmonisation of policy responses at different levels of government and across different government departments.

3.7 Leadership *continued*

This complexity can require a management and governance vehicle that achieves 'buy-in' and is responsive to changing market conditions over the long-term. International examples include HafenCity GmbH, a company established to manage the development of HafenCity in Hamburg, the Boston Redevelopment Authority in Boston, Barcelona Activa in Barcelona and the not-for-profit MaRS Discovery District corporation in Toronto.

In NSW, three major stakeholders in the Randwick Health and Education Precinct, working together under the umbrella of the Greater Sydney Commission's Collaboration Area*, are developing a vision and identifying challenges and opportunities that affect development of the precinct. At the Westmead Health and Education Precinct, a Westmead Alliance was established by the partners entering into a Memorandum of Understanding (MoU) aimed at building commitment and consensus towards a shared vision. A Collaboration Agreement or MoU can be easier than establishing a dedicated legal entity or contractual arrangement between parties, but stakeholders ought to assess the most effective mechanism for each precinct depending on their unique circumstances.

One of the challenges of a multi-institutional innovation precinct is to accommodate different voices and build an institutional alliance. Paris Saclay has experienced challenges gaining the support of all participating research universities to re-design curricula and degree-awarding processes, and combine assets. In contrast, the London Knowledge Quarter in Euston has been much more able to create and convene networks that have built a culture of partnership and started to speak with a single unified voice.¹²⁰

3.7.2 Precinct leadership

A strong leader or leadership group will identify the value proposition of the precinct and the different resources needed for success.¹²¹ They help facilitate partnerships between industry, research, education and government.

Whichever governance model is chosen, it ought to be adequately insulated from politicisation and risk-aversion so it can quickly adapt to market needs.¹²²

3.7.3 Shared vision

Setting a shared vision that provides actionable guidance for how an innovation precinct should develop in the short, medium and long-term, and covers economic, physical and social goals has proven beneficial for a number of successful innovation precincts.¹²³

A strong vision that reflects the unique offering of the precinct gives clear guidance to members, local and regional institutions and companies. It also serves to promote the precinct and make a compelling case for investment.¹²⁴ Areas of focus in this vision will be influenced by the maturity of the precinct. For example, a precinct that is just emerging may concentrate its leadership efforts on infrastructure investment and improving amenities while an active precinct may focus on building international connections.

3.7.4 Political commitment and support

Innovation precincts are complex and require multi-agency collaboration. A successful precinct takes time and patience and long-term political support and commitment is critical.¹²⁵

Pro-innovation policies, incentives, regulation and programs can assist precincts overcome some of the inherent barriers to establishment and growth. For example, zoning guidelines and incentives established to encourage private developers to bring forward flexible, innovation-friendly development, and regulatory frameworks developed to enable the provision of required land and infrastructure can provide the macro-environment preconditions for a precinct to establish and grow.¹²⁶

Political support helps to promote and market precincts and sends a strong market signal, for example when a minister opens a new precinct facility or publicly recognises an important partnership. Government can also help to promote and market their innovation precincts, and champion emerging precincts and provide them with valuable credibility and exposure to potential investors, both domestically and internationally.

*A collaboration area describes a whole-of-government approach to managing places that either hold great potential, or face complex challenges in meeting the demands of urban growth to enhance the liveability, sustainability and productivity of the area through collaboration between local councils, stage agencies and other key stakeholders, facilitated by the Greater Sydney Commission.

Chapter 4

Barriers to success

Risks and factors inhibiting
innovation precincts

As locations for the creation of new-to-market and new-to-firm innovations, precincts are affected by the same types of risks and factors that hinder innovation more generally. The complex mix of multiple stakeholders and factors required for an innovation precinct to succeed make them particularly vulnerable to market-based coordination and information failures.

International research found a number of factors at play in precincts that are not thriving:

1

Weak market demand

Precincts may not have the market drivers needed for them to be economically viable, or there may be little evidence of new economic activity or innovation from businesses locating there. There are also risks when precincts are established primarily because of political will rather than market demand.

2

Barriers to investment and commercialisation

Factors that impact the investment in and commercialisation of R&D will slow innovation activity and the success of precincts. These can include restrictive intellectual property controls, a closed academic culture and a tendency for industry to under-invest in research.

3

Lack of entrepreneurial culture

The precinct may not provide quality incubator and accelerator programs or other support needed for precinct participants to interact collaboratively with startups and smaller firms.

4

Poor access to capital

Firms in startup and growth phases may not be able to access enough capital from angel and venture capital investors, standard investment groups or public funding.

5

Poor access to skills

Local skills shortages can hinder the capacity of the precinct to innovate and scale.

6

Poor place-making and connectivity

Insufficient amenity, inadequate public transport and poor tenant infrastructure will reduce the attractiveness of the precinct to employers, workers and startups.

7

Lack of policy and coordination

Policies and long-term funding decisions of stakeholders may not support the new technologies, emerging business models and changing demand for skills that are central to successful precincts. A complex planning system and regulations can create financial or bureaucratic impediments to zoning land to support mixed uses, while poor IP regulations can restrict knowledge sharing and have a negative impact on innovation activity in the economy.

4.1 Weak market demand

4.1.1 Market drivers of planned precincts have not been well established

New innovation precincts that have been planned without an understanding of the real market demand can falter. A 'build it and they will come' approach may work in dense cities in need of innovation space, but needs careful implementation to deliver results as a commercial proposition.¹²⁷

In Seville, up-front investment to develop a 215-hectare riverside site for Expo 92 was intended to spark the growth of a futuristic technology precinct.¹²⁸ The site did not attract interest from office occupiers and left the city with large debts. Some of the pavilions were dismantled, but many others are still vacant or derelict today. One part of the site eventually became a conventional business park, and another a theme park.

Precinct projects are also at risk when they are driven primarily by real estate developers in their traditional role as asset owners/managers rather than from an understanding of the foundational requirements of the specific innovation ecosystem in the precinct.

4.1.2 Policy plays

Innovation precincts that are planned because of political considerations, rather than a comprehensive analysis of the demand and innovative activity, will often struggle without broader stakeholder support and a strong value proposition. There are similar issues when an existing area is labelled as innovative for political reasons, when it is not.¹²⁹ A 2018 review by the Brookings Institution highlights the risk of managing innovation projects from the top down without sufficient understanding of the science and technology involved and the likely demand from the private sector.¹³⁰

Hong Kong Cyberport was conceived in 1999 by the Hong Kong government as a high-tech campus that would make their technology sector more competitive. However luxury residential takes up 70% of the built space, along with an office complex, retail mall and luxury hotel.¹³¹ It opened in 2002 and has not achieved the level of technology success anticipated¹³², despite significant government grants and support for startups.

The multifunction polis (MFP) in Adelaide, South Australia was proposed as a new city to combine the best technology, energy, health, education and lifestyle in a contained environment. It was never developed because it lacked a defined vision and a compelling economic case.¹³³ It is estimated that the feasibility and planning of the MFP project cost around \$150 million.¹³⁴

4.1.3 Little evidence of additionality

Some new precincts may attract established firms to relocate there, but not to innovate. The move may boost their performance slightly but without any increase in local jobs. In some cases the relocation can even reduce their staff numbers.

An example of this is partly visible in Turin. The city's Polytechnic University expanded into a new central campus – the "Cittadella Politecnica" – and new curricula were created to persuade large manufacturing investors such as General Motors, Motorola and JAC to set up. Although this has helped technology transfer between business and academia, the overall impact on job creation and retention of large employers in the city has been low.¹³⁵

A precinct may also not host enough on-site innovation activity, even with a quality anchor tenant. The local innovation impact of a tech giant depends on their role in the larger corporation—it matters whether they are a sizable product development team or just the local sales division.

4.1.4

Underperforming firms

Unsuccessful precincts may carry too many underperforming firms. The health of these firms may not be immediately visible when using sector-wide metrics and so their prospects for growth ought to be directly assessed.

A recent study of Singaporean startups found that only 8% were gazelles (high-growth companies) and 57% were struggling as 'zombie' firms, kept afloat by state support and basic revenue. The number of startups in Singapore had doubled between 2004 and 2015, but this was driven by high-tech services, although the number of startups in high-tech manufacturing is in steady decline.¹³⁶

4.2

Barriers to investment and commercialisation

4.2.1

Under-investment

A beneficial effect of innovation precincts is that knowledge and innovations can 'spill over' between and beyond their participants to deliver a social benefit greater than the private benefit returned to the investing firms and institutions. But these spillovers reduce the incentive for precinct participants to invest in risky or novel research and development, particularly in sectors where innovation can be easily copied or adapted to trigger further innovations by competitors. As with the broader economy, firms tend to under-invest in innovation without additional support to overcome these disincentives.¹³⁷

4.2.2

Collaboration and information

Australia's performance on metrics of collaboration between industry and research institutions is below international counterparts.¹³⁸ A lack of understanding and trustworthiness between industry and research bodies has been observed, where businesses may not understand the benefits of working with researchers, or how to find and build productive partnerships, or where academic and commercial interests around the publishing of research results are not aligned.

Academic funding arrangements that focus on peer-reviewed publications have not historically incentivised researchers to create startups. Linking funding to research impact and increasing university focus on industry engagement and proposals for R&D tax concessions aimed at rewarding collaborations by industry with public research institutions is helping to address this.

There are also information gaps in the wider interactions between actors within an innovation system. Entrepreneurs or SMEs may develop high-tech innovations, but not have the external legal, marketing and financing connections needed to make them commercially viable.¹³⁹

4.2.3

Intellectual property regimes

Traditional university legal and IP frameworks have been a barrier to patenting research findings and creating commercially successful products.¹⁴⁰ This can create challenges for spin offs to take place or for licenses to be transferred to a company, but the standard models are changing. The University of Waterloo in Canada took early steps to make it possible for more university faculties to set up innovative businesses, and more university commercialisation units are now starting to offer Easy Access IP programs for significant research discoveries, with NSW a leader of this approach.¹⁴¹

4.3 Lack of entrepreneurial culture

4.3.1

Low success of local startups

In many regions or precincts within regions, local startups have a comparatively low record of achieving success or scale. This can reflect a lack of aspiration, management capability, business planning, or international experience. For example, lack of business skills has been viewed as a contributing factor to the failure of Malaysia BioValley Science Park.¹⁴²

4.3.2

Varying success of accelerator programs

Incubator, accelerator and mentor programs in or near to precincts give startups access to the space, tools and expertise they need to experiment and grow. There are well-known 'A' list accelerator programs (e.g. Y Combinator, Techstars and 500 Start-ups in the US, or Startmate in Australia), but the quality of this type of support in the marketplace can vary.¹⁴³

Some lesser-known programs have had low success rates and have quietly disappeared with little to show in the way of converting startups into fully-fledged businesses.¹⁴⁴ Many international incubators and accelerators did not succeed because of a lack of experienced mentorship, low track record in business development and a tendency to replicate models without regional customisation.¹⁴⁵

4.3.3

Small firms excluded from collaboration

Larger firms may have more capacity to invest in risky collaborative ventures but the involvement of smaller firms is critical to the health of a precinct innovation ecosystem. A lack of integration of small firms in collaborative research and development activities can be a barrier to realising the innovation potential of precincts.

Sophia Antipolis has been Southern France's main innovation precinct since the 1990s, and has struggled with the fact that innovation networks stayed within firms, vertically, rather than spreading out to the group of startups.¹⁴⁶ Few large firms have their HQ functions in the out-of-town park, so there is little leadership to productively engage with the main concentrations of SMEs and entrepreneurs in the Nice-Cannes area.¹⁴⁷

4.4 Poor access to capital

4.4.1

Lack of seed capital

Some precincts fail to build links with the wider investment community, especially the specialist angel and venture capital groups that are critical, early stage funding sources for startups. There may be a lack of available high-risk capital in the ecosystem, or the precinct may not have put the right level of effort into building new finance networks.

4.4.2

Reliance on public funding sources

Precincts that rely on significant funding from public sources may be vulnerable to shifts in political control or policy priorities. An over-reliance on public funding can also point to a lack of demand in the market and risks to the commercial viability of the precinct.

Innovation precincts can also become 'political footballs' where a lack of bipartisan support can jeopardise early stage precincts that are reliant on direct public investment or government loans.¹⁴⁸

4.5 Poor access to skills

Location quality

Innovation precincts need skilled workers in order to succeed. Local shortages in specialist or knowledge-intensive skills can be a major impediment to innovation activity and growth.

The amenity of the innovation location and surrounding area and its enterprise culture play a role in attracting and retaining talented workers.¹⁴⁹ Situating innovation precincts in unaffordable locations, unsafe areas, or neighbourhoods that otherwise offer a low-quality lifestyle, can undermine the precinct's commercial efforts by making them unattractive places for skilled employees to live and work.

Workforce culture

The culture of a precinct and its occupants can be crucial to attracting the best talent from diverse backgrounds. An enterprise culture that is tolerant, open and welcomes diversity can assist precincts to become destinations of choice for talented workers and bring out the best in that workforce.

Labour markets

The precinct's capacity to retain globally mobile talent also reflects the scale of the local labour market opportunities. Sustaining a growing innovation precinct can be a challenge for regions with smaller and less dynamic labour markets.

4.6 Poor place-making and connectivity

4.6.1

Lack of amenity and public transport

Precincts without strong planning and transport infrastructure investment can create affordability and amenity issues that can impact their competitive advantage. A precinct that is easily accessible by public transport is in a stronger position to attract skilled workers and desirable anchors and smaller companies.

In Silicon Valley, rising housing costs, longer commute times, and growing opportunities in other innovation regions are drawing talent away. In 2015-16, Silicon Valley experienced a 50% drop in venture capital investment. During this time, median home values were 17% higher than San Francisco and local rental prices increased by 9%, while the average commute time had increased by 15.5% between 2010 and 2015, with the average worker spending over an hour a day commuting each way.¹⁵⁰

4.6.2

Mismatch of infrastructure with precinct needs

Precincts that do not offer the right mix of facilities may not attract the types of firms they need to succeed. Desirable anchor firms may need a bespoke combination of infrastructure to entice them to locate there.

For example, as a digital platform with significant warehousing and transport needs, Amazon looks for large-scale facilities that have the digital infrastructure to be highly automated with little requirement for an on-site or skilled workforce. As one of many of the disruptive emerging business models in logistics and distribution, Deliveroo looks for extensive 'hard' infrastructure for fleet parking, maintenance and loading, next to a comfortable, people-friendly sales and marketing office.

At the other end of the spectrum, many startup hubs flourish in basic, relatively poor quality office space because of cheaper rents.¹⁵¹ Precinct developers need to fully assess and provide for the diverse infrastructure needs of prospective tenants.

4.7 Lack of policy and coordination

While the success of innovation precincts is ultimately driven by their participants in response to market forces, it is still reliant on effective government policy, regulation and coordination, which can stifle innovation without the right incentives or business climate adjustments.

4.7.1 Coordination failure

The collective effort to develop a successful innovation precinct takes time, negotiation, resources and sustained effort by numerous players. However, the specific role, potential contribution and possible returns for each stakeholder is not always clear to them or others in the network.

Due to the complex and fluid nature of innovation precincts, deliberate coordination is needed to create good practical governance. Without this, efforts to develop the precinct can be fragmented and undertaken in service of competing commercial and brand priorities rather than working towards an overarching strategic vision.

4.7.2 Longer term return-on-investment

Innovation precincts are the result of countless business activities, research efforts, collaborations, investments, policies and locational factors that evolve and change. The large investments from government and universities in cornerstone infrastructure and anchors such as hospitals, campuses, transport infrastructure and high-technology equipment, can take decades to plan and mature.

Because innovation precincts tend to develop over a long time-scale – beyond the standard property, economic and political cycles – the necessary investments may be overlooked for development offering faster returns, such as high-density residential developments.

Government investment in precincts can have long-term returns and make it challenging to justify the public spend. In Canada, the funding viability of the MaRS Toronto precinct became a major election issue in 2014 with questions over state government support and an extension to repay a \$290 million loan.¹⁵² Some predicted the support package would fail, but the outcome was successful, with the precinct continuing to grow and the loan repaid three years early in 2017.¹⁵³ However, such return on investment is not guaranteed or may take many years, emphasising the need for government support to be determined on a case-by-case basis.

4.7.3 Restrictive regulations

Restrictive land zoning may prevent precincts from converting some of their land to mixed and residential use, which can reduce foot traffic and limit their potential as immersive, 'live-work-play' environments. Land-use regulations are a particular challenge in precincts that spill across multiple jurisdictions or that are under the control of multiple agencies and government departments.

Planning regulations can create financial or bureaucratic impediments to land zoning or low-cost programming of events in precincts. This can impact precincts' ability to pivot to more innovative uses and become a vibrant 18-hour or 24-hour environment. The Werksviertel District in inner city Munich took close to five years to obtain approval to convert the industrial zoned land to mixed-use.¹⁵⁴

Chapter 5

NSW innovation precincts



There is a broad range of place-based innovation activity across NSW taking place in a variety of sectors including healthcare, scientific instruments, financial and business services, biopharmaceuticals, defence, software and communications, ag-tech, engineering and creative industries.*

These innovation locations span different scales – from a single building to a cluster of affiliated locations to an innovation corridor defined by the opportunities and characteristics of the location.

A number of them are developing into innovation precincts where commercial collaborations between researchers and businesses are attracting capital and fuelling further innovation.

With targeted effort, some may achieve the concentration of activity and momentum needed to grow into globally recognised precincts.

Metropolitan area strengths

A number of the developing precincts in metropolitan areas have been driven by research-intensive local health districts in collaboration with universities. These are seen in the densification of medical innovation and research in Sydney locations such as Westmead, Randwick and Camperdown-Ultimo.

Specialised precincts are also emerging around major assets at Australian Nuclear Science and Technology Organisation (ANSTO) and large aerospace infrastructure at the Williamtown RAAF base and an Aerospace and Defence Industries Precinct is planned around the new Western Sydney Airport to leverage the scale of the investment.

Inner city activity is seeing a clustering of creative industries in Surry Hills, Redfern and Moore Park. In the Sydney CBD, the digital and financial technology sector is increasingly characterised by a growing entrepreneurial and innovative culture and an increase in startups and venture capital. This activity has spilled over into surrounding areas, such as from Central to Eveleigh where there is Australia's largest cluster of start-up firms, and Pyrmont, which have seen a proliferation of digital industries where rents are cheaper. North Sydney CBD has also experienced a growth in entrepreneurs, startups and supportive spaces such as innovation hubs and co-working places.

Regional NSW strengths

Regional areas are developing competitive advantages in innovation, particularly around ag-tech, biosciences and research. Regional concentrations of innovation have developed around the expertise and facilities of the University of New England in Armidale, such as the Centre for Agribusiness, and Charles Sturt University in Wagga Wagga, which has established an Agritech Incubator. Charles Sturt University in Bathurst is becoming a centre of innovation for the local communications and digital technology industries, with CenWest Innovate providing business accelerator training support. Innovative locations have also formed around the research strengths of the University of Newcastle and the University of Wollongong's Innovation Campus.

Recognisable typologies

The location-specific characteristics of NSW precincts are unique and reflect their opportunities, activities and development of the precinct. They do have some broad similarities that allow their categorisation into recognisable typologies, but these are dynamic and over its operation a precinct may transition from one typology to another, or be described as a hybrid of two or more. For example, Randwick Health and Education Precinct could be considered both a health and education precinct and an innovation precinct orientated around a university. Existing anchors in precincts can also help to attract other large institutions to change the characteristics and industry focus of the precinct over time.

Drawing on the global study 'The Logic of Innovation Locations',¹⁵⁵ precincts developing in NSW can be broadly grouped under four typologies:

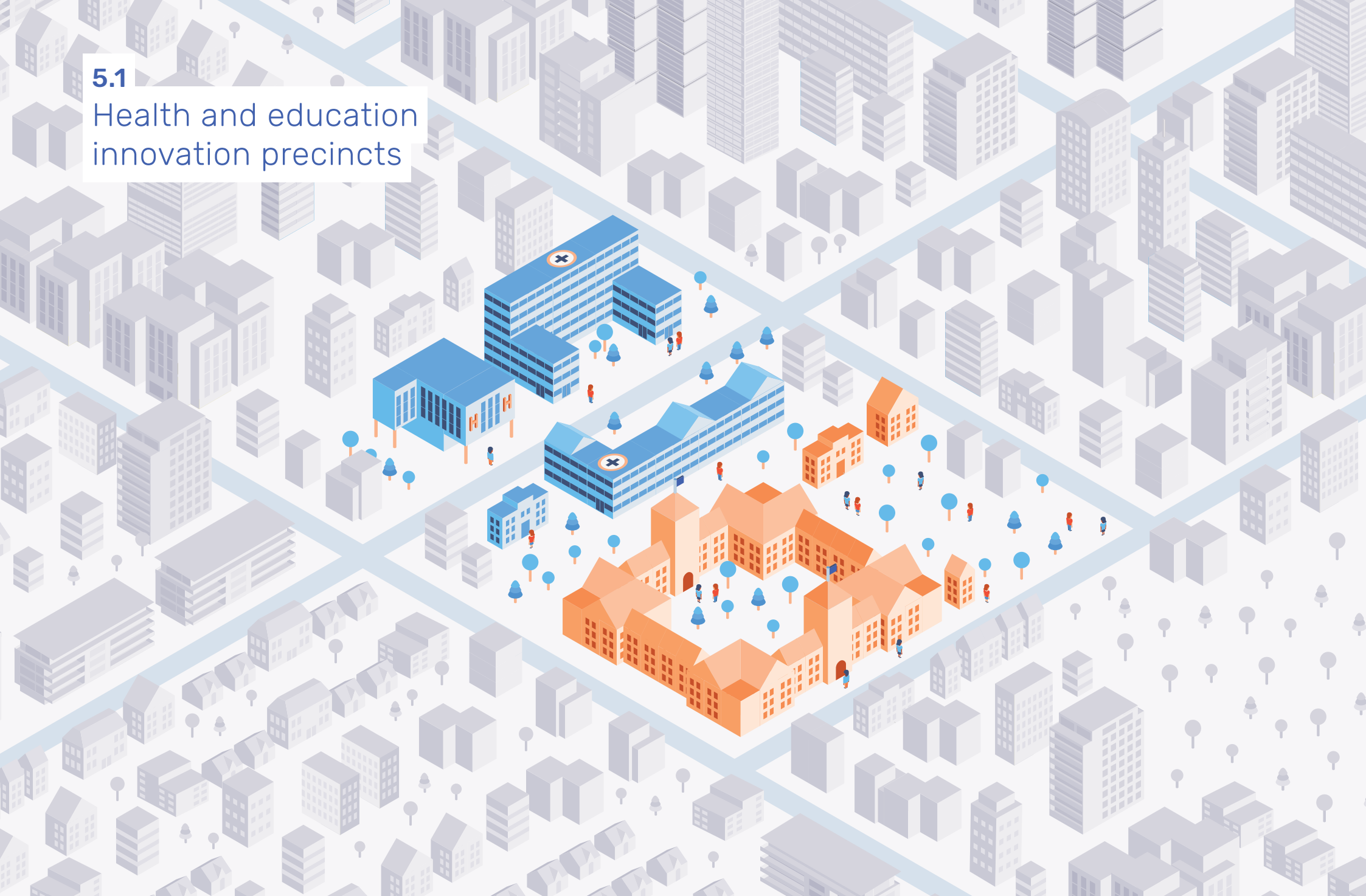
- 1 Health and education innovation precincts**
- 2 Innovation precincts around universities**
- 3 Innovation precincts around a major asset**
- 4 Inner city innovation locations.**

This chapter is focused on larger precincts, does not cover all types and scales of innovation locations in NSW and is not presented as a definitive list. The NSW precincts presented are based on foundational evidence-based research by the University of Technology, Sydney (UTS) Business School¹⁵⁶ and further refined through stakeholder consultation. Information sources include publicly available datasets, secondary sources such as reports and media articles and in-depth consultations with precinct and other stakeholders.

*This was developed from initial research by UTS in conjunction with input from the IPC subcommittee and stakeholder consultation.

5.1

Health and education innovation precincts



Globally recognised health and education precincts feature world-leading research, internationally competitive and recognised health and education institutions, and a strong value chain.

They also have formal governance that guides the interactions between the different stakeholders, a focus on commercialising research and intellectual property that supports collaboration and profit-sharing, access to state-of-the-art research facilities and capital, and efforts to attract local and international talent.

Health and education innovation precincts are developing around some of the major NSW research hospitals and universities. Three of these are highlighted in this section:

- Randwick Health and Education Precinct
- Westmead Health and Education Precinct (Greater Parramatta)
- Camperdown Ultimo Health and Education Precinct (Harbour CBD)

These NSW health and education precincts have built an active network of medical research institutions, a mix of complementary industry tenants, and offer ancillary facilities, services and access to a large pool of researchers, medical experts and patients for clinical trials.

The Greater Sydney Commission's Greater Sydney Region Plan 2018¹⁵⁷ has also identified potential health and education precincts for future expansion to leverage significant investments in local health districts, hospitals and associated medical research and education.

The plan identifies 13 health and education precincts that are at varying points along a maturity pathway:




- Bankstown
- Blacktown
- Campbelltown-Macarthur
- Frenchs Forest
- Greater Parramatta
- Greater Penrith
- Harbour CBD
- Kogarah
- Liverpool
- Macquarie Park
- Randwick
- St Leonards

The Oslo Cancer Cluster is an international example of a health and education innovation precinct. Located next to the Norwegian Radium Hospital and the Institute of Cancer Research, it aims to bring the whole value chain of oncology together in one place, and integrates a high school with medical courses, lectures, internships and pathways for employment.

Health and education innovation precincts

Westmead Health and Education Precinct

An active precinct orientated around three hospitals, three medical research institutions, two universities and over 350 businesses. It specialises in research, education and delivery of health services and clinical care, providing direct health services to almost 10% of Australia's population. \$3 billion has been committed by NSW Government, universities and the private sector to improve facilities in the precinct.

-  Medical research
-  Engineering
-  Health and pharmaceuticals

Randwick Health and Education Precinct

An active precinct orientated around the University of New South Wales (UNSW), with four hospitals, nine medical research institutions, internationally recognised research centres, and more than 100 student startups. UNSW has also partnered with Chinese industry and government to benefit from the Chinese Torch Innovation network. \$3 billion in developments are planned in this active precinct by UNSW and other stakeholders over the next 10 years.

-  Advanced materials
-  Energy and the environment
-  Medical research
-  Quantum computing
-  Life sciences
-  Robotics

Camperdown Ultimo Health and Education Precinct

An active precinct orientated around Royal Prince Alfred Hospital, the University of Sydney and the University of Technology Sydney. The precinct includes internationally recognised research centres, the Sydney Innovation Hub, which provides early stage support for start-ups and HatchLab, which hosts incubator programs and educational events.

-  Digital technology
-  Medical research
-  Engineering

Randwick Health and Education Precinct

The Randwick Health and Education Precinct is a significant health and education precinct in NSW centred around the University of New South Wales (UNSW) and the Randwick Health Campus with four hospitals, nine medical research institutions, internationally recognised research centres, a large number of student startups and more than 6,000 skilled workers.



The precinct includes internationally recognised research in cancer, neuroscience, mental health, women's and children's health, infection and immunology and non-communicable diseases.

An entrepreneurial culture is supported through an ecosystem of expansive health education, research and innovation services, student startups, entrepreneur and incubator programs, the Michael Crouch Innovation Centre and industry engagement.

Precinct members have a long history of collaboration with each other, external organisations and international allies. The NSW Government is investing in the redevelopment of the health campus, enabling stronger collaboration with the UNSW and Randwick City Council to further develop the Randwick Health and Education Precinct.

UNSW has also partnered with Chinese industry and government to benefit from the Chinese Torch Innovation network, and to establish the UNSW Centre for Transformational Environmental Technologies (Yixing) and a high-tech, multi-million-dollar innovation precinct proposed at the UNSW campus to drive innovation and economic growth.¹⁵⁸

The current precinct has extensive ground floor area, equipment, facilities, student accommodation, childcare, IT infrastructure, and easy transport by bus, car, and plane. UNSW development plans will significantly increase ground floor area, childcare places, student accommodation, IT, research facilities and equipment, and general amenities.

A \$3 billion investment is planned by UNSW as well as other stakeholders in the precinct in the next 10 years to improve transport and public amenities surrounding the precinct and the affordability of spaces for innovation activity.¹⁵⁹

Westmead Health and Education Precinct

The Westmead Health and Education Precinct is a significant health and education precinct in NSW and a key provider of jobs for the greater Parramatta and western Sydney region, providing around 18,000 jobs.¹⁶⁰



There are more than 1,100 research staff and a high concentration of workers with qualifications in the fields of science, health, engineering, mathematics and IT.¹⁶¹ Westmead Hospital is the teaching hospital for University of Sydney, with over 3,400 students, including a high number of PhD students.¹⁶² The NSW Government, universities and the private sector have committed \$3 billion to improve facilities in the Westmead Health and Education Precinct.¹⁶³

Westmead provides direct health services to almost 10% of Australia's population¹⁶⁴ throughout Australia. The precinct is orientated around three hospitals (Westmead, the Children's Hospital and Cumberland Hospital), three internationally-recognised medical research institutions (Westmead Medical Research Institute, the Children's Medical Research Institute and the Kids Research Institute), University of Sydney and Western Sydney University.

In 2013 precinct stakeholders formed the Westmead Alliance to create a shared vision and advocate for the interests of the precinct. A strong presence of leadership and businesses built around the anchor institutions has created a dynamic precinct of over 350 complementary enterprises. An entrepreneurial culture is supported through the Westmead Research Hub, a collaboration of five organisations with expertise in medical research, health and education.

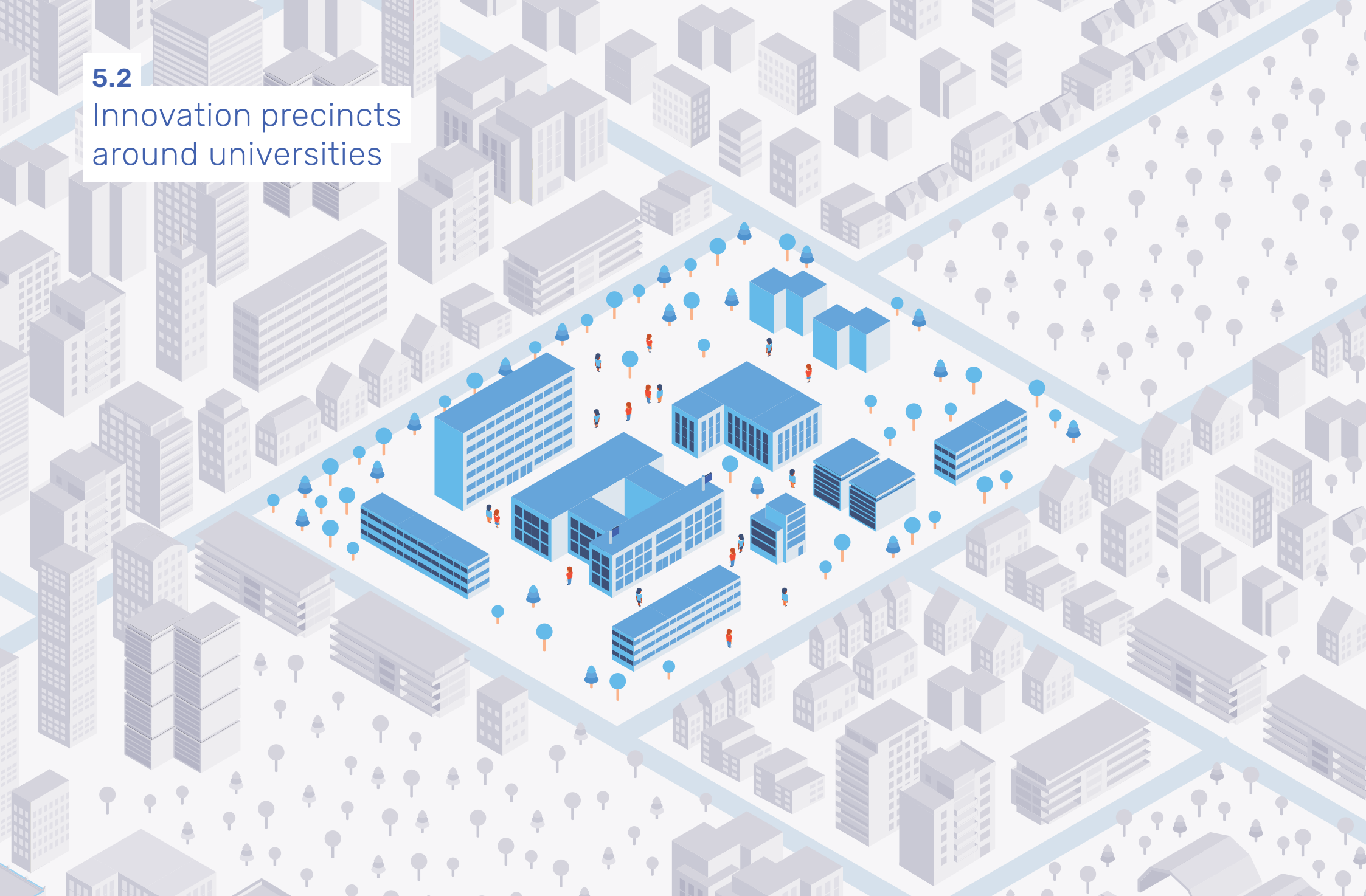
Westmead has a well-developed talent pool and access to public and private funding that attracted \$79 million in medical research in 2015.¹⁶⁵ A number of initiatives such as the Western Sydney University Launch Pad and the Research Hub actively support and mentor local tech startups through training events and seminars. There are currently three launch pads planned across Western Sydney, Werrington, Parramatta and Liverpool. A new 8,000 square metre innovation centre is also in the pipeline to provide a platform for connecting and facilitating industry and commercial partnerships.

Westmead has a mix of high-density residential and health service and educational establishments with expectant growth in supporting amenities such as accommodation and food services. It is well connected to transit by the T-way rapid bus system, train, and access to the M4 and M7. A planned light rail will link the Westmead Hospital precinct to the commercial centre of Parramatta CBD and improved pedestrian bridges will link Western Sydney University and Westmead Hospital. Westmead has been announced as an additional station location on the Sydney Metro West project, which will link Westmead to previously announced stations of Sydney CBD, The Bays precinct, Sydney Olympic Park and Parramatta CBD.

The Medtech Knowledge Hub,¹⁶⁶ coordinated by the Medical Technology Association of Australia (MTAA) fosters collaboration between academia, industry and government to improve the business environment for all areas of the medical technology industry.

5.2

Innovation precincts around universities



A number of precincts in NSW have emerged around universities to leverage their research strengths and assets to attract businesses and investment.

This has seen a densification of innovative activity and mixed use, driven by quality commercial collaboration between researchers and businesses and a growth in capital investment.

Regional precincts are developing around the University of New England in Armidale and the Charles Sturt University campus in Wagga Wagga to leverage their strengths in agriculture research, while an emerging precinct is developing around the Charles Sturt University campus in Bathurst focused on digital technology.

An innovation precinct has emerged around the University of Newcastle to leverage its research strengths in energy, engineering, and medical research, and established institutes and programs. The new Innovation Campus in Wollongong is fostering innovation around the University of Wollongong's strengths in engineering and materials research and health and well-being, supported by a diverse range of startups.

In Sydney, an innovation precinct has developed around Macquarie University and Hospital with a focus on life sciences, health and pharmaceuticals and biotechnology, while an emerging precinct has developed around the University of Technology Sydney campus in Ultimo with strong links to the creative innovation corridor that includes Redfern, Surry Hills and Moore Park.

Features of globally recognised precinct campuses include excellence in research and international leaders in a specific industry or research area, clear market demand and strong value chain potential, formal governance that guides the interactions between the different stakeholders, a strong focus on commercialising research and intellectual property that support collaboration and profit sharing, ability to tackle big research challenges and opportunities through interdisciplinary collaborations, access to capital, and the attraction of local and international talent.

An example is Paris, where a government joint venture has consolidated many of its leading research institutions within a single suburban precinct – Paris-Saclay. This project has reinvented the programs of over a dozen academic institutions, while large firms in energy, IT, automotive and health have become tenants on the site, as well as multiple public and private incubators.

Armidale Agritech Innovation Precinct

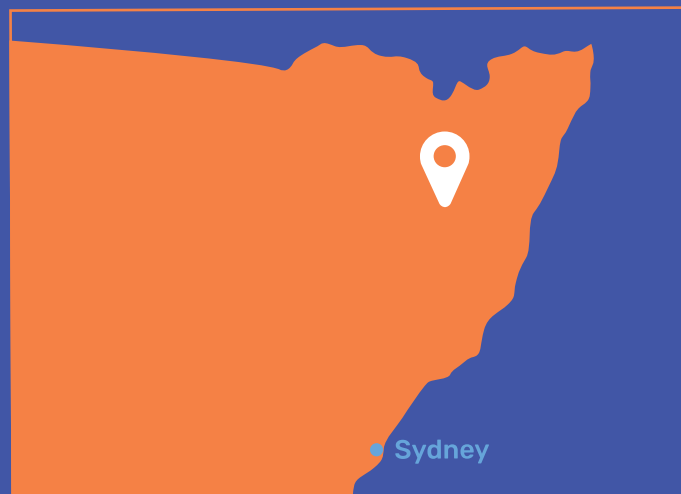
The Armidale Agritech Innovation Precinct is centred around the University of New England (UNE), which excels in the environmental, crop and animal sciences.

UNE has eight rural properties that are used for research and education purposes, including the award-winning SMART Farm.¹⁶⁷ It showcases the latest technologies, with the goal to improve productivity, environmental sustainability and safety. Students and the community can access the latest data streaming from a range of field, animal and machinery sensors. Integrated in the precinct is a comprehensive program of education and outreach aimed at primary (UNE Discovery¹⁶⁸), secondary (UNE GRASS¹⁶⁹ and the international-reaching Smart Farm learning Hub¹⁷⁰), VET (TAFE Digital) and tertiary level (undergraduate teaching and postgraduate research¹⁷¹) students.

The university's Smart Farm Innovation Centre (SFIC) specialises in agriculture, farming and horticultural technologies and works closely with farmers to deliver technology-enabled farming solutions to regional and international communities.

The precinct integrates an **ag-tech cluster**¹⁷² of more than 35 businesses including international agricultural technology companies such as ICT International, which produces sensors for farming use. A UNE Smart Region Incubator was launched in 2017 to enable small to medium-sized enterprises and entrepreneurs to connect regionally, nationally and internationally using communications technology supported by commercial expertise. An example is the successful online platform to enable regional parents to participate in birthing classes remotely¹⁷³ and the recently-launched SmartShepherd.¹⁷⁴

The region hosts industry events including 'Tech Fest' and the Agementation Hackathon¹⁷⁵ to attract stakeholders from outside the region to collaborate with local businesses, while UNE hosts national agribusiness events with Meat and Livestock Australia and other rural Research Development Corporations (RDCs) to share ideas from across the country.



Innovation precincts around universities in NSW

Bathurst Innovation Precinct

An emerging precinct centred around the Charles Sturt University (CSU) Bathurst campus and includes 60 educational providers and strong community and business involvement. Gunther's Lane, an experimental technology hub that includes everything from robotics, to the latest in gaming software, is an initiative by Reliance Bank to inspire local innovations. A business incubator called 'Upstairs' gives locals and students access to shared workspace and local businesses, training, and the opportunity to pitch their ideas.



Digital technology

Wagga Wagga Agritech Innovation Precinct

An emerging agricultural precinct centred around the Charles Sturt University (CSU) Wagga Wagga campus that hosts the headquarters of AgriFutures Australia. It includes AgriPark, which offers tenants a range of options from office space, laboratories, glasshouses and warehousing. It forms part of the agricultural innovation ecosystem that includes the Graham Centre for Agricultural Innovation, National Wine and Grape Industry Centre and the Agritech Incubator, which also implements initiatives to improve women's participation in technology.



Agricultural technology

Wollongong Innovation Precinct

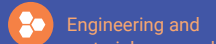
An emerging innovation precinct centred around the University of Wollongong's Innovation Campus to draw on the university's strengths in engineering, materials research, health, wellbeing, and medical research and attract a large startup hub of mixed uses. The university also hosts the iAccelerate business incubator program. The university has recently commissioned a health, wellbeing and aged care precinct.



Digital technology



Health



Engineering and materials research



Medical research

Macquarie Park Innovation District

An active precinct centred around Macquarie University that includes a state of the art purpose built incubator, as well as the Australian Hearing Hub and Macquarie University Hospital. The adjacent Macquarie Business Park has more than 180 large international and 200 small businesses. An industry led initiative, Macquarie Park Innovation District was created by key stakeholders in 2015 to leverage their competitive advantage in life sciences, health and pharmaceuticals, digital and biotechnology.



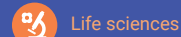
Biotechnology



Digital technology



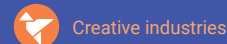
Health and pharmaceuticals



Life sciences

The Ultimo Precinct

An emerging precinct centred around the University of Technology Sydney (UTS) campus that includes the ABC and Sydney School of Entrepreneurship with strong links to the creative innovation corridor that includes Redfern, Surry Hills and Moore Park. The Creative Industries Knowledge Hub coordinated by UTS includes KINDRED.PLACE, an online knowledge-sharing platform to link, engage and educate creative industry professionals.



Creative industries

Armidale Agritech Innovation Precinct

An emerging precinct in agritech centred around the University of New England's strengths in environmental, crop science and technology and animal sciences. The Smart Farms Innovation Centre works closely with the national farming community to deliver innovative farming solutions. Education and outreach targeting primary, secondary, VET and tertiary level students is integrated with precinct activities along with a Smart Regions Incubator, ensuring ideas from the university community and from across the sector are translated into outcomes that grow not only agricultural productivity but also the emerging agritech startup culture in Australia.



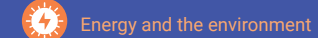
Agricultural technology

Newcastle Innovation Precinct

An emerging precinct built on the University of Newcastle's strengths in science, engineering, energy and the environment, health and medicine, and well established initiatives and programs. These include the Hunter Medical Research Institute, Newcastle Institute for Energy and Resources (NIER), acceleration programs including the Hunter Innovation Project and the Integrated Innovation Network (I2N) and the NIER-hosted NSW Energy and Resources Knowledge Hub – a knowledge-sharing platform for the sector and enhanced industry connections. The precinct leverages the region's capabilities, supports startups, and fosters collaboration.



Digital technology



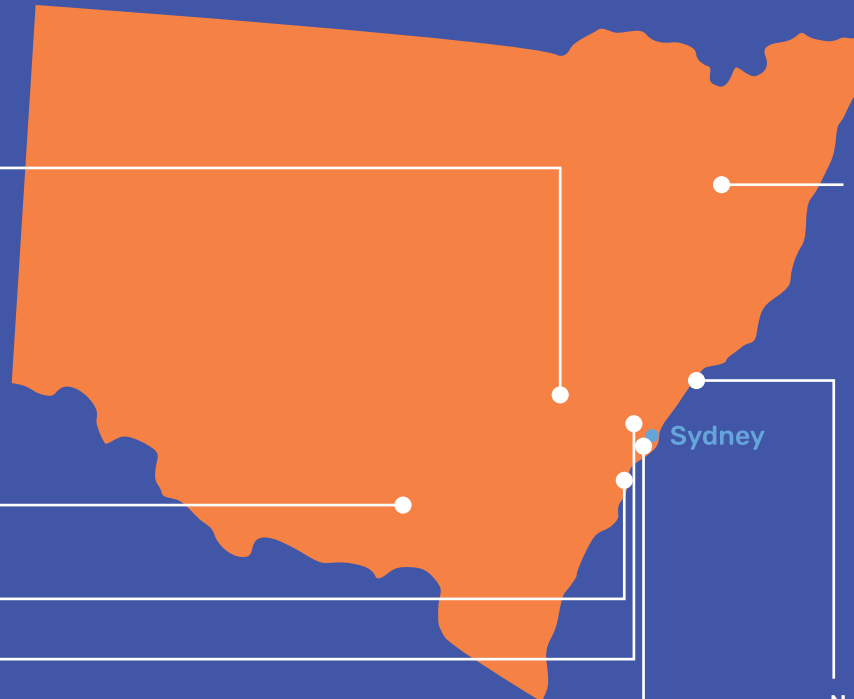
Energy and the environment



Engineering

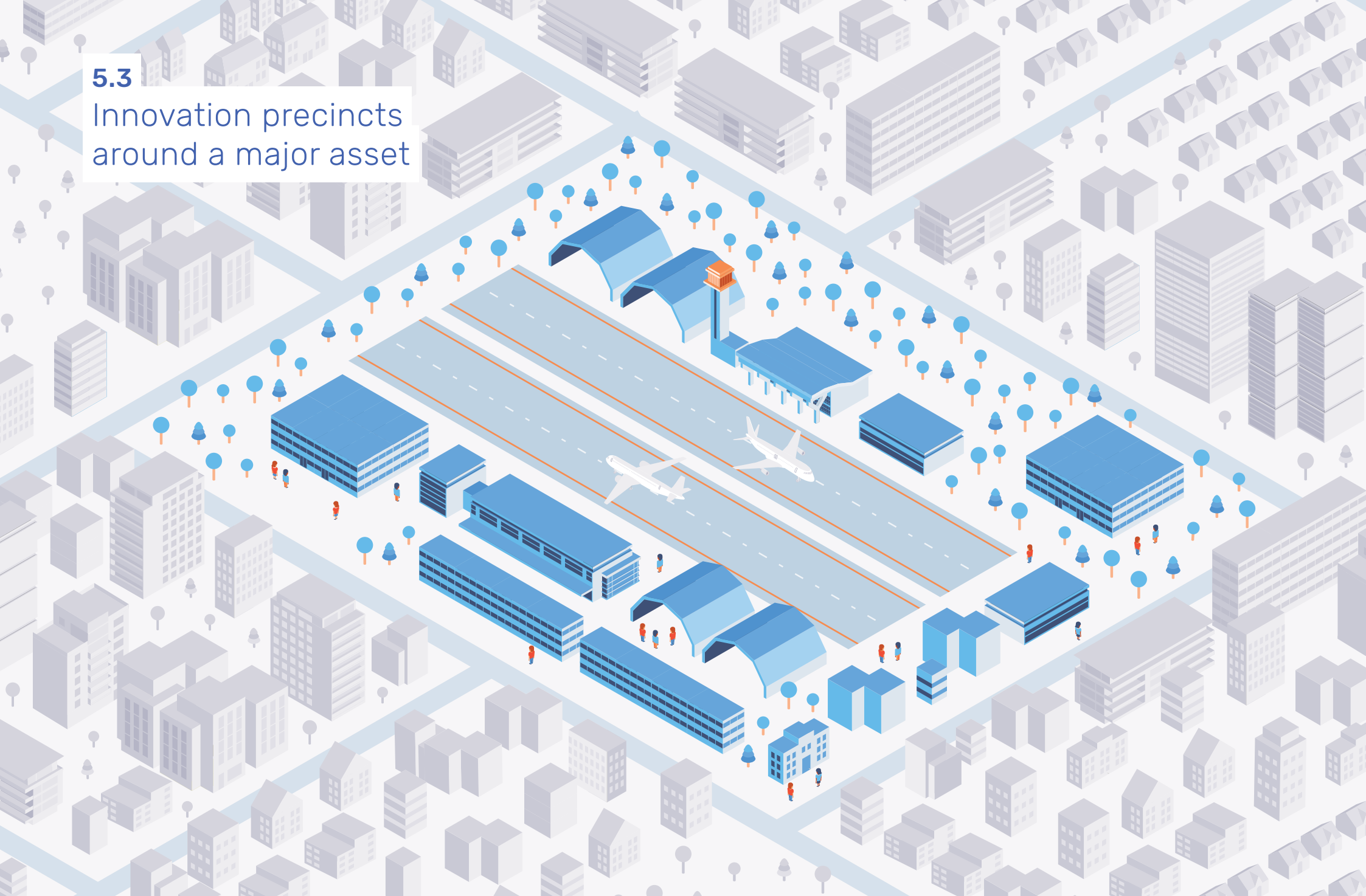


Medical research



5.3

Innovation precincts around a major asset



5.3 Innovation precincts around a major asset continued

Specialised precincts are emerging in NSW around major assets that leverage the large public investment in these locations and their access to supply chains. These are creating mutually beneficial opportunities for investment and job attraction.

An innovation precinct is developing around the Australian Nuclear Science and Technology Organisation (ANSTO) in applied nuclear science and technology to leverage the unique scientific infrastructure and capabilities. Outside Newcastle, an emerging innovation precinct in aerospace and defence is developing around Australia's largest operating air force base at Williamtown Aerospace Centre. The GATE is based at the NSW Department of Primary Industries Orange Agricultural Institute to leverage the expertise of extensive scientific and technical capabilities, data and infrastructure for on-farm validation.

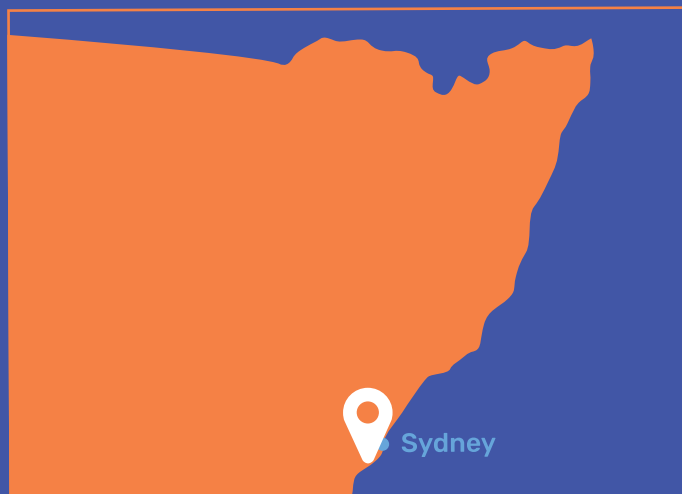
Two precincts are also proposed close to the future Western Sydney Airport to leverage its links to global supply chains and access to new export partners: the Western Sydney Aerospace and Defence Industries Precinct; and Luddenham Science Park with a focus on advanced STEM research and development.

Features of globally recognised precincts located around a major asset include proximity to new or existing major infrastructure and supply chains, and the provision of business services that make it easier for companies to relocate there.

In Manchester, the expansion and internationalisation of the city's airport has catalysed the development of the MediPark innovation precinct, anchored by the University Hospital of South Manchester. The hospital, Manchester City Council and Manchester Airports Group recognised the opportunity to expand research and clinical expertise and use land parcels in the adjacent Enterprise Zone to grow the cluster.

Australian Nuclear Science and Technology Organisation

The Australian Nuclear Science and Technology Organisation (ANSTO) is a publicly-funded research organisation and significant science facility utilising applied nuclear science and technology.



Located in Lucas Heights in the Sutherland Shire, ANSTO is a significant contributor to the local economy, working with around 280 local enterprises and investing more than \$25 million into local business. It is currently one of the region's biggest employers, with more than 1,000 staff on its Lucas Heights campus, predominantly scientists, engineers, and technicians. The ANSTO Innovation Precinct seeks to expand ANSTO's contribution to the region, NSW and the nation.

The current science and technology campus is largely occupied by ANSTO, with other tenants including the CSIRO and businesses in the nuclear science and technology industry. Each week, ANSTO delivers more than 11,000 doses of life-saving nuclear medicine from its Lucas Heights campus to over 250 hospitals and medical practices across Australia. They also run events and school outreach programs, provide training and support for incoming students and access to its world-leading research capabilities to industry and research users from across Australia and overseas.

ANSTO is planning to expand its existing technology park to accommodate new startups and businesses on land adjacent to its current campus. As part of this growth strategy, ANSTO is also investing in the extension of their existing technology campus including the development of a graduate institute and a deep technology incubator. The redevelopment will give opportunities for business, universities, research organisations and government offices to co-locate within the precinct.

Innovation precincts around a major asset

The GATE (Global Ag-tech Ecosystem)

Based at the NSW Department of Primary Industries (DPI) Orange Agricultural Institute, the GATE is an emerging precinct to develop ag-tech ideas and fast-track adoption of agricultural R&D. DPI is the largest agricultural R&D provider in Australia and the GATE will provide access to the expertise of 600 scientific and technical staff and long-term data sets and facilitate on-farm validation of new technologies across 25 research stations and 13,000 ha of trial farms.

 Agriculture technology




Western Sydney Aerospace and Defence Industries Precinct (proposed)

A proposed precinct adjacent to the future Western Sydney Airport to leverage the links to global supply chains and access to new export partners and markets. It is part of the proposed Western Sydney Economic Corridor by the Greater Sydney Commission.

 Aerospace and defence

Luddenham Science Park (proposed)

A proposed science park in close proximity to the future Western Sydney Airport. It will provide advanced STEM facilities and schools with a focus on research and development in the food, energy and health sectors and is set to open in 2021.

-  Food
-  Energy and the environment
-  Health






Williamstown Aerospace Centre

An emerging precinct next to Australia's largest operating air force base and Newcastle airport. It will be RAAF's Sustainment Hub for operations and training of the new F-35 Joint Strike Fighter. The commercial campus-style tech park includes defence-level security, commercial offices, technical and light industrial spaces, a conference centre and hotel facility. Current tenants include Lockheed Martin, Boeing and Bohemia Interactive (global leaders in military training simulation).

 Aerospace and defence

Australian Nuclear Science and Technology Organisation (ANSTO)

An emerging precinct specialising in applied nuclear science and technology centred around ANSTO's landmark scientific infrastructure and unique capabilities. Currently, other tenants include the CSIRO and businesses in nuclear science and technology. The ANSTO campus is currently undergoing expansion to provide for a Deep Technology Incubator, a Graduate Institute and an expanded Technology Park, which will support and house new startups and businesses on site.

-  Advanced manufacturing
-  Health
-  Agricultural technology
-  Industry 4.0
-  Food and nutrition

5.4

Inner city innovation locations



5.4 Inner city innovation locations *continued*

Inner city areas can make a significant contribution to the local innovation ecosystem, although they do not typically trade under an identifiable innovation precinct brand.

These areas attract corporate headquarters of global companies working in specific industry sectors and have a well-established customer base. They are highly urbanised and accessible with vibrant, mixed-use environments and are characterised by a high concentration of businesses, the presence of entrepreneurs and venture capital firms and good quality public transport.

Within the Sydney CBD, there is growing entrepreneurial and innovation activity driven largely by the digital and financial technology sector and anchored by major software companies such as Atlassian. The Sydney Startup Hub established with NSW Government funding provides critical support to strengthen the local startup community. The NSW Government is also supporting a new Sydney Technology and Innovation Precinct, stretching from Central to Eveleigh where there is Australia's largest cluster of startup firms.

A clustering of complementary creative industries across Surry Hills, Redfern and Moore Park has taken advantage of a concentration of industry talent and market demand to develop into a creative industries corridor. The North Sydney CBD is also experiencing local growth in entrepreneurs and startups and the emergence of supportive spaces such as innovation hubs and co-working places.

Features of globally recognised inner city innovation locations include proximity to customers, strong connections between complementary industry clusters and supply chains, access to a large talent pool and investors, a good selection of day and night time amenities, and affordable workspaces to accommodate businesses expansion.

In the New York borough of Brooklyn, several inner city locations have become highly popular for innovative firms in digital media, publishing, advertising and health technology. Many have opted to reclaim disused factories in areas such as the Brooklyn Navy Yard, and populate shared workspaces, incubators, and creative office buildings. The clustering of firms has created huge demand for amenities – including a 21-acre park, new and improved bus services, and public infrastructure to test and demonstrate new innovations. As the geography of the precinct expands, the different hubs have begun to organise as the Brooklyn Tech Triangle to identify the next shared priorities for investment and to maintain affordable rents.

A globally recognised hub building is Seoul Space, located in the Korean capital's Gangnam district. In an environment where there is limited capital in the startup ecosystem because government programs extend to a small number of companies, Seoul Space has laid important foundations for helping IT startups and early-venture businesses to go global, while also providing a gateway for global internet and software companies to enter the domestic market. Like many hub buildings it provides mentoring, market research and 24/7 space.

Inner city innovation locations

North Sydney

A high-density area with an emerging technology and startup culture which has seen traditional office spaces being converted into innovation hubs and co-working spaces (e.g. Workinc). The Australian Catholic University has a startup hub, Collaborate Plus, in their North Sydney campus providing a co-working space for new SMEs. There are also around eight shared spaces on the North Shore; CSIRO's Lindfield Collaboration Hub; established medtech, biotech and pharmaceutical companies; and startups/small businesses specialising in robotics, EdTech and STEM. The North Sydney Innovation Network (not-for-profit) helps connect local businesses, government and industry on the North Shore.



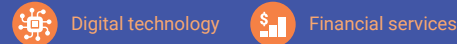
The Sydney Startup Hub

Established by NSW Government funding and launched in 2017 to support innovation, strengthen the startup community, and grow new, sustainable, high-value jobs in NSW. This emerging precinct covers over 17,000 m², spanning 11 floors and brings together a diverse mix of organisations and talent under one roof in the centre of the Sydney CBD to help spark innovation, ignite collaboration and give easier and superior access to networks, skills, funding and leadership. The hub also gives subsidised rents to help build a sustainable startup ecosystem. Tenants include Stone and Chalk, Fishburners, Tank Stream Labs and The Studio.



Sydney CBD

Australia's main financial and economic centre, this active precinct has a strong presence of venture capital financing and is home to many of the largest companies located in the country. It is also one of the main commercial hubs for the Asia-Pacific. There is an entrepreneurial and innovative culture, particularly in the digital and financial technology sector.



Surry Hills-Redfern-Moore Park Creative Industries Corridor

An active, diverse precinct with a large mix of creative talent that includes Australian Technology Park, Redfern, Surry Hills, and Moore Park and links up with the Ultimo Precinct. The corridor includes the recently redeveloped International Convention Centre and numerous event and collaboration spaces.



Sydney Technology and Innovation Precinct

The NSW Government is partnering with the tech industry to help design a technology and innovation precinct, stretching from Central to Eveleigh. The precinct is already home to Australia's largest cluster of startup firms. Atlassian, Australia's largest tech company, along with other industry players including co-working space Fishburners, and industry representative body Tech Sydney, will work with the NSW Government to co-create the precinct. A NSW Government taskforce will also include representatives from University of Technology Sydney, University of Sydney and Sydney Business Chamber, as well as industry experts from a wide range of Australian startups.



The Bays (proposed)

A proposed precinct that will adapt the heritage-listed White Bay Power Station into a technology precinct and draw on the site's working heritage.

Surry Hills–Redfern–Moore Park

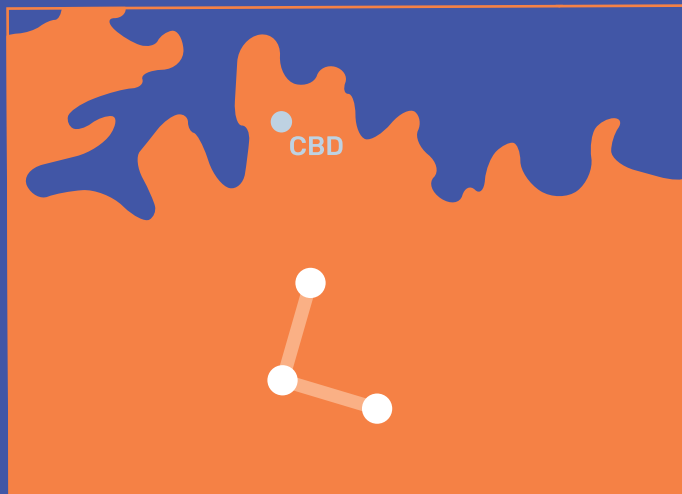
The creative industries of Surry Hills, Redfern and Moore Park and those in Ultimo around UTS, the ABC, and the new Sydney School of Entrepreneurship, together with the digital industries in Pyrmont, form a corridor of creative digital, media and design industries.

The area is diverse, with a large mix of creative talent, and includes the recently redeveloped International Convention Centre and numerous event and collaborative spaces. UTS's City Campus Master Plan will further develop and support the creative and cultural industries.

The 14-hectare Australian Technology Park (ATP) is located at the southern end of the corridor. It currently hosts a diverse business community in digital technology and research, including Cicada Innovation, Data61 and the CSIRO. The redevelopment of the former railway site, undertaken by Mirvac, commenced in 2016 and will include new buildings, revitalised heritage buildings and continued operation of the Blacksmiths Workshop. Co-working and event spaces are also planned to give startups and industry opportunities to collaborate.

The corridor benefits from access to innovation labs, training and mentoring programs to build the skills and capabilities of industry and quality events to create a strong culture of innovation and entrepreneurship. Sydney School of Entrepreneurship's dynamic educational and engagement activities are designed to develop an entrepreneurial mindset and The Hatchery education program offers a range of programs including Accelerate, a three-month tailored program to support early stage ventures through collaborative co-working space, mentorship and education. The Accelerate program has helped generate startups including Hear Us Roar (clothing line), FOOD4FACE (non-pollution skin care solution), Airsticks (a revolutionary musical instrument) and Fortifex (a platform managing Cryptocurrency portfolios).

The activities of the Creative Industries Knowledge Hub,¹⁷⁶ coordinated by UTS, include development of an online knowledge-sharing platform KINDRED.PLACE to link and engage creative industry professional across the state and equip them with business and entrepreneurial skills, and features research and self-curated learning.



Role of government and other stakeholders

Innovation precincts rely on collaboration between governments, research, education and health institutions, industry, entrepreneurs, investors and land owners. Stakeholders may collectively seek to act in the best interests of the precinct, but they are also driven by their individual business needs. For a precinct to develop and mature, its leadership must be drawn from multiple sources and overcome competing priorities to provide stable governance.

Stakeholders play different roles and can use different 'levers' to contribute most effectively to the precinct. These are also linked to the type of innovation location, its activities, the particular sector and industries it consists of, and any national or regional differences in the market and regulatory environment, including cultural attitudes to risk. The significance of different stakeholders in the leadership of the precinct may also vary as it develops and matures.

While there are common features of precincts that work, and common levers available to stakeholders to help make them work, each precinct will be shaped by their specific characteristics and market drivers and there is no single recipe for success.

6.1 Institutions

Institutions can act as anchors for an innovation precinct.

They include universities, hospitals and local health districts, large broadcasters, airports, defence facilities and even convention centres. Their essential characteristic is having the scale and appetite to catalyse local innovation activity.

Institutions provide knowledge and investment, may contribute land or facilities and play a significant role in attracting external talent and capital. They can lend market identity, brand reputation and organisation capacity to the precinct. They may also play a critical leadership role in partnership with other stakeholders.



The active role of institutions – Oslo's Oncology Innovation Park¹⁷⁷

Growth of the Oncology Innovation Park in the Ullern suburb of Oslo has been underpinned by two institutions – the Norwegian Radium Hospital and the Oslo University Hospital's Institute of Cancer Research. Leadership at these institutions recognised the opportunities not only to build their own R&D networks and actively commercialise research, but to build an entire oncology value chain – from skills to basic research to industry – within one precinct.

The hospitals saw a major advantage in creating an environment that could take cellular research back and forth quickly between the patient bed and the laboratory bench. When a nearby piece of land occupied by Ullern High School was slated for demolition, the hospitals obtained and developed the site under an innovative deal to re-house the school within the precinct and integrate it into the scientific mission of the precinct, with the universities providing lectures and mentoring to school students. In 2016, Oslo University Hospital also moved its Molecular Diagnostics and Genomics and Bioinformatics Units to the park.

The Radium Hospital transitioned from a simple technology transfer office into a pre-seed investor. It began to operate as an oncology-focused, early stage, evergreen fund and take an active role in the development of the nine on-site biotech companies in its portfolio. Adjustments to IP regulations enabled hospital cancer specialists to set up biotech companies, and the physical space of the precinct allowed these companies to cluster, share knowledge and adapt quickly.

The hospitals helped set up a park management team with good experience in real estate and public realm activation.

Oslo's experience highlights that research institutions have an important role in actively pursuing co-location and commercial partnerships with industry to make it easier to connect with research capacity and overcome barriers to collaboration and commercialisation.

6.2 Businesses

Innovative businesses contribute to the diversity and health of the innovation ecosystem and the ‘internal market’ within the precinct.

They include startups, gazelles (high growth companies), unicorns (fast-growth companies with over \$1 billion valuation) and larger, more established firms. They provide important network and knowledge-sharing opportunities and either establish or are part of a broader supply chain of connected trading enterprises.

Established innovative businesses can play an important role in sharing knowledge and research with other businesses, particularly smaller firms, when they can see clear business reasons for doing so. They also are well placed to invest in the next cycle of talent, and spotting demand-side opportunities to ensure the precinct and the city/region remain responsive to changing trends in their industry.



The active role of businesses – Telefónica¹⁷⁸

There are many international examples of innovative firms playing a catalytic role in their precinct, from Amazon’s role as a city-shaping company in the South Lake Union district of Seattle, to SoundCloud’s contribution to a digital eco-system in the Berlin district of Mitte (specifically within Factory Berlin), to the anchor role of drug developer Vertex Pharmaceuticals in Boston.

Telefónica has made a long-standing contribution in Barcelona’s 22@ district. It established an early presence in the district and set up an open innovation and entrepreneurship program called Wayra to produce the next generation of firms and talent.

Many of the companies that have grown in Wayra (e.g. Marfeel, MyTwinPlace, Social And Beyond, Tappx and Cl3) opted to locate in the district and maintain close links with the original company.

In 2011, Telefónica set up the global headquarters of its R&D division in the district, rather than at its corporate headquarters in Madrid.

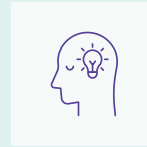
The firm also championed Barcelona’s hosting of the Mobile World Congress, the world’s largest mobile technology gathering, helping the city to diversify and move up the technology value chain during a challenging post-recession cycle.

6.3 Entrepreneurs

Both new and established entrepreneurs are vital participants in successful innovation precincts.

They have vision, enthusiasm and a risk-taking appetite to grasp market opportunities and build connections between different actors such as university researchers, investors and firms. They may also play a mentoring role and even act as intermediaries between public sector leaders and big capital providers. They can act as disruptors of larger institutions or firms and can encourage a healthy competition between stakeholders in the precinct.

Decisions about where and how entrepreneurs co-locate can influence the geography of innovation within a city and region. They are typically attracted to the amenities, lifestyle and affordability of particular locations.



The active role of entrepreneurs – Tel Aviv¹⁷⁹

The contribution of entrepreneurs to precinct success is especially visible in the Tel Aviv precincts of Herzliya and Rothschild Boulevard.

A generation of entrepreneurs graduating from the military and the Technion-Israel Institute of Technology with a degree in industrial management engineering helped to establish an innovation system in Israel's emerging internet, telecommunications, energy and cleantech industries.

One of the most significant was Yossi Vardi, who had 22 exits and 27 failures during the course of his career. He started one of the Tel Aviv region's first software houses in 1969. Later Vardi and colleagues became mentors to entrepreneurs, especially through GarageGeeks, a non-profit space for young innovators.

Vardi moved into government to shape new public sector approaches to innovation, and became an early stage angel investor in 1996, helping to establish ICQ, the first instant messaging application for the internet.

These activities catalysed a startup boom in Tel Aviv that actively involved hundreds of young Israeli entrepreneurs. A characteristic of the Tel Aviv and Herzliya entrepreneurs is their reinvestment back into ventures in the local ecosystem. They also supported the 1994 establishment of the Interdisciplinary Center in Herzliya on a disused military site to provide an entrepreneurial education based on co-working and partnerships with students. The ecosystem matured and among many successes the company Waze was purchased by Google and became a worldwide phenomenon.

6.4 Investors

Investors provide the capital and expertise that is needed to finance ventures that commercialise product and process innovations. They can also strengthen firm networks and provide growth management, marketing, and operational advice.

6.4.1 Venture capital

Venture capital (VC) investments come from specialised business growth funds to startups and small businesses that have high growth potential. They are characterised by dynamic growth cycles, high risks of company or product failure, but with significant returns when successful.

Venture capitalists bank on some business investments achieving very high returns in order to offset losses from those that fail.

VC firms usually aim to take a business through a successful growth cycle towards a public listing or private sale to realise their own profit. They can provide startups and growth companies with oversight, experience, expertise and access to their networks. VC investors are a typical part of successful precincts.



The active role of venture capitalists – Boston’s Seaport Innovation District¹⁸⁰

VC firms played a fundamental role in the growth of the Boston’s Seaport Innovation District over the past decade. OpenView Partners was the first VC firm in the district, part of a new generation of VCs with more innovative business models able to support firms at earlier stages. Others, such as Polaris Venture Partners and Battery Ventures, have relocated to be in or adjacent to the district.

These firms’ ability and appetite to supply capital to firms in the tech-oriented innovation economy was a major factor in Boston’s ability to retain growing firms and talent from the pull of New York and San Francisco. They are responsible for a substantial share of the \$6 billion raised in the Boston region annually.

VC firms have helped to finance a number of tech and life sciences firms in the Seaport District, while the district has also attracted more financial services and law firm giants to locate. The major VC players have also given rise to smaller funds focused on very early stage financing to support students.

Boston’s VC firms also operate co-working spaces for entrepreneurs, play a prominent role in larger public events and meet ups, and have become much more active at mentoring startups as they have become more experienced.

Boston’s example shows that although VC firms are not usually themselves the initial catalyst for precinct development, over time they do underpin the vitality and ‘stickability’ of precincts.

6.4 Investors continued

6.4.2

Angel investors

An angel investor is an individual or group that provides small sums of investment capital to startup firms to develop viable products. They play an important role in providing seed and early stage investment to new startups.

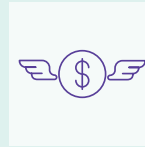
Innovation precincts are attractive to them as they know the firm they invest in is part of a broader supportive ecosystem.

6.4.3

Crowd funding

Crowdfunding platforms such as Kickstarter and Indiegogo give startups an opportunity to raise capital by selling their idea directly to consumers.

A successful crowdfunding campaign can also help prove to venture capitalists, angel investors and banks that there is market demand for the product.



The active role of angel investors – Seoul¹⁸¹

Angel investors have been an important part of the revival of the startup ecosystem in the central Seoul district of Gangnam, after a long downturn following the dot-com crash in 2000. Older entrepreneurs with liquidity from the dot-com era became angel investors into fast-growing sectors such as gaming, fashion, design and beauty, including CEOs such as Ryu Jung-hee. A number of angel investment clubs, syndicates and consultancies have emerged, consisting of consortia of business leaders in Seoul and Gangnam.

One non-profit coalition of 20 banks called Dream Bank has built a large asset base to support startups and provide high-quality space such as D.CAMP since 2012. South Korea's government has also become an angel investor itself into Gangnam startups, to fill specific gaps or co-invest with angels.

The example of Seoul shows how angel investors can play an important role in the system when they have sufficient understanding of early stage innovation challenges and the risk appetite to match.

6.5 Incubators and accelerators

Precincts often play host to accelerator and incubator programs that support early stage firm development.

Accelerators focus on scaling a business rapidly, while incubators are often targeted to refining the innovation. Both provide the opportunity to demonstrate the products to potential investors.

6.5.1 Incubators

An incubator also provides business support, resources and services such as co-working spaces, access to capital, coaching and networking connections.

Depending on the organisation sponsoring or hosting the incubator, it may have a specific market focus. For example, an incubator sponsored by a hospital may only support medical technology startups, as in the case of incubators within Toronto's MaRS Discovery District and the Oslo Oncology Innovation Park.



The active role of incubators – Block 71¹⁸²

Incubators play an important role in precincts whose physical fabric lacks the ingredients conducive to creativity and interaction. Block 71 is an incubator located in a 9 am–5 pm suburban innovation park west of Singapore CBD, owned by the state infrastructure developer JTC Corporation.

The seven-storey building was relaunched as an incubation centre that also houses a number of firms and funds. Low costs, good facilities, networking opportunities, and proximity to investors, make up for any initial location and amenity deficits.

For precincts or city sub-regions that have limited or dispersed innovation activity, the example of Block 71 and others show how incubators can provide a single common location to build energy, synergy and economies of scale.

6.5 Incubators and accelerators continued

6.5.2

Accelerators

Accelerators can provide mentoring, education and business support within a set timeframe to rapidly scale the business and help them avoid common problems during this period of high growth. They play an important role in helping startups in precincts succeed by building the necessary business skills and management capability and providing important connections with other businesses or mentors that can offer valuable experience and guidance.

Accelerators can make a big difference to the critical mass of startups in a precinct when they provide access to top-level technology leaders, a customised curriculum and strong shaping for end user needs.

They are less effective when they have inexperienced management, a limited evidence base to inform decision-making, and do not coordinate with wider stakeholders and their expectations.¹⁸³



The active role of accelerators – CONNECT and MassChallenge¹⁸⁴

One of the longest running examples of a successful accelerator that has had a big influence on a precinct and the wider ecosystem is CONNECT in San Diego. CONNECT was set up in 1986 by the city's main university, the economic development corporation and several private businesses.

The aim was to make the scientific and technological community more commercially capable, while also helping to make the business community more technologically literate. Its leaders acted as a neutral broker to create traffic between the two communities in the Torrey Pines Mesa precinct, hosting social events that gradually built up a shared language of innovation.¹⁸⁵

Over time, CONNECT has broadened its mandate to become an advocate to government on behalf of entrepreneurs and innovators.

Many accelerators have grown to become global networks, operating in many different precincts and ecosystems around the world. An important catalyst to the growth of the Boston Seaport Innovation District was the relocation of MassChallenge, a startup accelerator with more than 110 firms and 200 mentors. This relocation was financially supported by state government and the city government. MassChallenge helped to support and guide many startups in the early development of the precinct and has since expanded to Jerusalem, London and Austin among others.

6.6 Real estate partners

Real estate partners and property developers and owners are mainly involved in the physical development of a precinct and its facilities, although increasingly they also act as service providers of funding, coaching and networking to resident firms.

They can also play a key role in building a compelling 'story' around the precinct and provide leadership and advocacy to fill gaps in the ecosystem with connectivity, density, social infrastructure and even capital.



The active role of real estate partners – I.D.E.A. and Kings Cross¹⁸⁶

San Diego's main inner city innovation precinct, the I.D.E.A. District was substantially driven by experienced developers David Malmuth and Pete Garcia of I.D.E.A. Partners. Unlike many other precincts around the world, the neighbourhood had no centralised planning model. Instead, the impetus mostly came from the developers forming effective alliances and building a common language and vision.

They successfully forged a shared vision for the area in collaboration with local government authorities and development agencies, local firms, residents, potential tenants, and other developers, and built consensus around a new set of planning principles.

The developers created a demonstration building to showcase place-making and design principles and attract further investment and new tenants to the area. The developers also adopted a 'tactical urbanism' approach through the artistic transformation of indoor and outdoor spaces to encourage people to experience their neighbourhood and community differently.

The Kings Cross innovation precinct in London is another example of a developer taking an active role in the development of a precinct. Working closely with two local governments and the community, the developer and asset manager, Argent spent many years refining the masterplan framework for the whole precinct to reflect changing market preferences.

The phased project incorporated an arts university, two schools, 1,000 affordable homes, restored heritage and numerous examples of community infrastructure.

The experience highlights the importance of real estate partners with long-term asset management, a 'total place' perspective and transparency in community engagement in fostering innovation precincts.

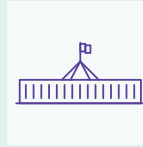
6.7 Government

Governments are instrumental in creating the pro-enterprise and pro-productivity reforms that can protect IP, reduce the regulatory time and cost burden on innovative businesses, and reduce barriers to investment that are critical for innovation precincts as well as the broader innovation economy.¹⁸⁷

The role of governments in precinct development can range from peripheral or supportive actions to instigating precincts and making significant investments. While government has an important role to play, the actual activity at the core of a precinct, its level of success, and its sustainability will ultimately be driven by the businesses, institutions, entrepreneurs and researchers present.

However, creating a successful innovation precinct is a long-term undertaking and requires sustained effort, patience and coordination. The long-term political support and commitment that governments can provide is often decisive.¹⁸⁸

Any intervention ought to be based on a comprehensive analysis of the demand and innovative activity that is proportionate to the scale of the market opportunity and the realistic potential of the individual precinct.



The active role for government – Paris-Saclay and MaRS¹⁸⁹

The French government designated the clustering of institutions in Paris-Saclay as one of national interest (opération d'Intérêt national, or OIN) and injected an initial €2bn of public investment, while a larger metropolitan rail project was simultaneously agreed to connect the innovation precinct to key locations in the region. The government's Grand Paris Act then created a Development Authority to drive and coordinate.

The Development Authority acts as the developer for joint development zones, partner to the universities, and adviser to investors. Additionally, the government has incentivised the local governments involved in the precinct to form soft collaborative governance structures. Over time, other partners in the precinct, including the universities and chambers of commerce, have taken a stronger leadership role.

This example illustrates the way that governments may need to take leadership roles, support land redevelopment and engage in enabling activities to make the precinct business-friendly and investor-ready.

Government can also anchor a second cycle of precinct growth and take a longer term view, particularly when there are additional public benefits. In Toronto, the rapid success of the first phase of the MaRS Discovery District led the Ontario provincial government to support the development of a second phase by moving into the Toronto laboratory of Public Health Ontario. The intention was to provide an anchor to the new tower while also making the public health system more responsive in light of the SARS crisis, and provide the public institution with access to a world-class health research community in the precinct.

At the same time, the province also launched a new Institute of Cancer Research in the precinct. Following the financial challenges of 2008, the province issued a loan and assumed many of the risks as developer until the new tower became over-subscribed in 2015. This illustrates the value of government patience and investment in a long-term vision for a precinct and region's future economy and shows that government is often a primary investor in the R&D that is commercialised in precincts.

6.7.1

Australian Government

The Australian Government plays an important role in fostering an environment that encourages innovation across the Australian economy. It does this through a range of national policy settings and investments such as business regulation, labour and taxation laws, skilled migration programs, communications, transport, power and other infrastructure, and support for higher education and research.

These policies can help attract and retain high-value firms and skilled workers, incentivise research institutions to shift from research and development to commercialisation and partnering with state governments to address infrastructure deficits.

6.7.2

Local governments

The role played by local governments in innovation precinct development is typically through land use planning, local economic policies and programs, engaging with stakeholders and the community, and activating its assets as a landowner. It has significant influence on the local amenities, including the quality of the public domain and open spaces, walkability and local services. In many successful international precincts, including Herzliya in Tel Aviv, sustained support and leadership from a local government has been essential to ensure a precinct becomes competitive and remains relevant through the cycles.

Local governments can also convene key stakeholders to exchange knowledge and ideas to ensure that local leaders feel ownership and investment in a credible plan they have helped develop. For example, City of Parramatta Council is a member of the Westmead Alliance, which was formed to develop a future vision for the Westmead Health and Education Precinct, and plays a key supporting role in providing secretariat and planning services for the group.

6.7.3

NSW Government

State governments are crucial for creating a regulatory and business climate that supports firm growth and economic activity. Industry, purchasing and other government programs can directly support emerging and established companies to foster their growth and international competitiveness.

The NSW Government can help to build the vibrancy and liveability of a place. It can work to ensure precincts are anchored in the community, leverage other infrastructure investments and do not create or exacerbate any local socioeconomic inequality. It can do this through supportive, coordinated land use policies, investment in and delivery of cultural infrastructure, transport, universities, hospitals, research and scientific facilities, and effective coordination across government department portfolios.

The NSW Government plays a critical role in facilitating inter-agency and inter-government collaboration, and can also participate in precinct governance and coordination directly as convenors and facilitators.

The Greater Sydney Commission's collaboration areas is an example of this. Collaboration areas are a place-based, multi-stakeholder approach to solving complex urban challenges over a 12-month period.

Strong leadership and political commitment can help to promote and market NSW innovation precincts internationally and provide them with valuable credibility and exposure to potential investors. The NSW Government can assist in bringing stakeholders together to assess opportunities and foster collaboration, as well as attend events.

The NSW Government can also directly utilise its land ownership and leverage investments in significant assets and infrastructure projects. There is a leadership role for government, particularly when making catalytic public investments that have the potential to change the innovation landscape. These include the development of major facilities, such as those at the Westmead Health and Education Precinct and Western Sydney Airport. A proactive approach to identifying key success factors and priority actions, coordinating government programs and working with stakeholders all help efforts to drive the development of a successful innovation precinct. Similarly, the NSW Government can consider how its existing assets can be used to support and enhance place-based innovation.

Government support for individual precincts ought to be assessed on a case-by-case basis, with appropriate levels of investment and involvement that take full account of the features and level of maturity of the precinct. These investments should be relative to the market opportunity, the economic and other benefits provided to the precinct and surrounding areas, and the net benefit for the NSW community.

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PUB18/371

