



CITIE



CITY INITIATIVES *for*
TECHNOLOGY, INNOVATION
and **ENTREPRENEURSHIP**



*The Scotland
Analysis*

September 2016



Nesta...

CITIE

CITIE is the product of a partnership between Nesta, Accenture and the Future Cities Catapult under CITIE.

Index. It was developed from an original concept created by John Gibson, former Director of Government Innovation at Nesta, and Greg Marsh, Co-founder and CEO of onefinestay.

www.citie.org

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FOREWORD

Jamie Coleman
Managing Director, Codebase, Edinburgh

This CITIE Scotland report comes at an important time in the history of cities and how they respond to digital transformation.

Cities work because they are organic beasts, surviving or dying off in an evolutionary manner. We are the beneficiaries of the combined human efforts to build communities, lives and businesses over generations.

Successful cities are bottom up, not top down. But there are important exceptions. Since ancient times, major infrastructure such as sewerage have been collective, large-scale initiatives. The trick therefore is to create large-scale infrastructure and then create an environment which allows people to do the rest.

In reality, this is the mathematics of clouds not clocks. These complex interactions increase exponentially as cities increase in size and we are in the middle of both the huge growth of successful cities and the death of unsuccessful ones.

As software and the Internet penetrate every area of life we see the emergence of smart city initiatives. We

can now gather information from transport, energy use, healthcare, property, refuse and more. We can use this data to better understand our cities and build new means of helping the population.

Software is now at the heart of all business growth and the recommendations within this report must be understood and acted upon if Scottish cities are to compete globally. We have all of the ingredients to build successful tech ecosystems and smart cities but these must be brought together to build success. The data is clear that business support must be delivered by peers rather than legacy services and structures.

Cities can act as the glue to bring people and organisations together based on open data, soft landing sites for companies, exposure for local success, suitable infrastructure including superfast broadband provision, focus on digital skills and more. We have a golden opportunity to create environments which encourage innovation and disruptive business models to grow. This will need to be driven by best practise in promoting enterprise and regeneration.

So what are we waiting for... Lets go!

EXECUTIVE SUMMARY

The CITIE Scotland Analysis comes at a pivotal time for the country's seven major cities, Aberdeen, Dundee, Edinburgh, Glasgow, Inverness, Perth, and Stirling, which together account for a third of Scotland's total population. In the last year alone, three of the seven cities, Aberdeen, Edinburgh, and Inverness, have negotiated historic City Deals, collectively worth over £1.5 billion¹) that will accelerate local growth over the coming decades.

As a group, Scotland's seven cities have also embarked on a collaborative smart city initiative, the '8th City' project, to develop new capabilities, technologies, and processes that will enable more intelligent, sustainable, and vibrant local economies. The Scottish Cities Alliance secured £10 million of ERDF funding for Scotland's 8th City – The Smart City programme which, once match funded, will see £24 million invested to make Scotland's cities smarter, using technologies to transform the delivery of city services.

Innovation and entrepreneurship have never been more crucial qualities in helping secure the long-term sustainable prosperity of Scottish cities, in

creating grass roots local employment opportunities, in providing a fertile innovation ground that attracts big international business, for acting as an idea generation pool to help local government solve some of its most complex urban challenges.

While the CITIE Scotland Analysis reveals good average performance, as a result of these major investments and initiatives, it is expected that Scottish cities could improve significantly in the near future, especially in the Leadership and Infrastructure dimensions.

Scotland's biggest cities, Glasgow and Edinburgh, already display performance rivalling that of leading cities from the CITIE global analysis, including places like Paris and Tel Aviv. And while smaller cities, indeed the smallest analysed using the CITIE Framework, expectedly register lower performance, they also punch above their weight. Good performance in both big and small cities is also underpinned by a number of important national initiatives related to digital infrastructure, skill-building, procurement and other policy areas. However, it is only if these major investments are made in parallel with smart policy tweaks that are mindful of the start-up and innovation ecosystem, we will realise an important multiplier effect that can set the cities on a path towards enduring prosperity.

Section one: **An introduction CITIE**

This section of the report explains the CITIE framework. The CITIE framework is a diagnostic tool that captures over 35 individual data points per city region. This is supplemented with qualitative data from interviews, to generate a snapshot of the areas of relative strength and weakness in a city region’s capabilities for stimulating innovation and entrepreneurship. These capabilities are organised into nine distinct roles the city can play, as a Customer, for example, of innovation within their procurement practices, or as a Host of innovation, using their physical spaces. It is our aspiration that the framework helps city governments to recognise where they are excelling and where they could benefit from adopting best practices from other global cities.

Section two: **Scotland cities’ performance and recommendations**

Within *CITIE: The Scotland Analysis* the team worked closely with multidisciplinary practitioners, to go beyond the analysis of the current perspective, to set out 13 definitive and actionable recommendations to the cities that will support them to accelerate their support for innovation and entrepreneurship, and compete with the global leaders.

Some of the key recommendations set out below, indicate where the Scottish cities, are collectively performing below average, or have the opportunity to collaborate in the development of solutions and make a step change in performance.



DATAVORE
Establish Offices of Data Analytics



ADVOCATE
Develop best practice soft-landing packages for business relocating to Scottish cities



DIGITAL GOVERNOR
Experiment with open-source citizen engagement tools



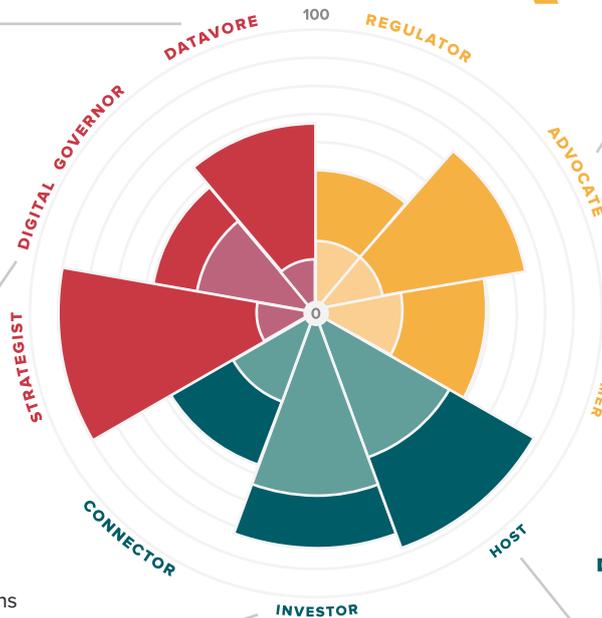
CUSTOMER
Design a Scottish cities challenge prize series



INVESTOR
Support venture capital trade missions to connect local start-ups to funding



HOST
Engage in ecosystem matchmaking to complement hard infrastructure investments



Maximum and minimum CITIE profile of the Scotland cities and highlighted recommendations

13 RECOMMENDATIONS TO THE SCOTTISH CITIES

RECOMMENDATION 1: **Undertake collective analysis of emerging business models and develop a 'play book' for Scottish cities**

RECOMMENDATION 2: **Develop best practice soft-landing packages for business relocating to Scottish cities**

RECOMMENDATION 3: **Ensure start-ups and SMEs are represented on trade missions**

RECOMMENDATION 4: **Design a Scottish cities challenge prize series**

RECOMMENDATION 5: **Engage in ecosystem matchmaking to complement hard infrastructure investments**

RECOMMENDATION 6: **Support venture capital trade missions to connect local start-ups to funding**

RECOMMENDATION 7: **Establish city-wide IoT platforms to stimulate digital infrastructure innovation**

RECOMMENDATION 8: **Ensure success of transformative digital and smart city strategies through dedicated teams and champions**

RECOMMENDATION 9: **Open-source strategies to promote regional learning and innovation**

RECOMMENDATION 10: **Experiment with open source citizen engagement tools**

RECOMMENDATION 11: **Engage citizen and city employees to generate real-time insights**

RECOMMENDATION 12: **Establish Offices of Data Analytics**

RECOMMENDATION 13: **Make all city procurement contracts 'Open by Default'**

Section three: Analysis of the cities

This section provides the geographic lens, setting out for each city, their individual performance against the CITIE framework, key strengths, promising practices, and priority areas for improvement.

CITIE: The Scotland Analysis shows leading examples in different domains, for example, in Host with Perth's Angel Share programme, to Investor and Dundee's Dare School Team Challenge for digital game development, and Glasgow's Smart City Observatory in Datavore.

Within each city region, the report pulls out two potential areas for improvement and refers to relevant global best practice from which we hope the city regions draw inspiration.

The objective of the report is to provide a pragmatic diagnostic and offer city leaders with actionable insight, which, for limited financial investment, can yield significant positive improvement in their ability to attract and retain the most sought-after entrepreneurial talent.

Taken together, Scottish cities' performance compares with many of the 40 global leading cities from the 2015 CITIE analysis. Compared to international peers from previous CITIE analyses, Scottish cities as a group outpace European counterparts in six of CITIE's nine policy roles, with clear strengths in the Openness and Leadership dimensions. The reverse is true for North American peers, which Scottish cities trail on all but one of the nine roles. Still, relative strength in the Leadership dimension reflects Scotland's evident and growing commitment to augmenting cities' digital capabilities, capacity to engage citizens and businesses in decision-making, and, skills to develop better policy insights using data.

By cities actioning policy tweaks and amplifying existing initiatives on an individual basis, and by recognising where important opportunities exist for collaboration across the region, Scottish cities have the potential to take the lead in their innovation capability.

“ We welcome the CITIE Scotland report which highlights that Scotland's cities as a group are performing well and even outperforming our European peers across six of CITIE's nine policy roles including clear strengths in openness and leadership.

The report highlights that digital technologies have been key to unlocking faster economic growth by 2.3 per cent in real terms, and this underlines the vital role the Alliances' Smart Cities Scotland Programme, including the 'Scotland's eighth City – the Smart City' project, will play in developing the new capabilities, technologies and processes that will drive the future success of Scotland's city economies.

I am delighted that the research shows that Scotland's seven cities

are at the forefront of this hi-tech agenda. Between them, Scotland's cities are rivalling cities such as Paris and Tel Aviv and punching above their collective weight in terms of innovation. This provides a strong basis for the cities to build on existing activity and work together to deliver our Smart Cities Scotland ambition to be world leading in this field.

The Alliance, which is the collaboration between the seven cities and the Scottish Government, will work together to take forward some of the key recommendations of the report which are pivotal to securing Scotland's cities ongoing success to the benefit of its citizens, businesses and Scotland. ”

Councillor Andrew Burns
Chair of the Scottish Cities Alliance

Section one: AN INTRODUCTION TO THE CITIE SCOTLAND ANALYSIS

The CITIE Scotland Analysis comes at a pivotal time for the country's seven major cities – Aberdeen, Dundee, Edinburgh, Glasgow, Inverness, Perth, and Stirling – which together account for a third of Scotland's total population.

In the last year, three of the seven cities, Aberdeen, Edinburgh, and Inverness, have negotiated historic City Deals, collectively worth over £1.5 billion²) that will accelerate local growth over the coming decades. Glasgow has recently completed delivering on a £24 million grant funded project to build the UK's first 'Future City,' while Stirling has approved a large-scale development framework to support a range of infrastructure and programmatic investments that will augment digital and innovative capacity. In July of 2016, Perth also approved a £500 million investment in infrastructure, jobs and leisure. Over the past several years, Dundee has been implementing an ambitious waterfront revitalisation strategy that is radically transforming the innovative potential of its region.

As a group, Scotland's seven cities have also embarked on a collaborative smart city initiative, the '8th City' project, to develop new capabilities, technologies, and processes that will enable more intelligent, sustainable, and vibrant local economies. The Scottish Cities Alliance secured £10 million of ERDF funding for Scotland's 8th City – The Smart City programme which, once match funded, will see £24 million invested to make Scotland's cities smarter, using technologies to accelerate and transform the delivery of city services.

Figure 1: City regions assessed



So while the CITIE Scotland Analysis reveals good average performance, as a result of these major investments and initiatives, it is expected that Scottish cities could improve significantly in the near future, especially in the Leadership and Infrastructure dimensions (see the following sub-section for a full explanation of the CITIE framework). The CITIE Analysis further indicates that as a group, Scottish Cities are outpacing European peers, which they lead in six of nine policy areas measured by the Framework.

Scotland's biggest cities, Glasgow and Edinburgh, already display performance rivalling that of leading cities from the CITIE global analysis, including places like Paris and Tel Aviv. And while smaller cities, indeed the smallest analysed using the CITIE Framework, expectedly register lower

performance, they also punch above their weight. Good performance in both big and small cities is also underpinned by a number of important national initiatives related to digital infrastructure, skill-building, procurement and other policy areas.

WHY DOES INNOVATION AND ENTREPRENEURSHIP MATTER TO CITIES?

- Growth is disproportionately driven by young, high-growth companies.³ Between 2010 and 2013 high-growth companies in the UK accounted for just 1 per cent of all job creating firms, but 18 per cent of the jobs created.⁴
- Digital technologies have been shown to unlock faster economic growth, by 2.3 per cent in real terms.⁵
- Thirty-six per cent of UK jobs are at risk of automation, innovative companies are creating the skills and ideas that cities will need in order to compete in an increasingly digital global economy.⁶
- Leading cities are increasingly engaging with outside ideas and innovators to improve services, develop new skills, and jointly create solutions to complex problems.
- The digital technology industry in Scotland is experiencing exceptional growth – 68 per cent of businesses achieved sales growth in 2015. Over the next five years there is potential for 70,000 more jobs to be created by the industry.⁷

Evidently, the local context and range of performance across cities means that each will need to follow an individual path to ensure innovation and entrepreneurship thrive. However, there remain a number of areas where cities face similar challenges or could benefit from greater collaboration.

In Section two, the CITIE Scotland Analysis assesses collective performance and sets out 13 recommendations applicable to all cities. A number of the recommendations have been inspired by the recent CITIE Northern Powerhouse Analysis,

which also analysed a region on the cusp of major economic and constitutional change.

Section three provides a deeper-dive of local policy environments, and identifies promising practices as well as specific priority improvement areas. Given the current state of transformation across cities, the CITIE Scotland Analysis therefore serves as a timely resource for policymakers seeking to catalyse innovation and entrepreneurship in their regions and across Scotland.

What is CITIE?

City Initiatives for Technology, Innovation and Entrepreneurship (CITIE) is the product of a partnership between Nesta, Accenture and the Future Cities Catapult.

CITIE provides city policymakers with a resource to support the development of policy initiatives to catalyse innovation and entrepreneurship in cities.

CITIE comprises three main components (see Figure 2):

1. A framework for understanding how policy in nine key areas at the city level can be used to support innovation and entrepreneurship (see Figure 3).
2. A diagnostic tool that allows cities to understand how they perform against this framework relative to over 50 global cities.

3. A range of examples and case studies that shine a light on best practice from around the world.

CITIE is designed to be used by policymakers in cities. To the greatest extent possible, it focuses on those policy levers that city governments have at their disposal, although this inevitably varies from place to place.

Explore the framework, diagnostic tool and case studies from the previous cities that were assessed at: www.citie.org and see the Appendix for further detail on the research methodology.

Figure 2: CITIE resources



CITIE FRAMEWORK

An assessment of 50 global cities against a framework of policy levers city governments can use to support innovation and entrepreneurship



DIAGNOSTIC TOOL

An online tool to allow city governments to explore their performance and assess how they compare with their peers



CASE STUDIES

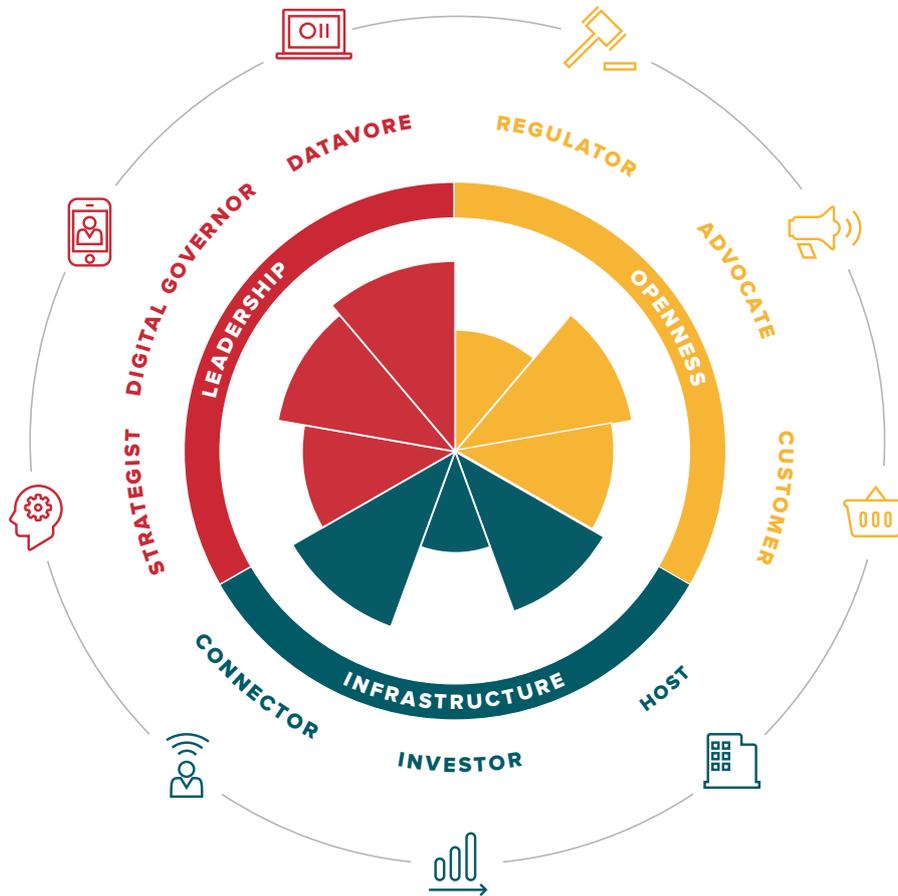
A series of case studies for cities to learn about global best practice

EXPLAINING THE CITIE PROFILE

A city region government's performance is represented by its CITIE profile, and performance against each of the nine policy roles. There is no single pathway to success. The CITIE profile captures

the relative strengths and weaknesses of a city region government's policy environment to support innovation and entrepreneurship, and provides a tool to understand priority areas for development, highlighting best practice from around the world.

Figure 3: The CITIE Framework



OPENNESS	INFRASTRUCTURE	LEADERSHIP
<p>How open is the city to new ideas and businesses?</p>	<p>How does the city optimise its infrastructure for high-growth new businesses?</p>	<p>How does the city build innovation into its own activities?</p>
<p>REGULATOR How does the city regulate business models in a way that allows for disruptive entry?</p>	<p>HOST How does the city use space to create opportunities for high-growth companies?</p>	<p>STRATEGIST Has the city set a clear direction and built the internal capability required to support innovation?</p>
<p>ADVOCATE How does the city promote itself as an innovative hub and its new business community to the outside world?</p>	<p>INVESTOR How does the city invest in the skills and businesses required for innovation?</p>	<p>DIGITAL GOVERNOR How does the city use digital channels to foster high-quality, low-friction engagement with citizens?</p>
<p>CUSTOMER Is procurement accessible to small businesses, and does it actively seek out innovation?</p>	<p>CONNECTOR How does the city facilitate physical and digital connectivity?</p>	<p>DATAVORE How does the city use data to optimise services and provide the raw material for innovation?</p>

Section two: SCOTLAND PERFORMANCE AND RECOMMENDATIONS

2.1 PERFORMANCE AGAINST THE CITIE FRAMEWORK

The CITIE Framework shows very strong performance by the country’s two biggest cities, putting them among some of the global leaders that have so far been assessed in the global CITIE analysis. Aberdeen, the third largest city, puts in a well-rounded performance across CITIE’s three policy dimensions, but still trails the larger cities, both twice its size, by a considerable margin.

Not unexpectedly, cities with smaller populations (under 150,000) perform less well. However, they still demonstrate elements of best practice and are actively setting the stage for stronger innovation ecosystems. Furthermore, they already punch above their weight. When taken as a group (and including Aberdeen) their average performance still rivals that of much bigger European peers (see Figure 7).

Compared to international peers from previous CITIE analyses, Scottish cities as a group outpace European counterparts in six of CITIE’s nine policy roles (see Figure 6), with clear strengths in the Openness and Leadership dimensions. The reverse is true for North American peers, which Scottish cities trail on all but one of the nine roles (see Figure 8). Still, relative strength in the Leadership dimension reflects Scotland’s evident and growing commitment to augmenting cities’ digital capabilities, capacity to engage citizens and businesses in decision-making, and, skills to develop better policy insights using data.

The following section analyses Scottish cities’ performance in more detail, by each CITIE role, and sets out 13 overarching recommendations, drawing on leading practice in Scotland and globally.

Figure 4: Average CITIE profile of Scottish cities

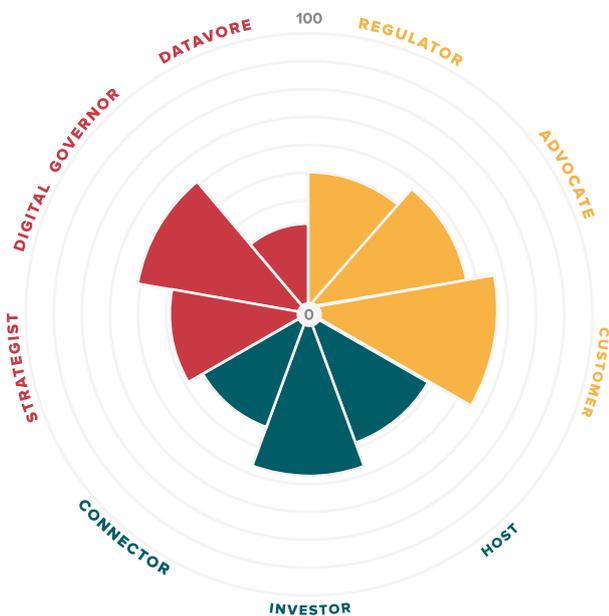


Figure 5: Maximum and minimum CITIE profile of Scottish cities

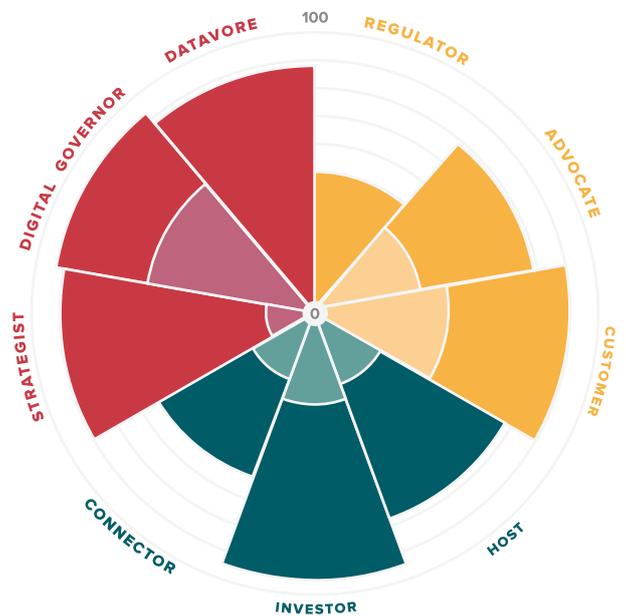
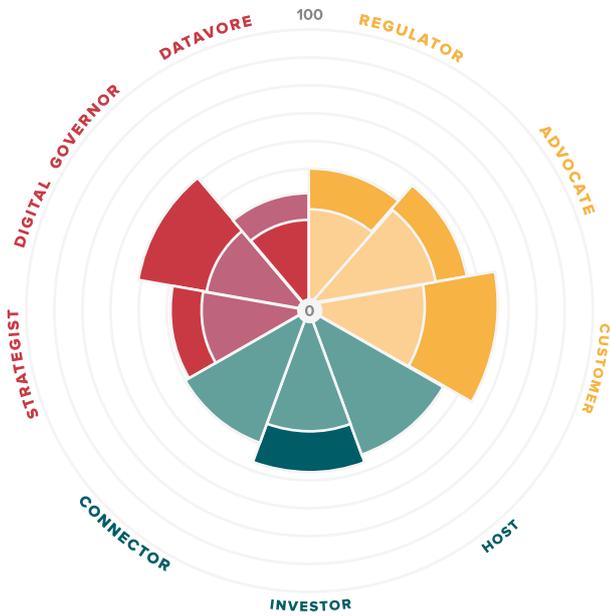
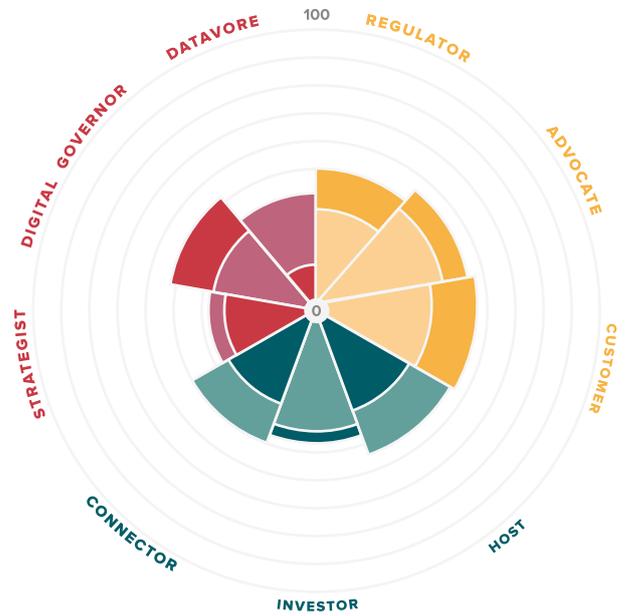


Figure 6: Scottish cities vs. European cities*



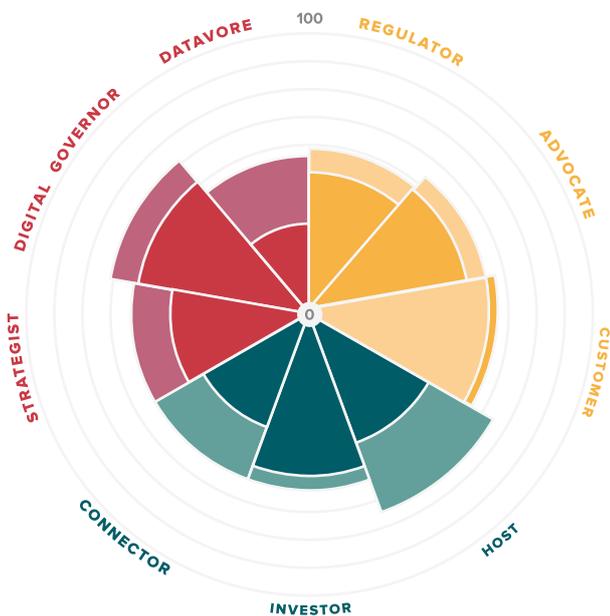
*The European group of cities comprises Amsterdam, Barcelona, Berlin, Brussels, Cardiff City Region, Copenhagen, Geneva, Helsinki, Hull City Region, Liverpool City Region, London, Manchester City Region, Moscow, North East Combined Authority, Paris, Prague, Sheffield Combined Authority, Tallinn, West Yorkshire Combined Authority, Vienna and Zürich

Figure 7: Smallest Scottish cities vs. European cities**



**Compares Aberdeen, Dundee, Inverness, Perth and Stirling to the European peer group.

Figure 8: Scottish cities vs. North American cities***



***The North American group of cities comprises Boston, Chicago, Los Angeles, New York City, San Francisco, Seattle, Toronto and Vancouver.

Key for figures 6, 7 and 8: The average performance of the Scottish cities is represented by the darker shades, and European and North American cities by the lighter shades. Where there is only a lighter or darker segment showing, this means that the scores are equal.

2.2 ANALYSIS BY CITIE ROLE AND RECOMMENDATIONS



OPENNESS: REGULATOR

Cities in Scotland have taken a consistently accommodating approach to disruptive business models such as ride-sharing and short-term lets, which have faced little to no challenge from local authorities.

Both Edinburgh and Glasgow have granted Uber a licence to operate as a private hire service, while homes rented through Airbnb number in the thousands across the country.

In the last couple of years, UK legislation on ride-sharing and short-term lets has greatly clarified what was previously a more contentious legal area for local authorities.⁸ Still, with innovations like autonomous

vehicles or blockchain promising ongoing disruption, city governments that proactively engage with the opportunities and challenges presented by emerging technologies and business models will be more likely to harness their potential benefits, while also mitigating against possible risks.

Scottish cities could gain from taking action together in this area. For example, mayors from more than 20 cities around the world have recently agreed to develop a joint approach to the challenges and opportunities raised by Airbnb and Uber, which will boost their individual influence over the sharing economy's biggest players and lead to policies that support innovation and social and economic benefit, while limiting unfair advantages.⁹ Scottish cities could benefit from deploying a similar approach.

RECOMMENDATION 1: Undertake collective analysis of emerging business models and develop a 'play book' for Scottish cities

Scottish cities, potentially through the Scottish Cities Alliance (SCA) or the Convention of Scottish Local Authorities (COSLA), should conduct periodic reviews of emerging business models and future technologies to understand where regulatory barriers or gaps might limit innovation or create

unfair advantage in established markets. A joint play book would lead to a more consistent and predictable environment for innovation (in particular in cities where there has been limited market disruption) and strengthen cities' ability to influence better policy outcomes.



OPENNESS: ADVOCATE

As a group, whilst the cities demonstrated only average performance, good practice was evident across individual cities.

Edinburgh was the strongest Advocate in this analysis, playing an active role in hosting major international events related to technology and innovation.

Its own annual Turing Festival as well as the Design It Build It conference this past spring, put the local digital economy front-and-centre on the world stage. Inverness, through the Discover Digital for SME showcase hosted by Highlands and Islands Enterprise, has equally managed to attract tech giants like Google, IBM and Microsoft to its doorstep.

Examples of promising but relatively small-scale support for start-ups and SMEs to build market share outside of Scotland are also present. In particular, Edinburgh's new incubator scheme with Shenzhen, a reciprocal incubation programme between the

two cities, provides local start-ups with a unique opportunity to test and develop new products in an important emerging market. In Dundee, local SMEs have access to a small but valuable grant that helps them take their first steps in internationalising their customer base (see Section 3.2). A similar grant is available in Inverness, as well. Overall however, though cities tend to provide various kinds of financial and advisory export assistance, for the most part these are rarely targeted to SMEs or entrepreneurs.

From the smallest to the biggest, Scottish cities are uniformly good at selling themselves through well-designed trade and investment platforms. The SCA website also provides a single-window view into various investment opportunities across the seven cities, making it easy for investors to assess local and national contexts. However, a key area of improvement for most cities lies in developing more comprehensive 'soft-landing' packages, the bundle of services and incentives offered to businesses relocating to their cities.

RECOMMENDATION 2: Develop best practice soft-landing packages for business relocating to Scottish cities

Most cities in this analysis offer at least some level of basic support to new business arrivals, such as property search assistance or introductions to local networks. In addition to these services, cities could

boost their performance by emulating Berlin's offer of free office space and housing for a limited time, to remove key barriers to relocation and facilitate a smooth transition.

RECOMMENDATION 3: Ensure start-ups and SMEs are represented on trade missions

SMEs make up more than 99 per cent of all business in Scotland and more than 50 per cent of the employment base.¹⁰ However, SMEs in Scotland are selling less overseas and the number of firms exporting is also on the decline.¹¹ Export is key for business growth, and so cities should be enabled

to work closely with counterparts in UK Trade and Investment, Scottish Council for Development and Investment and Scotland Europa to ensure SMEs and early-stage start-ups receive sufficient exposure on trade missions and trade visits from overseas delegations.



OPENNESS: CUSTOMER

A strong national procurement agenda significantly contributes to Scottish cities' good performance in the Customer role. Initiatives including the Supplier Development Programme, which helps more types of firms and SMEs do business with government, the single national procurement portal for all public sector tenders, and new rules that allow suppliers to self-declare on relevant criteria rather than providing evidence up-front, make it easier for businesses to access valuable city contracts across Scotland.

In addition to these nationally-led initiatives, better performing cities also tend to have highly visible policy commitments that highlight the importance of connecting SMEs to procurement opportunities, though few have publicly stated targets for increasing the proportion of bids received from or contracts issued to SMEs. Setting and communicating these types of targets sends a strong signal to the small business community that cities are committed to opening up procurement to support SME development.

Additionally, the best performing cities in this role, including Aberdeen, Glasgow, and Edinburgh use procurement as a lever to encourage new ideas and problem solve, through hackathons and challenge-led initiatives. These techniques are a relatively cost-effective way to generate viable ideas and do not require significant resources from council to run at a small scale. However, they often represent a significant departure from the status-quo and greater risk, therefore requiring strong support from top leadership to implement.

For example, Edinburgh Apps, championed by the city's digital manager, challenges participants over the course of one month to create smart phone applications that improve the urban experience. It rewards winners with business supports and the chance to work with the council to further develop their product. Smaller cities are not far behind. As part of its smart city strategy, Stirling is looking to introduce a regular hackathon series, while Perth aims to use Hackathons to tackle local challenges and develop innovative products and services.

RECOMMENDATION 4: Design a Scottish cities challenge prize series

Build on the momentum and learning of existing competitions and emerging smart city strategies to develop a national challenge prize series. Challenge-led procurement prioritises innovation and solutions over a heavily rules-bound tendering process, and supports fledgling entrepreneurs. A

challenge prize led by the seven cities would create a larger and more attractive market for innovators, while also reducing risk and cost for each city. Cities could each lead different strands, such as environment, well-being, mobility, and other areas where they face common challenges.



INFRASTRUCTURE: HOST

The larger cities of Glasgow and Edinburgh benefit from numerous co-working and incubator spaces, which, in a number of cases, are supported directly by local councils through funding or provision of space.

In Aberdeen too, entrepreneurs and innovators are increasingly gaining access to more spaces like Elevator's Centre for Entrepreneurship or the ABV Venture Zone, where they receive support for new ideas in collaborative, high-tech environments. CodeBase, the largest tech incubator in the UK, has also voiced its intentions to expand beyond Edinburgh, into Glasgow, Aberdeen and Dundee.¹²

Access to incubators, accelerators, and co-working spaces is in shorter supply in Scotland's smaller cities, but councils in these places have recognised the gap in physical space for innovation are making significant investment to close it.

This includes projects like Inverness Campus, an emerging innovation district for the Highlands, the planned Business Innovation and Creative Industries Hub in Perth, Dundee's District 10 and Vision Building, and Stirling's Digital Hub, all of which will host a combination of co-working spaces, training academies, labs, incubation services and other facilities dedicated to collaboration and experimentation. When fully implemented, these projects should see the cities' performance as Host increase significantly.

While capital investments will remain a priority in most places, cities could also improve performance by engaging in greater ecosystem matchmaking. Programmes like Perth's Angel's Share, which connects local entrepreneurs to investors (see Section 3.6) are uncommon in Scotland, but could be replicated with relative ease by others to increase visibility of local entrepreneurs and maximise the impact of existing supports. Angel's Share has attracted over £1 million of investment from private investors since 2012, enabling leveraging of further public sector and bank funding.

RECOMMENDATION 5: Engage in ecosystem matchmaking to complement hard infrastructure investments

Scottish cities are investing in critical innovation infrastructure, but should also consider how to better connect local start-ups to incubators, investors, and each other. Appointing an Entrepreneur in Residence, developing a digital

map of all local start-ups, or adapting programmes like Angel's Share to the city or regional context, are different ways cities can improve visibility of local entrepreneurs and accelerate innovation growth.



INFRASTRUCTURE: INVESTOR

Cities in Scotland vary considerably in performance as Investors, a role that assesses support for both advanced skills training and access to finance. However, as with the Customer role, cities benefit from a number of leading-edge national skills initiatives that provide a uniform boost for all.

This includes the roll-out of CoderDojo, a popular coding club for kids, across Scotland. Skills Development Scotland has also spearheaded the Modern Apprenticeship programme, which promotes the uptake of 25,000 apprenticeships in areas including ICT and Data Analytics, through partnerships with local Sector Skills Councils.¹³ The first digital skills academy in Scotland, located in Edinburgh, is also supported by the Scottish Government and has plans for national expansion.

Stronger performance in places like Glasgow is supported by additional initiatives, including the city's start-up academy for youth, delivered in partnership

with Rookie Oven, a local enterprise centre (see Section 3.4). Both Edinburgh and Aberdeen have also leveraged new ICT contracts to create dozens of technology apprenticeships and support new suppliers in delivering digital training courses to school-aged children (see Sections 3.1 and 3.3). On top of building a skilled workforce of the future, these programmes also contribute to shaping a local culture of entrepreneurship.

In terms of access to finance, better performing cities tend to possess clear and accessible information on funding opportunities along with city-specific funds that target local start-ups and SMEs. However, access to capital overall remains a key concern for business across Scotland, which lacks a robust Venture Capital (VC) landscape particularly for start-ups.¹⁴ Furthermore, with many city funds for SMEs being of only limited financial value and facing uncertain futures as a result of ongoing budgetary constraints, programmes like Perth's Angel's Share (see above), combined with incubation and accelerator support, could play a significant role in building a sustainable ecosystem for local entrepreneurship.

RECOMMENDATION 6: Support venture capital trade missions to connect local start-ups to funding

Working with local incubators, cities could support 'trade missions' to London and other destinations with deeper VC and angel networks to help local start-ups access funding. The scheme should also invite delegations of VCs and angels to the Scottish cities to increase visibility of local entrepreneurs

and encourage them to set up regional offices. With many smaller cities now investing in business incubation facilities and programmes, there is an opportunity to introduce VC trade missions as a core offer from the start, and even develop a regional network to attract more capital to Scotland.



INFRASTRUCTURE: CONNECTOR

Better integration across all modes of transport and service providers is a key measure of good physical connectivity. Since 2012, local authorities across the country have been working with Transport Scotland on a smart payment model to connect the various bus, rail, ferry, subway and tram networks. The National Entitlement Card, a smart card for concessionary travellers, has already been put in place, with leadership from Dundee City council and other partners including National Express and the Scottish Cities Alliance.

In time, this transformational project will significantly boost the seven cities' performance in the Connector role, in which they collectively demonstrate lower to average performance. Still, isolated examples of leading practice can be identified. Notably, Edinburgh's inhabitants have enjoyed the benefits of integrated electronic ticketing through the citysmart card (modelled on London's Oyster card) since 2014. Glasgow is not far behind with its smart ticket for subways. Glasgow's residents and visitors, like those in Stirling, further benefit from widespread bike sharing networks that make it easier to move around

each city. Inverness is also trialling an e-bike sharing scheme.

In terms of digital connectivity, as a group, cities again register lower to average performance. Smaller places, in particular Inverness, Stirling, Dundee, and Perth, provide limited access to free public Wi-Fi, which is usually limited to public libraries and some public buildings. Cities are actively seeking to change this and upgrade their digital infrastructures however, as evidenced by the Inverness City Deal's plans to expand public Wi-Fi, and Perth and Dundee's plans to introduce public Wi-Fi to their city centres. Glasgow is presently the only city with comprehensive and unrestricted coverage, while Edinburgh aims to complete its city-wide Wi-Fi initiative in summer 2016. Furthermore, the cities in this analysis along with all other Scottish local authorities are investing £40 million in a massive national broadband initiative, which will deliver access to superfast fibre broadband to 95 per cent of premises nationwide by March 2018.¹⁵

The collection of these digital and physical infrastructure investments will yield higher performance in the Connector role for all cities in the near future.

RECOMMENDATION 7: Establish city-wide IoT platforms to stimulate digital infrastructure innovation

With more digital infrastructure investments on the horizon through Scotland's superfast fibre broadband programme and local smart city strategies, cities should be considering city-wide IoT platforms as a stimulus for wider digital infrastructure innovation. Because the majority of

Scottish cities are relatively small, with populations of less than 150,000, cities should also consider developing interoperability standards to make it easier for platforms to connect across boundaries and create a larger market space.



LEADERSHIP: STRATEGIST

Cities big and small are developing ambitious strategies that seek to augment digital capacity, analytics capability, and engagement with local communities.

For example, Aberdeen's Digital Place strategy will bring fundamental change to how the city uses connectivity and data with partners in the private, voluntary and academic sector to address entrenched social and economic challenges. Aberdeen, Perth, Dundee, and Stirling, are all in various stages of sophisticated open data programme redesign or development. Most city vision documents describe smarter cities, supported by digital-by-default government services and intelligent infrastructure.

Turning these ambitions into reality will necessarily require exceptional leadership and strong internal capacity. But while individuals are currently in place to lead these strategies across cities, few are in permanent roles or executive-level positions, such as Chief Information Officers (CIO) or Chief Digital Officer (CDO).

Furthermore, in places where dedicated smart or digital teams do exist, they tend to be small. Though additional capacity is delivered through the SCA's, which has invested in smart city projects across the seven cities, the constraints on internal council resources to deliver on exceptionally ambitious local programmes will remain a key challenge for small and big cities alike. Attracting and recruiting the right talent or retraining current staff to implement digital transformation is likely to be a priority for cities.

RECOMMENDATION 8: Ensure success of transformative digital and smart city strategies through dedicated teams and champions

Cities with temporary digital or smart project officers should look to formalise the roles, given the scale of proposed changes and the need for joining up an array of skills, expertise, and resources to deliver on new strategies. A group of 25 Scottish local authorities have recently put out a call for a new regional CDO¹⁶ - smaller cities in

this analysis could also consider coming together to hire an experienced CDO to oversee strategies and identify potential for collaboration and maximising investments, or seek to engage with the Improvement Service to see if this role (or the teams) could be expanded to have a pan-Scotland remit.

RECOMMENDATION 9: Open-source strategies to promote regional learning and innovation

From new digital tools, to hackathon event design or step-by-step guidance on running coding camps for young people, cities should adopt an open-by-default approach to projects and programmes that form their digital or smart city strategies. Open-

sourcing increases capacity for cities and individual departments to take on new ideas by reducing the need to build from scratch every time, and encourages greater innovation overall.



LEADERSHIP: DIGITAL GOVERNOR

Scottish cities perform consistently well in the Digital Governor role, the best collective average performance in the Leadership dimension, thanks to well-designed council websites that allow residents to easily process various payments, report issues, and manage some services through personal accounts.

As councils continue to digitise more services, user experience could be further enhanced through mobile applications that allow citizens to manage their interactions with the city on the go.

Higher scoring cities in this role, including Aberdeen, Edinburgh and Glasgow, have also taken steps to open

up their policy and decision-making processes. This includes participatory budgeting in Glasgow, Perth, and Aberdeen. The latter has already allocated £100,000 to children and youth programmes through its process. Edinburgh's Budget Challenge, which invited the public to comment on and prioritise key issues on a simple web platform, serves as another good example of open digital governance.

Furthermore these cities are moving toward enabling greater policy co-design through initiatives like Aberdeen City Lab! or Edinburgh Living Labs (see respective city section for more details), which aim to collaboratively develop data and tech-driven solutions to urban issues like congestion, sustainability and housing. Overall, however, most cities in this analysis have room to expand their role as effective Digital Governors.

RECOMMENDATION 10: Experiment with open-source citizen engagement tools

There are many off-the-shelf, open source products for citizen engagement that cities can immediately begin testing, instead of building their own with limited resources or understanding of what they hope to achieve through increased engagement. For example cities could look to the European

D-CENT project, a toolbox of direct democracy and collaborative policymaking products, based on open standards, APIs and shared identity systems, to take their first steps in digital citizen engagement or build on growing systems.



LEADERSHIP: DATAVORE

Once more, despite a low to average combined performance, there is evidence of both global best practice and investment in capacity building that is likely to yield higher performance for all cities in the Datavore role in the near future.

Glasgow, the beneficiary of a £24 million Innovate UK Future City Demonstrator grant, already shows a level of performance that places it among other leading Datavores in past CITIE analysis, such as Seoul and New York City. Importantly, the city has taken an open-source approach on a number of its Future City products and programmes (see Section 3.4), including its open data platform, which provides open license, machine-readable data, and features the latest user and developer tools including APIs and Big Data analytics technology. With a national target to open up data held by all public agencies by 2017, models like Glasgow's will be instrumental in setting a high standard and catalysing good practice across the country.

Glasgow has also invested much of its multi-million pound grant into smart infrastructure, such as intelligent street lighting and household energy sensors that is rapidly boosting the city's ability to generate and use real-time analytics. Other Scottish cities are pursuing similar capabilities, with a number of smart city strategies outlining intelligent street lighting, parking, and waste management projects. Aberdeen plans to implement a City Regional Management Platform will include a network of sensors to enable and enhance data analysis.

As an increasing number of public bodies and cities in this analysis now undertake to generate and open up more data, their leaders must also consider how vast amounts of data can be turned into actionable insights. Around the UK, places like Manchester, London and the North East are working to join up data across various city departments and public agencies to inform better policymaking. Similar capabilities will increasingly be required to drive needed public service reform across Scotland as well.

RECOMMENDATION 11: Engage citizen and city employees to generate real-time insights

In addition to planned smart infrastructure investments, cities could augment their analytics capability through lower-cost strategies that leverage ubiquitous smartphone and social media use. Cities can develop citizen apps (or adapt open-source options already available) to track

and analyse how people move around the city. For example, Boston relied on its own employees to locate potholes in the city through a driving app. Social media geo-location reports can also be scraped to identify issues and improve response time in emergencies or natural disasters.

RECOMMENDATION 12: Establish Offices of Data Analytics

Cities should put in place individual or regional Offices of Data Analytics (ODAs). The ODAs would integrate data across local public sector organisations, accelerate collaboration on data-sharing regulations and standards, develop a platform for citizens and businesses to share, buy

and sell data with the city, and work with central government to devolve datasets held at a central level. Similar approaches are being trialled in Manchester, London and the North East, and are inspired by New York's successful Mayor's Office of Data Analytics.¹⁷

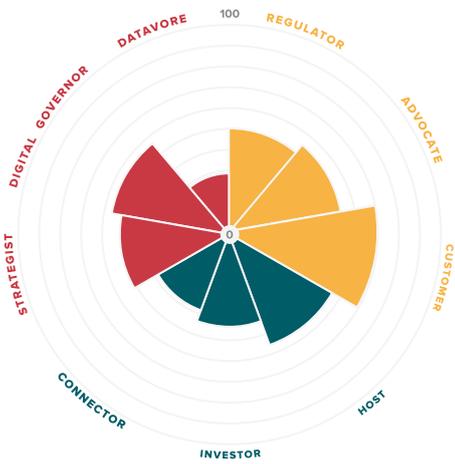
RECOMMENDATION 13: Make all city procurement contracts 'Open by Default'

By including open API's standards and data quality criteria into new public contracts, Scottish cities with ambitious smart strategies will be able to more

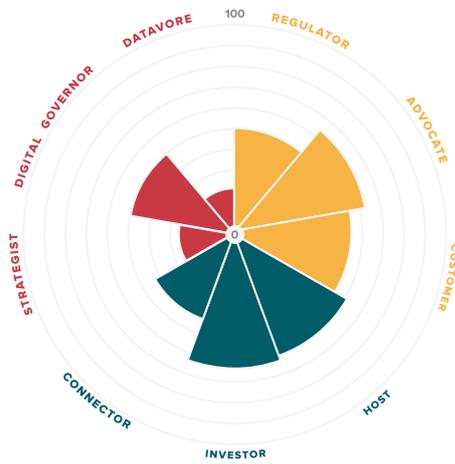
easily generate, compare, and analyse data from multiple sources, and devise better policies.

Section three: ANALYSIS OF SCOTTISH CITIES

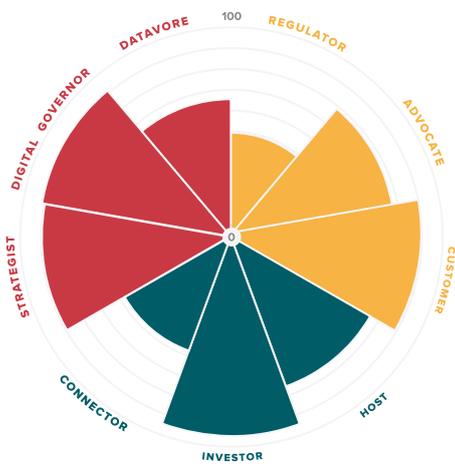
ABERDEEN



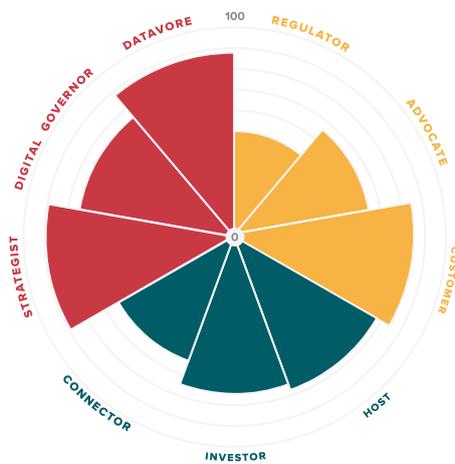
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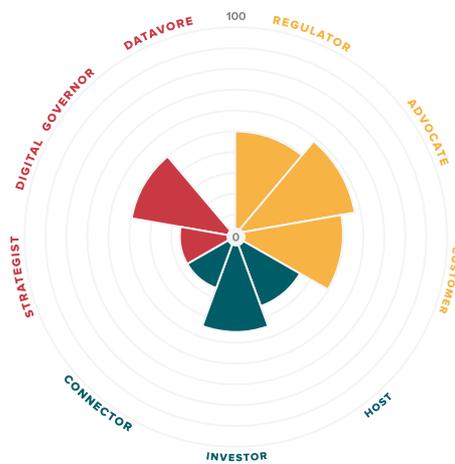
EDINBURGH



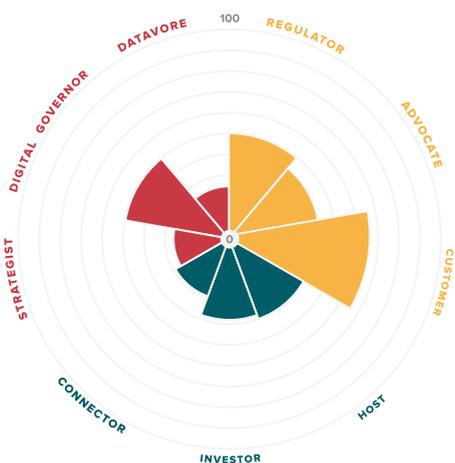
GLASGOW



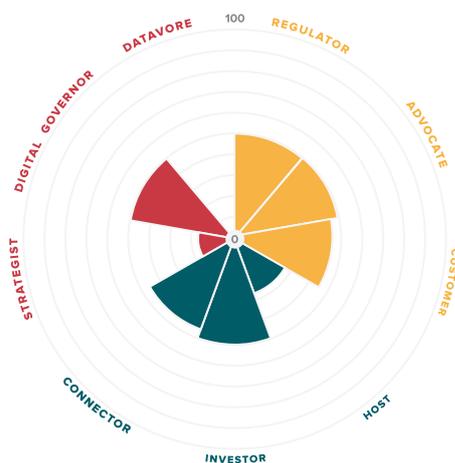
INVERNESS



PERTH



STIRLING



3.1 ABERDEEN

Aberdeen is the only Scottish city in the UK's top-ten ranking of cities according to start-up rates, placing sixth.¹⁸ Over the last five years, the city has also emerged as a top job creator for employment in creative, professional, and digital sectors.¹⁹ The city is also ranked the second for patents per 100,000 population, recording 19.7 in 2014. With a signed City Region Deal worth £250 million, which will deliver a new energy innovation centre and significant digital infrastructure investments, the city is well-positioned for the future.

Performance against the CITIE framework

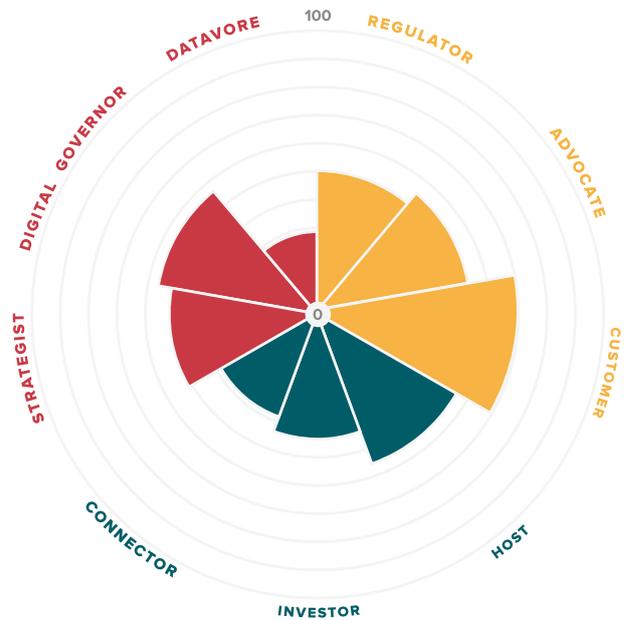
A collaborative approach to innovation underpins Aberdeen's well-rounded performance.

Aberdeen is in a dynamic phase of learning and development, which has led to a number of strong foundations and promising initiatives for the city's innovators and entrepreneurs.

Dedicated leadership is in place to take forward Aberdeen's Digital Place strategy, a programme of digital transformation across the city region, supported by investments in ultrafast fibre connectivity and free public WIFI.²⁰ A regional board led by the council and comprised of local public, voluntary, and private sector members, ensures planned investments and activities enable other regional strategies and generate value in areas such as health and transport. This collaborative approach extends to Aberdeen's current thinking on open data, which will see the implementation of a City Region Data Management Platform, delivering business intelligence, developed and managed in partnership with business and communities.

Aberdeen is also using procurement as a lever to support SMEs and innovation. Namely, the city delivers the Positive Procurement Programme, which helps local business develop capacity to successfully contract with the public sector through training and networking events. The council also actively seeks to procure and partner with companies that make broader social and economic contributions beyond contractual requirements. For example, by recently contracting the Data Centre (a local SME) to move the council's IT to a cloud-based system, Aberdeen is

Figure 9: Aberdeen's CITIE profile



also supporting the company to deliver its own digital training series to school children and, therefore, the highly skilled workforce of tomorrow.

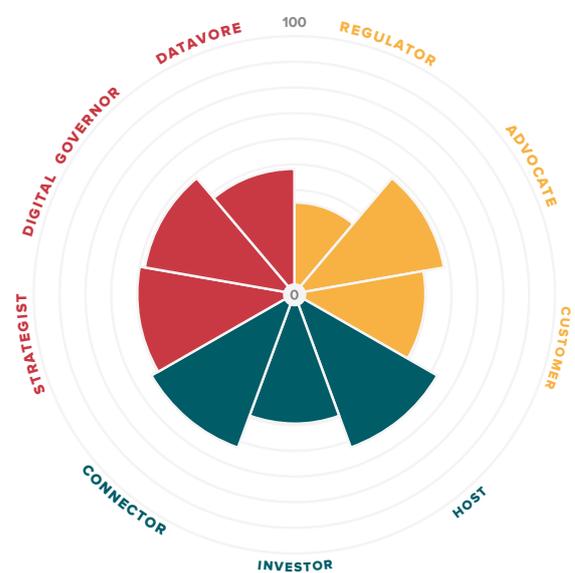
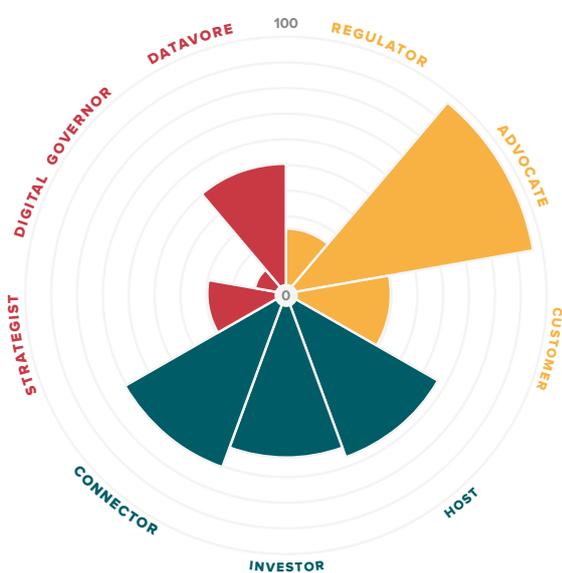
New initiatives, including participatory budgeting and the Aberdeen CityLab! also demonstrate the city's willingness to experiment with new models of citizen engagement. Aberdeen has allocated £100,000 to the participatory budgeting process, some of which has already been designated for children and youth programmes through a *Dragon's Den*-style competition.²¹ Meanwhile, the CityLab! pilot is bringing together students from the Universities of Aberdeen and Robert Gordon to work alongside council staff and partner organisations to tackle issues such as social housing through technology, with the intention of creating enduring solutions. The recently launched Open Data Institute in Aberdeen also partners with the city to host hack weekends and ideation sessions that address local issues.

Finally, the city's entrepreneurs will soon enjoy more room to grow at three new Digital Innovation Hubs. Funded by the city council and managed by Aberdeen's two universities and ELEVATOR, a regional business centre and accelerator, the hubs will offer flexible co-working arrangements, business and IT services, and commercialisation support for university spin-outs and students' companies.²²

Priority focus areas	
<p> ADVOCATE</p> <p>Become a better advocate for the region and its entrepreneurs by introducing a best-practice, soft-landing scheme for international investors, developing a city brand that emphasises the locals entrepreneurial community, and delivering greater supports for SME exports.</p> <p>International best practice Berlin provides extensive soft-landing support for businesses seeking to start out, operate and expand in the city, allowing them to try out the city for a few months at minimal cost. Operated by the Berlin Partner for Business and Technology, its Business Welcome Package, costing €4,500, provides entrepreneurs with an office, an apartment and advice on marketing, taxation and finance.</p>	<p> INVESTOR</p> <p>Make funding information easier to locate and compare. Aberdeen Council and Business Gateway sites either require registration to access a funding opportunities database or offer little information and guidance online. More comprehensive online information and user tools could help entrepreneurs quickly access and assess relevant information and reduce unnecessary administrative burdens for business and government.</p> <p>International best practice Vancouver Entrepreneur Fund raises private investment to support emerging start-ups, giving the city’s tech sector a boost as it competes for talent and investment. The Vancouver Foundation also funds the Greenest City Fund with \$2 million to support ideas generated by the community.</p>

Figure 10: Berlin CITIE profile

Figure 11: Vancouver CITIE profile



3.2 DUNDEE

With a staggering 129 per cent increase in digital turnover observed in the last several years, Dundee's globally renowned game design and broader digital tech cluster is the third fastest growing in the UK.²³ Dundee, a UNESCO City of Design, also belongs to an exclusive club of UK cities that produce a disproportionate number of computer science graduates and its overall population is one of the most highly-skilled in the UK, ranking in tenth place.²⁴ Going forward, a key challenge for Dundee (and most Scottish cities) will be ensuring this talent pool remains in place and continues to attract other talent to the region.

Performance against the CITIE framework

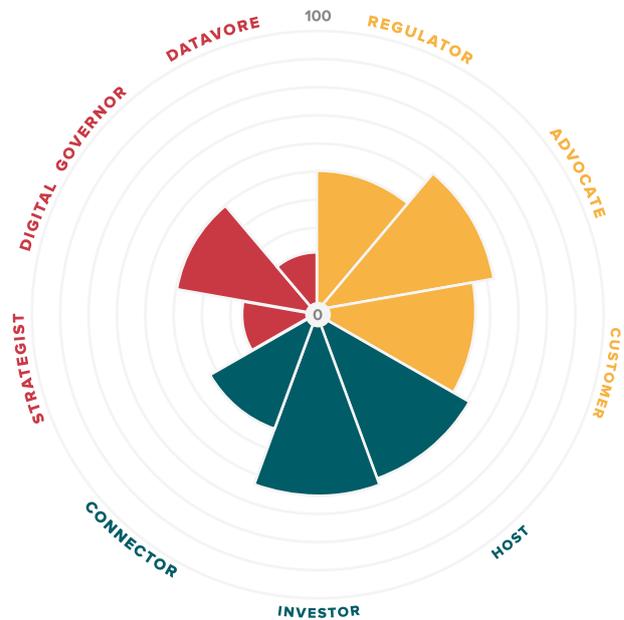
A strong digital tech community and expanding innovation infrastructure are cornerstones of the Dundee's entrepreneurial ecosystem.

In Dundee, aspiring entrepreneurs and growth-oriented SMEs benefit from local business support designed to help them achieve their ambitions. In addition to offering SMEs loan financing through the East Scotland Investment Fund (which Dundee contributes to, along with nine other councils), the city also delivers two grant programmes. The first, Dundee Development Grant, offers entrepreneurs and start-ups up to £2,500 to kick-start their business. The second, the Overseas Market Development Grant (OMDG) helps cover the cost of travel for SMEs looking to test and expand into new markets.

Launched 20 years ago, the OMDG is increasingly being accessed by local technology firms. Given that, on average, a digital tech firm in Dundee has 11 per cent of its customers based in the rapidly expanding Asian market,²⁵ the OMDG makes for a crucial resource for local SMEs looking to take their first steps in the global marketplace.

Digital Dundee is another key asset for the city's start-ups and SMEs. Formed to support local SMEs increase their competitiveness and productivity through greater digitisation, Digital Dundee also serves as a networking organisation and a Digital Observatory for emerging opportunities, innovative business processes, and new technologies. Meanwhile, the city's waterfront is undergoing significant transformation with the refurbishment of a former industrial site, which has recently seen the completion of District 10, a hub dedicated to

Figure 12: Dundee's CITIE profile



early-stage creative companies, as well as the Vision Building, which will provide business incubation services. The new Centre for Entrepreneurship at the University of Dundee, which includes an accelerator programme, will also provide more physical space for innovation growth to complement relationship-based assets like Digital Dundee.

Furthermore, the city is investing in the next generation of digital leaders and nurturing a culture of entrepreneurship through the Dare School Team Challenge, jointly delivered by Abertay University – the first university in the world to offer a computer game design degree – and the city council over the past eight years. Inspired by a similar university-level competition, the programme challenges secondary school students to develop the best 2D web-based single player game in one week. Leading local businesses, like 4J studios, step in with training and other motivational support. More recently, since 2015, the city has begun hosting an annual Games Jam for primary students, which encourages children from schools across the city to create and design their own game using Scratch.

Finally, while Dundee has already demonstrated commitment to open data through the Dundee Geoportals website, the council is also working with other Scottish cities to on a combined open data platform that will improve accessibility and quality of current and future datasets that will raise the city's performance as Datavore.

Priority focus areas	
<p> CUSTOMER</p> <p>Engage start-ups and SMEs in local problem solving. Through a challenge prize or hackathon series, Dundee can tap into the skills and expertise of its vibrant tech sector to address local issues, while also providing start-ups with a platform and market for their new products.</p> <p>International best practice Barcelona's BCN Open Challenge set out six challenges for businesses and entrepreneurs to provide solutions that will transform public spaces and services.</p> <p>The city government sought to procure innovative solutions, support winning companies and validate projects. Winning solutions were provided with public service contracts and office space from which to run their operations.</p>	<p> STRATEGIST</p> <p>Like other Scottish cities in this analysis, Dundee is exploring its future as a smart city. However, Dundee lacks a current digital strategy or permanent senior leadership (i.e. a CIO or CDO) to take its ambitions forward. A strong plan and leadership will be necessary to realise transformative change.</p> <p>International best practice Via the Seoul Innovation Bureau, Seoul is promoting a Sharing City where citizens can use social media and an online platform to engage with the development of their public services. With a Chief Information Officer (CIO) in place since 1999, Seoul has taken the lead in establishing a sophisticated e-governance information system infrastructure.</p>

Figure 13: Barcelona CITIE profile

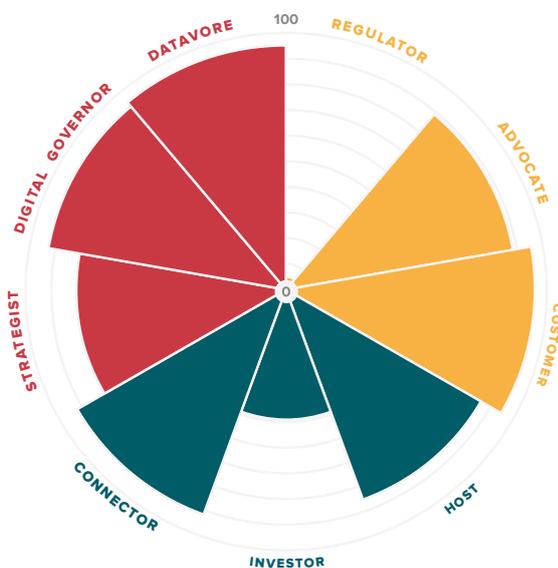
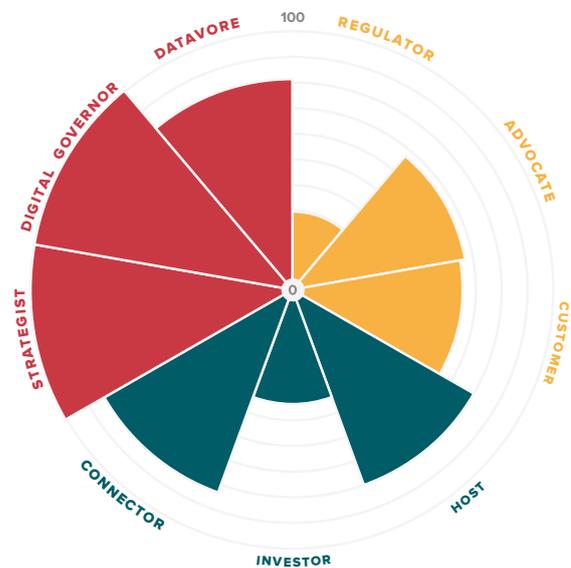


Figure 14: Seoul CITIE profile



3.3 EDINBURGH

Innovation is thriving in Edinburgh, Scotland's most patent-intensive city and among the top-ten in the UK overall, with a patent rate nearly double the national average.²⁶ Local firms cite Edinburgh's excellent business and education networks as key benefit of locating in the city, and are more likely than firms in other UK cities to access local business and technical support.²⁷ Thanks to higher salaries, relatively low cost of living, fast broadband and smart transport connections, the city also consistently ranks as one of the best places to live and do business in the UK.²⁸

Performance against the CITIE framework

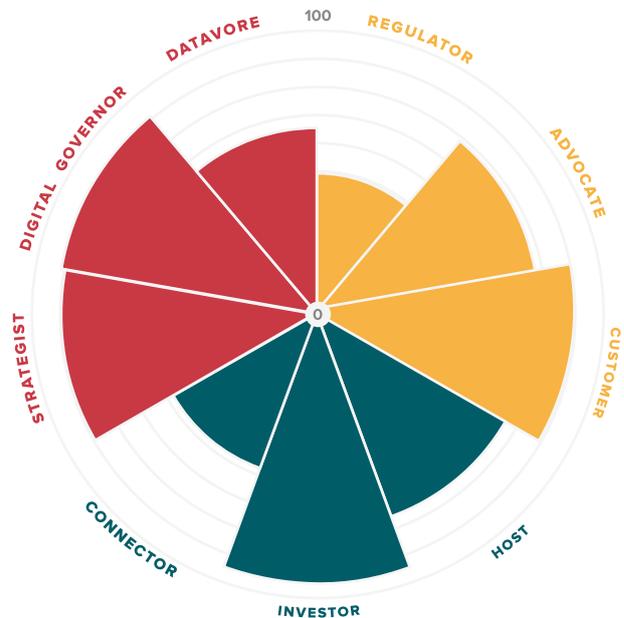
Edinburgh is an expert advocate for local start-ups and effectively leverages its community of innovators to make the city a better place for all.

Several leading practices contribute to Edinburgh's excellent performance as Advocate. The city promotes Edinburgh as an innovation capital through its annual international tech event, the Turing Festival. Earlier this year, the city also hosted the Design it Build it Conference, drawing the world's best UX designers and web developers to its doorstep.

These major events have been complemented recently by a smaller scale initiative to increase exposure of local start-ups to global markets, via the Edinburgh-Shenzhen Incubator. The initiative offers an opportunity for Edinburgh-based businesses to develop and grow in a physical incubator space in Shenzhen (Chinese companies are given the same opportunity in Edinburgh), allowing them to design products for new markets. Furthermore, the city's StartEDIN Tech Collective, a non-profit organisation supported by the council and local firms like SkyScanner, lends a cohesive brand to local start-ups and entrepreneurs. The membership-led organisation is designed to raise awareness of Edinburgh's tech cluster and attract more talent and resources to the city.

Thanks to good business support provided by the city and skills investments, Edinburgh also performs very well in the Investor role. In particular, the city's commitment to use its new ICT contract with CGI to create 60 tech apprenticeships demonstrates the

Figure 15: Edinburgh's CITIE profile



unique opportunity cities have to shape local labour markets when negotiating major purchases.

Furthermore, through its abundant incubator spaces and a network programme to coordinate them all, Edinburgh proves a strong Host for start-ups and entrepreneurs. The city already supports six of Edinburgh's 15 incubation schemes with funding and/or provision of space, but noting a lack of a strategic link between them, designed InterSpace to maximise coordination and impact. So far the networking approach has been shown to improve enterprise formation and growth rates in the city, via simplified access to enhanced incubation services, including equity finance.

Lastly, the city has increasingly opened itself to co-design with citizens, business and academia through programmes such as Edinburgh Apps and the Living Lab. Both initiatives capitalise on local talent and use data-driven analysis to develop games, apps, communication platforms, and other digital products that make the region more vibrant and sustainable. Along with the city's participatory Budget Challenge process – which invited the public to comment on, put forward, and prioritize key issues using a simple web platform – Edinburgh emerges as the strongest Digital Governor in the CITIE Scotland analysis.

Priority focus areas	
 <h3>REGULATOR</h3> <p>Follow the lead of innovator cities and update short-term let regulations to collect tourist taxes. Paris, San Francisco, and Amsterdam have successfully engaged with sharing economy giant Airbnb to developed new rules that allow it and similar businesses to operate while maintaining a more even playing field with traditional hospitality organisations and generating a new revenue stream for the city.</p> <p>International best practice</p> <p>In 2014, Seattle approved updated regulations to allow Uber, Lyft and other smartphone app-based transport services to operate legally. The result of more than a year’s debate between the city, taxi companies and ride-share services, the regulation allows a new industry to thrive while maintaining high levels of public safety.</p>	 <h3>CONNECTOR</h3> <p>Future proof local digital connectivity with a city-wide gigabit Wi-Fi network. An ultrafast gigabit Wi-Fi network would support Edinburgh’s brand as a global digital hub, drive more investment, and deliver benefits for leading tech companies and ordinary citizens alike.</p> <p>International best practice</p> <p>New York is one of the first cities in the world to introduce a network of free gigabit Wi-Fi hubs, LinkNYC. The network is already available across 500 access points, or ‘Links’, with plans for a total of 7,000 Links across New York’s five boroughs within the next four years.²⁹</p>

Figure 16: Seattle CITIE profile

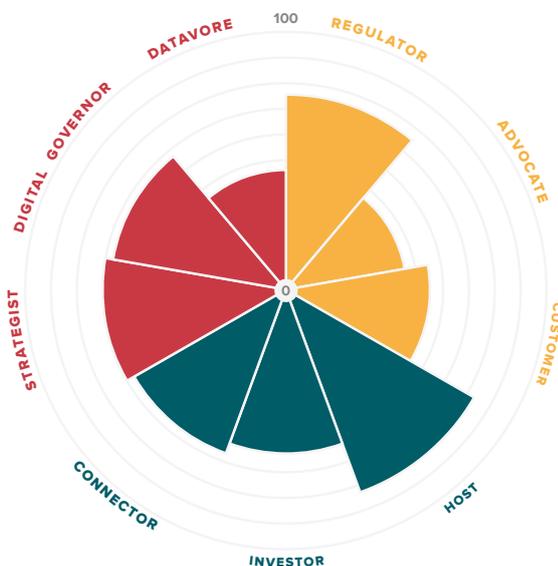
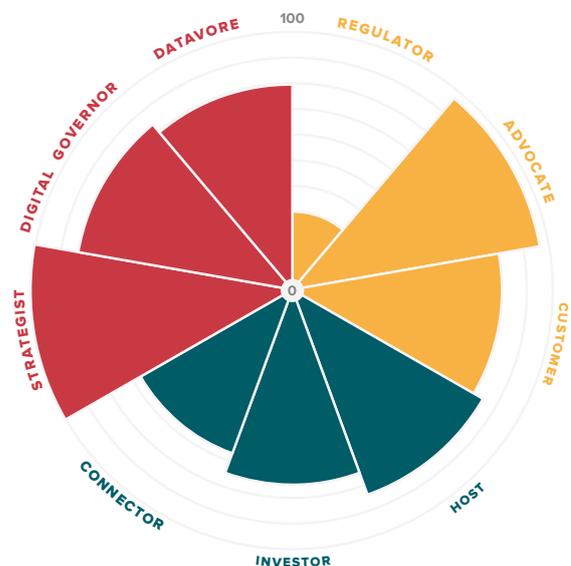


Figure 17: New York CITIE profile



3.4 GLASGOW

Scotland's biggest city is also increasingly its smartest. With an ambition to become a 'city of science' where all benefit from science and technology³⁰ and the help of a £24 million Future City grant, Glasgow has invested in advanced technologies and innovative partnerships that are making the city more intelligent, sustainable and safer. The next few years will be a pivotal period for the city as it seeks to sustain and scale its demonstrator projects and pass on learnings to other cities.

Performance against the CITIE framework

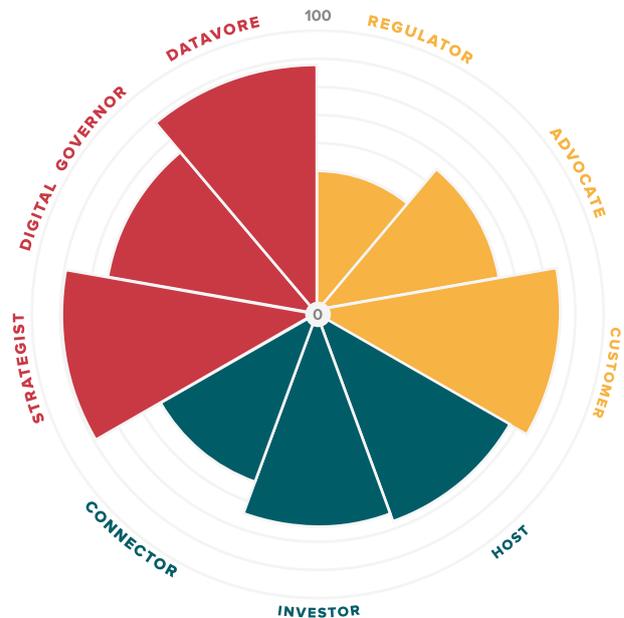
Glasgow's is quickly developing analytics capability and becoming a leading city of the future.

Glasgow's strong performance in the Leadership dimension, the best in the CITIE Scotland analysis and in line with leading cities in the global CITIE analysis, owes much to the city's Future City programme.

Through several demonstrator projects, including intelligent street lighting, household sensors for energy conservation, and a demand-driven system of social transport, the city is becoming smarter. These and other projects are backed by new data analytics infrastructure, including the Glasgow Operations Centre, an integrated traffic and public safety management system, and the City Observatory, an analytics centre located inside the new Technology and Innovation Centre (TIC). Plans for the City Observatory also include a 'living labs' component that will test and provide real-time feedback on new approaches to challenges across different cities.³¹ Together, these demonstrators and intelligence management systems have significantly augmented Glasgow analytics ability and capacity as a smart city in a relatively short time.

The city's analytics capacity is further supported by an advanced open data platform, which hosts nearly 400 datasets from 60 public and private organisations and provides the latest user and developer tools including APIs and Big Data analytics technology. An automated publishing function makes it easier for participating organisations to continuously feed into a growing data catalogue – an open-source product the city hopes will facilitate learning and development among cities.³²

Figure 18: Glasgow's CITIE profile



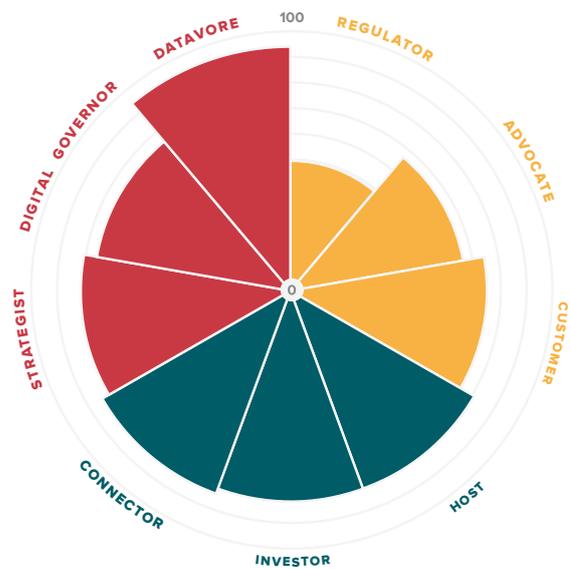
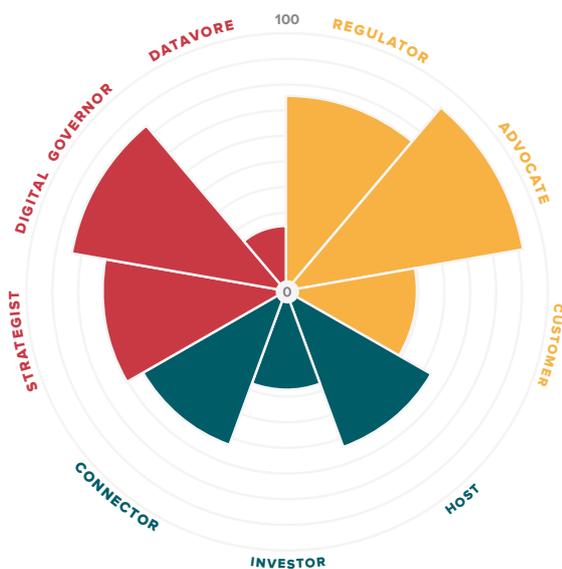
While Future City funding has clearly made it far more feasible for Glasgow to build its new assets and capabilities, the leadership required to manage and implement projects of such scale and complexity within a two-year time frame should not be overlooked. As previous CITIE analysis has made clear, well thought-out strategies, dedicated teams, and leaders with the right skills and powers are needed to push through transformative change, as they have in Glasgow.

Furthermore, the city also performs consistently well across the Infrastructure dimension. Programmes such as Glasgow Digital Apprentices and Digital Exporters, which connect young people with IT skills training and experience-building opportunities with SMEs, contribute to its above average Investor score. Equally, the city's partnership with Rookie Oven, a local co-working space, on a start-up academy for 16-18 year olds, as well as its Future Makers series on programming and gaming design for 5-17 year olds, demonstrate Glasgow's recognition of the important role entrepreneurship and tech skills play in the city's future. An emerging innovation district anchored by the University of Strathclyde's TIC (home to the City Observatory), and comprehensive access to free Wi-Fi across the city centre round-out good performance in the Connector and Host roles.

Priority focus areas	
<p> ADVOCATE</p> <p>Glasgow City Council should use its increased national prominence following the Future City Demonstrator programme, to support its SMEs to engage with international market opportunities and build export potential, taking SMEs with it on trade missions, exchange visits and to conferences such as the Barcelona Smart Cities Expo.</p> <p>International best practice Dubai's Department of Economic Development has a dedicated team focusing on SMEs, providing consultations and various incubator programmes. The Dubai SME100 ranking actively promotes Dubai as an innovation hub.</p>	<p> CONNECTOR</p> <p>Leverage the city's new capabilities and assets, including the Glasgow Operations Centre, learnings from demonstrator projects, and experience from the city's smart card system for subways, to develop a truly integrated public transport strategy for Glasgow.</p> <p>International best practice Helsinki is getting closer to a fully integrated public and private transport 'one click' solution. By offering citizens a 'mobility as a service' solution, the city is enabling users to purchase mobility packages, whether by bus, taxi, ferry or bike, or a combination of these, at a cheaper price with greater flexibility.</p>

Figure 19: Dubai CITIE profile

Figure 20: Helsinki CITIE profile



3.5 INVERNESS

At just over 56,000 residents, Inverness is the smallest city assessed by the CITIE framework globally. Thanks to many crucial investments and programmes led by Highland and Islands Enterprise, headquartered in Inverness, the city punches much above its weight and local entrepreneurs enjoy a supportive start-up environment. With more investments in science and technology research funding, transportation infrastructure, and faster broadband connection slated through the £315 million City Region Deal, Inverness is on the cusp of major change.

Performance against the CITIE framework

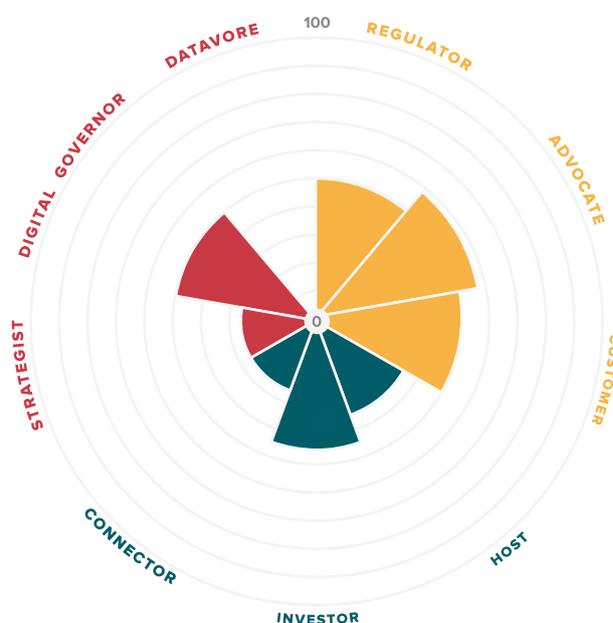
Inverness is building an ambitious innovation district for the Highlands and bridging connections between local entrepreneurs and global tech giants.

Opened in 2015, the Inverness Campus is materialising into a focal point for innovation for the Highlands. The Campus, a centre for research, enterprise, and education, specialises in life sciences and digital and rural healthcare and includes business incubator and accelerator facilities, as well as a collaborative space for SME tenants. Fibre broadband ensures superfast connectivity, while a network of new roads and cycling paths enable physical connectivity across campus and the adjoining region. At the new UHI STEM Hub, children will engage with STEM subjects at an early age and learn to act as research teams to solve real-world problems. The Campus is also an inviting public space, providing more than 30 acres of new parkland and plans for sporting facilities and performance spaces.

While the overall lack of co-working and incubation spaces in Inverness make for a lower to average Host score, many of the initiatives being launched and currently under development at Inverness Campus promise to strengthen the city's performance in this role in the near future.

Indeed, the city's good performance as an Advocate for the region and its entrepreneurial community demonstrate Inverness's drive to distinguish itself as centre of innovation and enterprise. Much of the work is being led by the Highlands and Islands Enterprise (HIE), the regional economic and community

Figure 21: Inverness's CITIE profile



development organisations also responsible for leading the Inverness Campus project. Notably, HIE's #hellodigital initiative and demonstrator space aims to raise the profile of the region as a digital hub and increase the use of digital technologies by local business. As part of the programme, HIE has lined up an impressive list of partner organisations, including Google and IBM, to provide training on topics ranging from predictive analytics to video-making.

An evident focus on entrepreneurship within HIE further contributes to Inverness's good Advocate score. HIE's Ambitious Entrepreneurship programme delivers a series of entrepreneurial masterclasses on strategy, investment, branding, and export, as well as other practical advice and supports. Leveraging an existing partnership with MIT, HIE also funds successful regional candidates attending the week-long Entrepreneur Development Programme at MIT in Boston.

Lastly, while Inverness remains relatively weak in the Connector role, its impending City Deal promises to bring free Wi-Fi to council-owned business.³³ As a physical connector, the city is also demonstrating a willingness to experiment with non-traditional models of transportation, including a unique electronic bike-sharing pilot and a car sharing service operated by the local transit authority.³⁴

Priority focus areas	
 <h3>STRATEGIST</h3> <p>Inverness needs stronger leadership and well-resourced teams to drive its portfolio of digital innovation projects. For the council’s Digital First programme, which aims to increase access to online services, the city plans to appoint six ‘Digital Champions’ responsible for promoting the initiative.³⁵ These individuals could be given a broader remit and responsibility to ensure upcoming open data, smart city, and digital infrastructure projects are aligned and deliver maximum benefits.</p> <p>International best practice Chicago’s Innovation Delivery Team is one of five city teams funded by Bloomberg Philanthropies, working on initiatives to improve city services. In 2011, Chicago appointed a chief technology officer, and The City of Chicago Technology Plan sets out an inspiring vision of change for the city.</p>	 <h3>HOST</h3> <p>Create a regional innovation network across the Highlands based on the Metro of Makers concept pioneered by Cardiff City Region (CCR). CCR is leveraging its new Metro system to create a network of digital maker spaces and creative hubs in new station developments. Inverness should consider how infrastructure funding received through its new City Deal could be maximised to create more spaces for innovation.</p> <p>International best practice Buenos Aires has been active in revitalising areas of the city into innovation districts with different themes – the first being technology. This initiative will transform local neighbourhoods, with tax incentives for locating there.</p>

Figure 22: Chicago CITIE profile

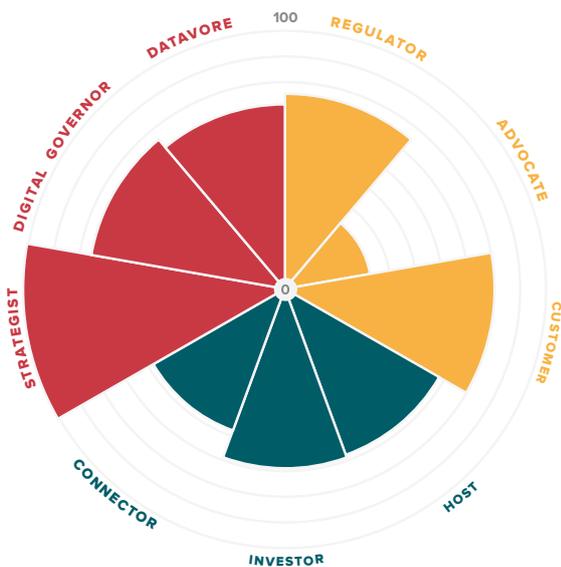
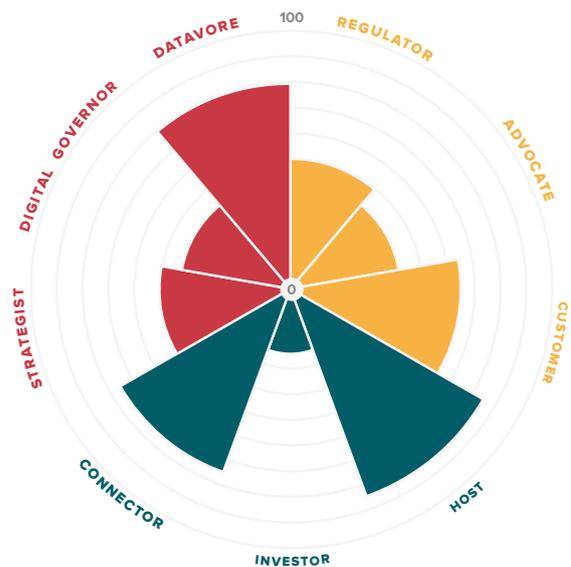


Figure 23: Buenos Aires CITIE profile



3.6 PERTH

Over the next 20 years, Perth will become one of Scotland's fastest growing cities, expanding its population by 25 per cent.³⁶ As the city prepares to take on new challenges and opportunities from this growth, the city council has laid out a multi-faceted strategy – a series of 'big moves' – that includes bespoke SME support, a focus on developing high-growth companies, clustering innovative activity, and revitalising public spaces. It's also bidding to be the European City of Culture in 2021. When fully realised, the projects have the potential to support an enduring and vibrant innovation ecosystem.

Performance against the CITIE framework

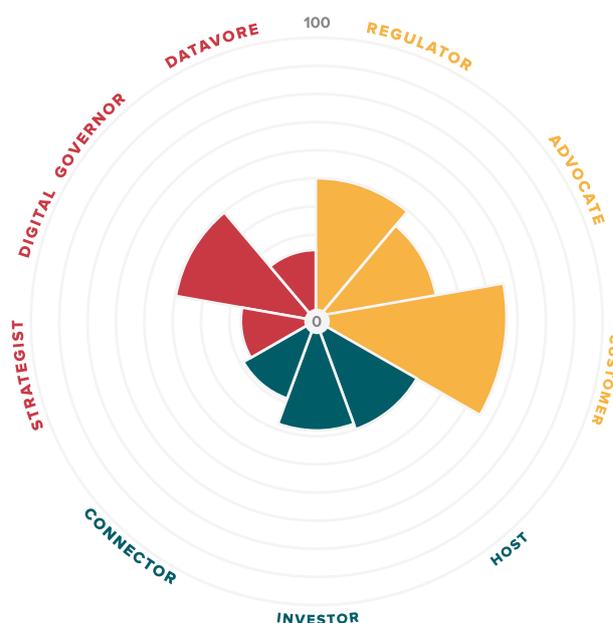
Perth is laying down the foundations of a smarter and more entrepreneurial city.

In 2011, Perth became a university city through a partnership between Perth College and the University of the Highlands and Islands (UHI). The new status has positioned Perth to better train and retain a skilled workforce, a key driver of economic growth. Today, Perth has set its sights on becoming a 'city of knowledge and learning', with UHI as its anchor.³⁷ This includes, as described in the city's five-year 'big moves' strategy, (Perth City Plan: Smart Growth for Perth City 2015-2035), a proposal to develop a former primary school as the Business Innovation and Creative Industries Hub, which will host entrepreneurs in a collaborative co-working space. In the coming years, these developments will boost Perth's performance as Host to the entrepreneurial community.

In the meantime, a key factor in Perth's current performance as Host is the city's Angel's Share programme. A unique matchmaking scheme to connect local entrepreneurs and investors run by the Perth's Business Investment Team, Angel's Share has attracted over £1 million of investment in new businesses since its launch in 2012.³⁸

Businesses and residents in Perth also enjoy some of the best digital connectivity rates in the country, with 89 per cent of premises having access to ultrafast broadband (80 mbps) and nearly total access to superfast connections (24 mbps or more).³⁹

Figure 24: Perth's CITIE profile



Like other cities in this analysis, national programmes and initiatives, including the Supplier Development Programme and new lower pre-qualification criteria, contribute to Perth's higher score in the Customer role. However, with stated commitments to SMEs, including a signing of a concordat between council and SMEs to work more closely together, and planned challenge prizes and hackathons on the visitor economy, Perth is demonstrating its willingness to work with start-ups and SMEs to encourage new ideas and creative problem solving in the city.

Other ambitious plans to radically transform Perth's innovation ecosystem and analytics capability are also underway as part of its Smart Perth strategy. Currently in development with an expected launch in late 2016, the strategy will put forward projects including the aforementioned Business Innovation and Creative Industries Hub, an open data platform, city-wide wireless, and intelligent street lighting.⁴⁰ Furthermore, the city has recently appointed an Open Data Coordinator to help deliver on its forthcoming open data strategy.

In time, this collection of projects has the potential to significantly raise Perth's performance in the Leadership dimension and bring many positive benefits to the city.

Priority focus areas	
<p> DATAVORE</p> <p>To generate more open data that will underpin the city’s new smart strategy, Perth should prioritise making all new city contracts ‘Open by Default’. Going forward, the city should also develop a set of city-wide principles that will allow data generated in the region to be easily compared and analysed.</p> <p>International best practice</p> <p>Leeds (West Yorkshire) city council has developed open design principles, which promote common standards and open APIs generated by anyone in the region. These principles are helping to improve interoperability and position the city as an open platform, where many components and players can be easily engaged in problem solving.</p>	<p> ADVOCATE</p> <p>Attract interest in the city’s burgeoning start-up scene by organising a signature tech event that showcases local innovators and promotes the city as an emerging digital hub. A branding strategy (potentially an extension of the Smart Perth brand) that highlights the city’s innovative side would also help to champion local talent and encourage more investment in the city.</p> <p>International best practice</p> <p>Innovate Los Angeles (in LA) is a not-for-profit organisation set up to promote and accelerate the innovation economy and spur job creation. Comprised of tech and venture capital leaders, entrepreneurs and universities, Innovate Los Angeles promotes the county as a global innovation and entrepreneurial hub, with Los Angeles Innovation Week celebrating the burgeoning sector.</p>

Figure 25: Leeds CITIE profile

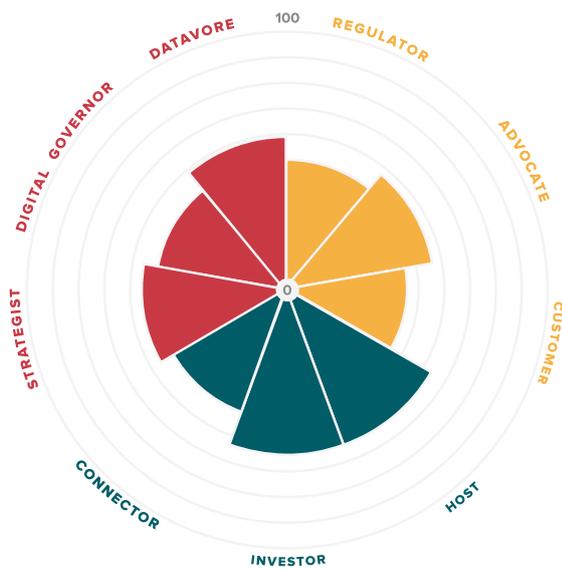
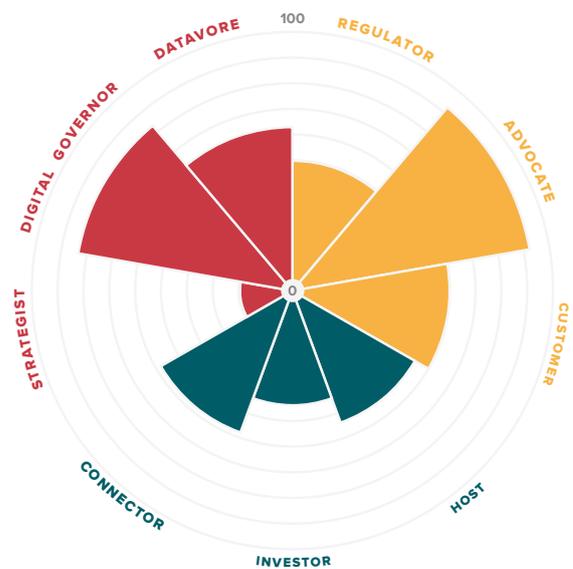


Figure 26: Los Angeles CITIE profile



3.7 STIRLING

Compared to the Scottish average, the odds of successfully launching a business are higher in Stirling. The Stirling council area with a population of only 92,830 was recently named the best Scottish city in which to start a business, based on criteria such as broadband service, energy costs, and quality of life.⁴¹ With an already strong business support environment and a plan for the city that will see the construction of a new digital hub and cultural quarter for the arts and creative industries, Stirling is ensuring the future of entrepreneurship and innovation in the city remains bright.

Performance against the CITIE framework

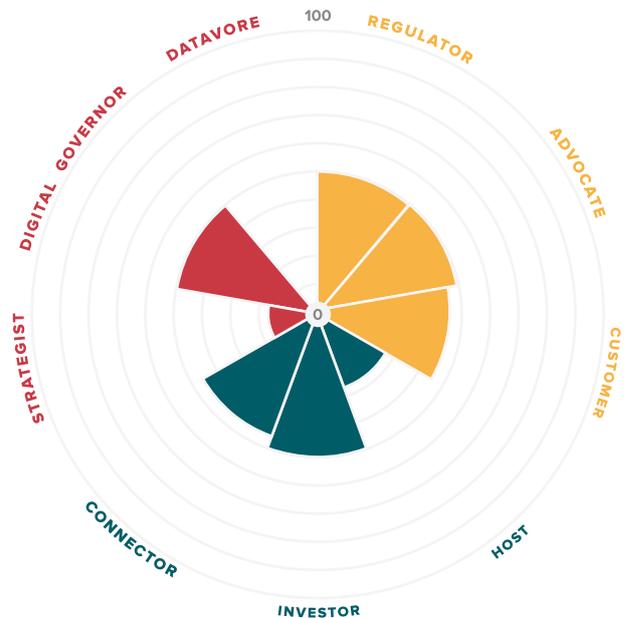
Stirling is growing an already supportive SME environment and is taking steps to position the city for the future.

Entrepreneurs and start-ups have a greater chance of succeeding in Stirling, which boasts higher business survival rates than the UK average.⁴² Business density, the number of businesses relative to the population, is also higher in Stirling than the Scottish average.⁴³ The CITIE analysis bears this out to some degree, with Stirling achieving its highest scores in the Advocate and Investor roles, both of which assess the portfolio of support and services for start-ups and SMEs.

The Stirling Enterprise Park, or STEP, is an especially valuable asset to the local business community, offering a single-door approach to a variety of supports and resources. Along with access to free start-up workshops, one-to-one expert advice and other programmes, STEP also features a Technology Centre where businesses can engage with advanced production and prototyping tools including 3D printers and scanners and hands-free 3D motion tracking. The Technology Centre is fibre enabled, delivering a superfast download speed of 60mbps. Given Stirling's rural and dispersed population, the Technology Centre also operates a mobile unit that brings its state-of-the-art tools and methods to SMEs outside the city centre.

Stirling also scores solidly as Investor, on account of its Stirling Business Investment Fund. The fund, which

Figure 27: Stirling's CITIE profile



only serves local SMEs, provides flexible business loans of up to £25,000 and offers a crucial source of financing in a small market. However, though Stirling remains a great place to start a business in terms of relative ease of setting up, low cost of living, and good business support, the city still struggles with lower rates of business formation.⁴⁴ One challenge is the lack of incubation, accelerator, and co-working spaces.

In response, Stirling is embarking on a major programme of investment to build the necessary infrastructure to catalyse more entrepreneurship and innovation. Notably, the city has allocated significant funds for its plans to (among other projects) build a grow-on incubation space and the Digital Hub, a collaborative space for businesses and students. A conference centre dedicated to digital technology and innovation events has also been identified as a signature development. These new investments will be complemented by an emerging local capacity in data analytics, with the University of Stirling's new MSc in Big Data in partnership with Data Lab.

Furthermore, before the end of 2016, the city plans to release its first open data strategy, which will increase its capacity (and performance as Datavore) to work with residents and entrepreneurs to improve local services and promote innovation more broadly.

Priority focus areas	
<p> DATAVORE</p> <p>Stirling is in the early stages of developing an open data strategy and platform, but the council can already begin experimentation and learning to inform its strategy by opening some rich and readily available datasets, such as procurement spending.</p> <p>International best practice</p> <p>Siemens and partners are creating a living lab in Vienna that will test designs and systems for intelligent cities of the future. By opening up the Aspern district as a testbed, new solutions are being developed in intelligent traffic solutions, green buildings, water management and smart grid infrastructure.</p>	<p> ADVOCATE</p> <p>Public Wi-Fi is only available in Stirling’s libraries. The city also has one of the slowest broadband speeds in the CITIE Scotland analysis. Greater access to free, faster Wi-Fi in the city would contribute to more productivity and help tackle issues around digital exclusion for lower income households.</p> <p>International best practice</p> <p>Tallinn has been offering free public Wi-Fi to its visitors and citizens since 2005, as Wi-Fi is seen as a service that directly benefits the city. Estonia was one of the first countries to establish access to the internet as a human right. It has also been offering free public transport since 2013, the first capital in Europe to do so</p>

Figure 28: Vienna CITIE profile

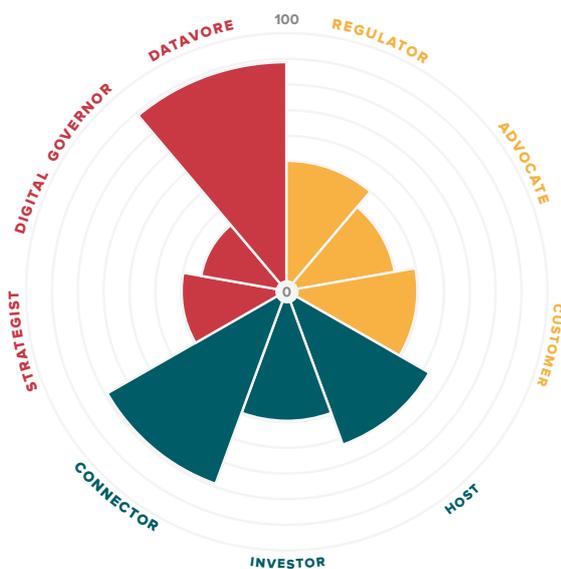
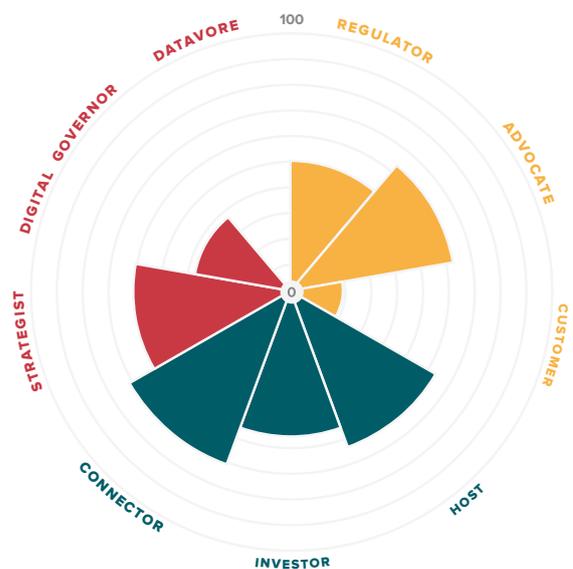


Figure 29: Tallinn CITIE profile



APPENDIX 1

The **CITIE** framework

The CITIE framework provides a resource for city policymakers who want to develop policy to support innovation and entrepreneurship.

It was developed by combining extensive consultation with city government leaders, policy experts, venture capitalists and entrepreneurs with detailed research into the state of the art in policy from cities around the world.

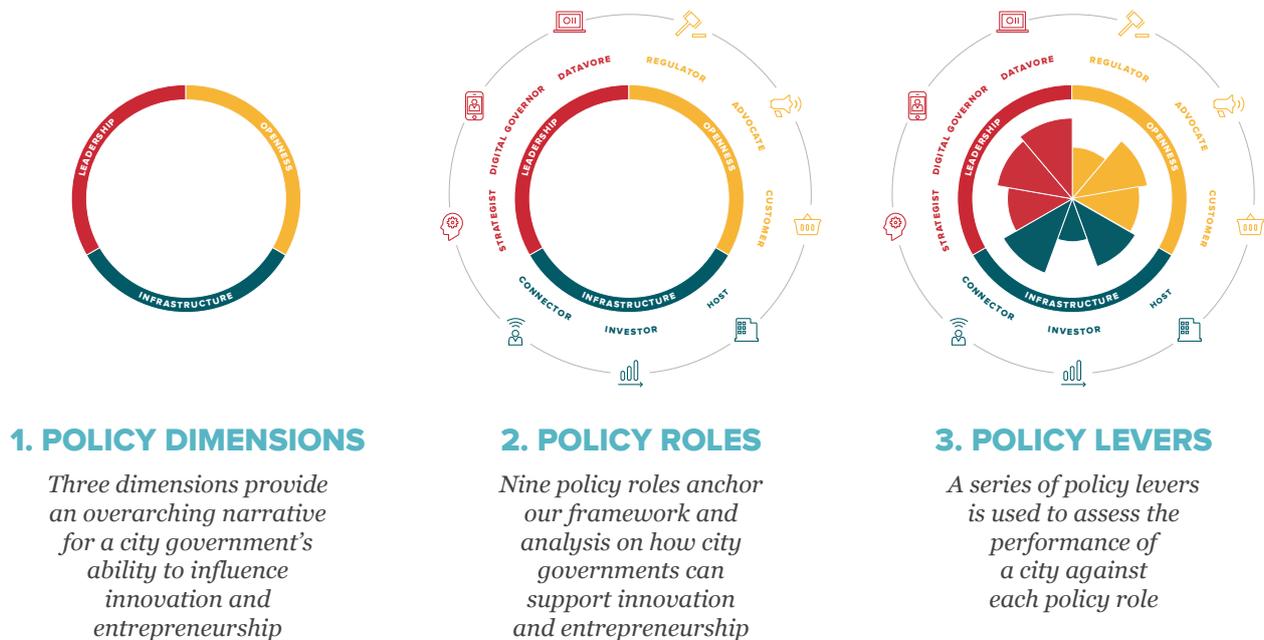
It comprises nine roles that cities need to perform well if they want to provide the optimal conditions for innovation and entrepreneurship. These roles are set out in Figure 2.

We tested how well over 50 leading city governments perform each of these roles by measuring a series of policy levers. These levers were chosen to represent best practice from around the world. In many cases, they are measures that can be quick to implement, allowing policymakers opportunities for prompt action.

Taken collectively, these three levels of analysis comprise the CITIE framework. Figure 30 shows how they build on top of each other.

We assessed how well the seven Scottish cities played each of these nine roles by measuring across the range of policy levers, allowing us to compare their performances to our dataset of over 50 cities that were analysed between 2015-16.

Figure 30: Constructing the CITIE framework



APPENDIX 2

Summary of the policy levers we looked for in city governments

We looked for city governments who:

REGULATOR	1. Enforce existing regulations proportionately	2. Review and update regulations to take account of new business models	3. Engage the full spectrum of stakeholders to craft balanced regulation		
ADVOCATE	1. Ensure a new business focus within the trade and investment function	2. Provide set-up support for new businesses	3. Promotion of the city as a hub of business creation	4. Sponsor events relevant to high-growth sectors	5. Helping early-stage ventures access global networks
CUSTOMER	1. Ensure the visibility of procurement opportunities through a single portal	2. Ensure that pre-qualifying requirements are achievable by new businesses	3. Define targets for spend on new businesses	4. Use problem-based procurement methods	5. Use open innovation methods to engage the ecosystem
HOST	1. Support access to co-working spaces	2. Support incubator and accelerator schemes	3. Enable access to affordable and flexible office space	4. Nurture Innovation Districts	5. Play the role of matchmaker within the ecosystem
INVESTOR	1. Support provision of coding and technical skills	2. Support schemes that help young people access the tech sector	3. Help businesses understand types of financing options	4. Provide funding	
CONNECTOR	1. Support access to high-speed internet	2. Provide free, public Wi-Fi	3. Ensure the high quality and extent of cycling infrastructures	4. Ensure frictionless and integrated public transport	
STRATEGIST	1. Publish a vision of how to support innovation and entrepreneurship	2. Have a public set of KPIs that measure the success of the city's vision	3. Have an innovation function within the city hall	4. Have senior leadership with responsibility for innovation and entrepreneurship	
DIGITAL GOVERNOR	1. Ensure 'digital by default' city services	2. Enable citizens to report city problems on the go	3. Enable citizens to engage in policy decision-making		
DATAVORE	1. Use data analytics to optimise city services	2. Publish open data	3. Publish live data with appropriate APIs		

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ENDNOTES

1. In public sector investment, Edinburgh - £1 billion, Aberdeen £250 million, Inverness £315 million.
2. In public sector investment, Edinburgh - £1 billion, Aberdeen £250 million, Inverness £315 million.
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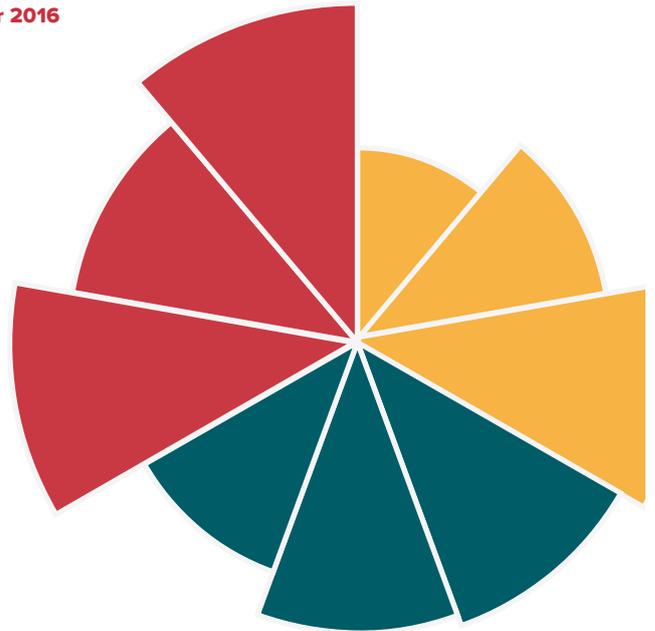
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*The Scotland
Analysis*

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